United States
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Forest
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September
2013

Buttercup Ski Lift Replacement

Environmental Assessment

Hood River Ranger District
Mt. Hood National Forest

Hood River County, Oregon

Existing Buttercup Ski Lift, 2013

United States Department of Agriculture

Forest Service

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Environmental Assessment

Hood River Ranger District
Mt. Hood National Forest

Mt. Hood/Parkdale, Oregon

Legal Description: T2S, R9E, Section 3, Willamette Meridian

Lead Agency:	US Forest Service
Responsible Official:	Janeen Tervo District Ranger Hood River Ranger District
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SUMMARY

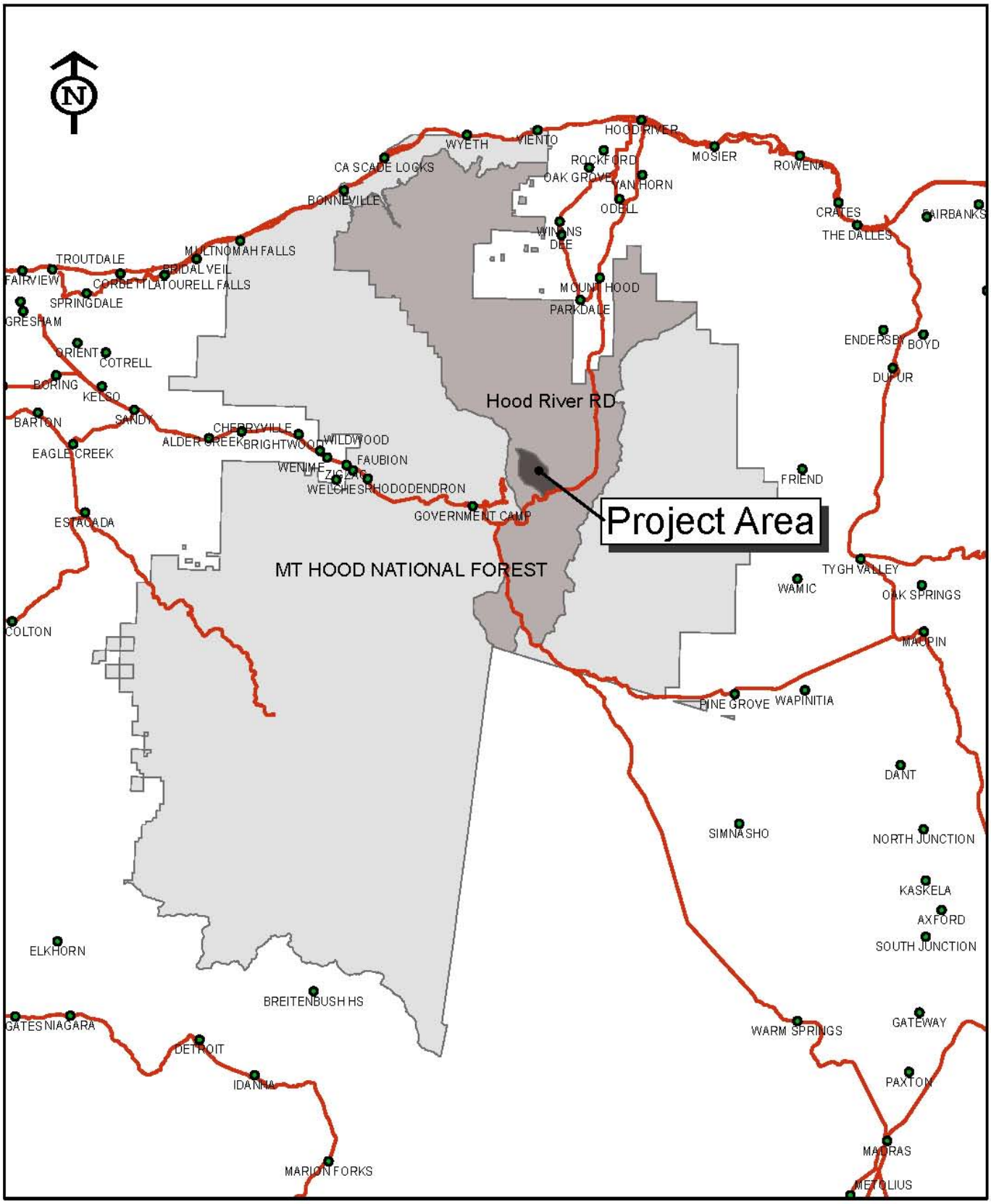
In January 1997, the Forest Service issued the Record of Decision (ROD) for the Mt. Hood Meadows Ski Area Master Plan Final Environmental Impact Statement (Master Plan), including Forest Plan Amendment No. 10. The ROD and Master Plan define the desired future condition for an expanded permit area, which includes improving the balance of skiing terrain through new chair and surface lifts as well as improving the quality of the recreational experience through upgraded facilities (ROD p. 8). In September 2011, Mt. Hood Meadows Ski Resort (MHM) requested the Forest Service consider a proposal to upgrade and relocate the Buttercup Ski Lift to a fixed grip quad lift.

An analysis of the Mt. Hood Meadows Ski Resort (MHM) terrain has identified a need for additional beginner/novice terrain. MHM has recently upgraded the quality of the beginner experience by replacing rope tows with conveyors, but there is an overall shortage of beginner/novice terrain. Also, the existing top terminal is located in a high traffic area. The lift and associated unload area concentrate traffic creating congestion which increases the risk of skier collisions. As such, the overall purpose of this project is to expand beginner/novice terrain and to improve traffic flow at the Buttercup Ski Lift.

The Proposed Action (Alternative 2) is to install a fixed grip ski lift with a loading conveyor, to change the alignment and extend the ski lift and to add new terminal sites for the Buttercup Ski Lift. Constructing the new top terminal site would require constructing a 310-foot gravel road. This road would remain on-site post-implementation in order to serve as an access road and maintain the lift equipment at the top terminal. In addition to the construction activities associated with the lift replacement, the bottom terminal would include a water-tight vault in order to operate the loading conveyor. In total, about 1.34 acres would be disturbed.

A connected action for this project includes the construction of approximately 730 feet of a new power and communication line that would be buried from the bottom of the Vista Ski Lift to the top of the new proposed Buttercup terminal. This utility line would run under an existing road and the short road proposed in this project. Another utility line would be buried under an existing roadway from the MHM's mountain shop to the bottom of the new proposed Buttercup terminal. Trenching the utility lines would occur during the dry season. Vegetation and topsoil would be carefully removed and replaced after filling the trench back in.

The Forest Service developed three alternatives based on public comments and environmental analysis: No Action (Alternative 1), Proposed Action (Alternative 2), and one additional action alternative (Alternative 3). The No Action (Alternative 1) is defined as the current condition and was compared to the underlying need for action. Alternative 3 was developed based on public and agency issues and concerns. Alternative 3 would install a detachable quad lift, change the alignment and extend the ski lift, and add new terminal sites for the Buttercup Ski Lift. The primary difference between Alternatives 2 and 3 is the type of lifts to be installed and the resulting changes in the required construction activities. All alternatives are located within the MHM permit area. The legal land description is T2S, R9E, Section 3, Willamette Meridian (See Figure 1: Vicinity Map).



Mt Hood Meadows Ski Resort

Vicinity

Miles

0 2.5 5 10 15 20

10/08/2010

Meadows GIS

1.0 PURPOSE OF AND NEED FOR ACTION

In January 1997, the Forest Service issued the Record of Decision (ROD) for the Mt. Hood Meadows Ski Area Master Plan Final Environmental Impact Statement (Master Plan), including Forest Plan Amendment No. 10. The ROD and Master Plan define the desired future condition for an expanded permit area, which includes improving the balance of skiing terrain through new chair and surface lifts as well as improving the quality of the recreational experience through upgraded facilities (ROD p. 8). In September 2011, Mt. Hood Meadows Ski Resort (MHM) requested the Forest Service consider a proposal to upgrade and relocate the Buttercup Ski Lift to a fixed grip quad lift. The approval for future development outlined in the ROD and Master Plan do not authorize specific facilities or uses or define the exact location of facilities, implementation requires additional site-specific environmental analysis pursuant to requirements in the National Environmental Policy Act (NEPA). Therefore, pursuant to the direction in the ROD and Master Plan, this environmental analysis will analyze the environmental consequences of the proposed chairlift changes at MHM.

1.1 Document Structure

This Environmental Assessment is written to fulfill the purposes and requirements of the National Environmental Policy Act (NEPA), as well as to meet policy and procedural requirements of the US Forest Service. The intent of NEPA, its implementing regulations, and Forest Service policy is to evaluate and disclose the direct, indirect, and cumulative environmental effects that would result from the proposed action and no action (baseline) alternatives on the quality of the human environment. The document is organized into four parts:

- *Purpose of and Need for Action:* This section includes information on the history of the project proposal, the purpose and need for action, and the agency's proposal for achieving that purpose and need. This section also details how the District Ranger informed the public of the proposal and how the public responded.

- *Alternatives, including the Proposed Action:* This section provides a more detailed description of the Proposed Action and action alternative as well as the No Action Alternative. This discussion also includes project design criteria and mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with selecting one of the action alternatives compared to the No Action alternative in terms of meeting objectives and addressing the issues.

- *Environmental Consequences:* This section describes the environmental effects of no action as well as the trade-offs and effects of implementing one of the action alternatives. This analysis is organized by resource area. Within each section, the existing environment is described first, followed by the estimated effects of no action that provides a baseline for evaluation, and finally the estimated effects of the action alternatives.

- *Consultation and Coordination:* This section provides agencies consulted during the development of the environmental assessment and a list of preparers.

Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at the Hood River Ranger District Office in Mt. Hood/Parkdale, Oregon.

1.2 Purpose and Need for Action

The Buttercup Ski Lift is a double fixed grip chairlift that was built in 1979. The current vertical rise of the Buttercup Ski Lift is 122 feet with the bottom located at 5,352 feet in elevation. The chairlift has 61 chairs that can accommodate two people at a time. The existing lift has a capacity for approximately 1,200 passengers per hour. The primary purpose of the lift is to provide beginner terrain for skiers and snowboarders. The majority of riders on the Buttercup Ski Lift are novice riders and for some it might even be their first time riding a chairlift.

An analysis of the Mt. Hood Meadows Ski Resort (MHM) terrain has identified a need for additional beginner/novice terrain. MHM has recently upgraded the quality of the beginner experience by replacing rope tows with conveyors, but there is an overall shortage of beginner/novice terrain. Also, the existing top terminal is located in a high traffic area. The lift and associated unload area concentrate traffic creating congestion which increases the risk of skier collisions. As such, the overall purpose of this project is to expand beginner/novice terrain and to improve traffic flow at the Buttercup Ski Lift.

In order to meet this overall purpose, the following needs have been identified:

- Expand the beginner/novice terrain by providing access to existing beginner terrain that is currently inaccessible via the existing lift; and,
- Provide skiers and snowboarders with a safer off-load location and improve the dispersion of skiers and snowboarders at the top of the lift by realigning the current Buttercup Ski Lift.

1.3 Management Direction

This environmental analysis process has been completed in accordance with direction contained in the National Forest Management Act, National Environmental Policy Act, Council on Environmental Quality regulations, Clean Water Act, Endangered Species Act and other applicable laws, policies and regulations. See Section 3.12, Other Required Disclosures for more information.

Mt. Hood Land and Resource Management Plan (Forest Plan)

This Environmental Assessment is tiered to the Final Environmental Impact Statement (FEIS) and 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. 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);

- Mt. Hood Meadows Ski Area Master Plan – Record of Decision for Mt. Hood Meadows Ski Area Master Plan Final Environmental Impact Statement, including Forest Plan Amendment No. 10 (US Forest Service 1997);

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

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

Mt. Hood Meadows Ski Area Master Plan

In January 1997, the Forest Service issued the ROD for Mt. Hood Meadows Ski Area Master Plan Final Environmental Impact Statement (hereafter referred to as the Master Plan), including Forest Plan Amendment No. 10. The Master Plan was based on the analysis contained in the Mt. Hood Meadows Ski Area Master Plan Final Environmental Impact Statement (December 1990) and the Final Supplemental EIS (June 1996). The Master Plan defines the desired future condition for an expanded permit area; provides general direction for future development at MHM; and establishes winter sports design capacity and summer use maximum capacities. The approval for future development does not authorize specific facilities or uses, define the exact location of facilities, nor stipulate a timeline for development. Rather, it conceptually approves the number and approximate locations of lifts, additional ski terrain, base area expansions, other winter facilities and uses, access and service roads, and summer uses. Implementation, including this project, requires additional site-specific environmental analysis pursuant to requirements in the NEPA. The site-specific environmental analysis may supersede the management direction provided in the Master Plan. This Environmental Assessment is the site-specific NEPA required by the Master Plan.

Specific management direction from the Master Plan for this project includes the following:

- Target expansion of skier services to existing base areas to minimize adverse environmental impacts (page 8);

- Improve the balance of skiing terrain through new chair and surface lifts and additional terrain (page 8); and,

- Improve the quality of recreational experience through expanded/upgraded facilities and access road improvements (page 8-9).

This document incorporates by reference the analysis and management direction contained in the Mt. Hood Meadows Ski Area Master Plan Final Environmental Impact Statement, Final

Supplemental EIS, and Record of Decision (1997).

Best Management Practices

Best Management Practices (BMPs) are defined as "methods, measures or practices selected by an agency to meet its nonpoint source control needs. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters" (EPA Water Quality Standards, Regulation, 40 CFR 130.2). Appendix H of the Forest Plan provides management direction on the BMP implementation process. Appendix H states: "The general BMP's described herein are action initiating mechanisms which are for the development of detailed, site-specific BMP prescriptions to protect beneficial uses and meet water quality objectives. They are developed as part of the NEPA process, with interdisciplinary involvement by a team of individuals that represent several areas of professional knowledge, learning and/or skill appropriate for the issues and concerns identified. BMP's also include such requirements as Forest Service Manual direction, contract provisions, environmental documents, and Forest Plan Standards and Guidelines. Inherent in prescribing project-level management requirements is recognition of specific water quality objectives which BMP's are designed to achieve." Appendix H of the Forest Plan continues on to describe the implementation process and format for project specific BMP requirements.

According to the Northwest Forest Plan, BMPs would be incorporated into the implementation of the project. BMPs 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); Mt. Hood National Forest Standards and Guidelines, Northwest Forest Plan Standards and Guidelines and The National Best Management Practices for Water Quality Management on National Forest System Lands - Volume 1: National Core BMP Technical Guide (April 2012) and professional judgment. The BMPs have been adjusted and refined to fit local conditions and then incorporated in the project design criteria/mitigation measures as described in Section 2.2.3 as well as the standard contract language for implementing these projects. According to the USFS National Core BMP Technical Guide (April 2012) "Site-specific BMP prescriptions are developed based on the proposed activity, water quality objectives, soils, topography, geology, vegetation, climate, and other site-specific factors and are designed to avoid, minimize, or mitigate potential adverse impacts to soil, water quality, and riparian resources. State BMPs, regional Forest Service guidance, land management plan standards and guidelines, monitoring results, and professional judgment are all used to develop site-specific BMP prescriptions."

Appendix A of this Environmental Assessment details the site-specific Best Management Practices for Water Quality for this project. The appendix includes all the required components of the site-specific BMPs as specified in Appendix H of the Forest Plan, including BMP title, objective, explanation, ability to implement, effectiveness, and monitoring. In addition, the site-specific BMP table provides a cross-walk with the PDC and planning process. The refined BMPs selected for this project have been found to be implementable and effective based on prior field observations and professional judgment, other pertinent research described in Chapter 3 of this document, and monitoring on the Mt. Hood National Forest. These BMPs are fully analyzed in Chapter 3 of this document (see Section 3.4, Water Quality).

Other Relevant Laws and Direction

National Environmental Policy Act
This DEIS has been prepared in accordance with regulations established under the National Environmental Policy Act of 1969.

Endangered Species Act
Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, requires federal agencies to review actions authorized, funded, or carried out by them, to ensure such actions do not jeopardize the continued existence of federally listed species, or result in the destruction or adverse modification of listed critical habitat. For this project, no consultation was required with any of the regulatory agencies for aquatic or wildlife species because there is not habitat present for any ESA-listed species.

Magnuson-Stevens Fishery Conservation and Management Act
The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996, requires federal action agencies to consult with the Secretary of Commerce (NMFS) regarding certain actions. Consultation is required for any action or Proposed Action authorized, funded, or undertaken by the agency that may adversely affect essential fish habitat (EFH) for species identified by the Federal Fishery Management Plans. For this project, there is no EFH present in the project area.

National Historic Preservation Act of 1966, Executive Order 11593, 36 CFR 800.9 (Protection of Historic Properties)
Section 106 requires documentation of a determination of whether each undertaking would affect historic properties. The Mt. Hood National Forest operates under a programmatic agreement between the Oregon State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation for consultation on project determination. The project area has been surveyed previously to current standards with no heritage resources located within the area of affect. Consequently, this project has limited potential to affect historic properties (Stipulation III.A.2(19); Proposed undertakings in areas that have been surveyed twice under an inventory strategy meeting current standards where no historic properties are affected; and Stipulation III.A.2.(18); Installation of buried utilities or power pole/tower placement when placed in previously disturbed ground) and is exempt from case-by-case review in accordance with the 2004 Programmatic Agreement.

Clean Water Act
The Clean Water Act of 1977 (CWA) and subsequent amendments established the basic structure of regulating discharges of pollutants into waters of the United States. The Environmental Protection Agency (EPA) has the authority to implement pollution control programs and to set water quality standards for all contaminants in surface waters. The EPA delegated implementation of the CWA to the States; the State of Oregon recognizes the Forest Service as the Designated Management Agency for meeting CWA requirements on National Forest System lands.

1.4 Desired Future Conditions and Land Use Allocations

Based on the land allocations for this project, the desired future condition is to provide areas for high quality winter recreation (and associated summer) opportunities, including downhill skiing, within a natural appearing forest environment. The entirety of the project area is within *A11-Winter Recreation Area* land use allocation, as described by the Forest Plan (pages 4-190 thru 4-191). The major characteristics for the land use allocation that this project would help to achieve include:

- High quality winter recreation activities, such as downhill skiing;
- Winter recreation activities occur in a natural-appearing forest environment; and,
- Ski lodges and chair lifts.

In addition, this project helps to achieve the desired future condition for winter function and uses as described in the Master Plan (ROD page 8-9) by upgrading and expanding the Buttercup lift. The components addressed through this project include:

- Improve balance of skiing terrain through new chair and surface lifts and additional terrain; and,
- Improve the quality of the recreational experience through expanded/upgraded facilities and access road improvements.

The Northwest Forest Plan land use allocations overlap with the land use allocations within the Forest Plan. This planning area includes riparian reserve and administratively withdrawn. *Riparian Reserve* includes areas along rivers, streams, wetlands, ponds, lakes, and unstable or potentially unstable areas where the conservation of aquatic and riparian-dependent terrestrial resources receives primary emphasis. *Administratively withdrawn* allocations are identified areas in the current forest and district plans, including recreation and visual areas, back country and other areas not scheduled for timber harvest. MHM permit area was identified as administratively withdrawn in the Master Plan, which amended the Forest Plan.

1.5 Proposed Action

In order to increase capacity and improve traffic flow at the Buttercup Ski Lift, the Proposed Action is to change alignment, extend the lift and add new terminal sites for the Buttercup Ski Lift. The existing towers would be removed over-the-snow with an excavator. The lower terminal footings would be removed and terminal sites would then be re-graded; and excess material would be used to restore the cut at the top terminal site. Excess material could also be used at the bottom terminal site. Access for removing and regrading the existing footings would be via existing roads. The bottom footing would be completely removed to minimize the long-term effects to groundwater. The remaining towers would be fractured to allow for improved groundwater distribution and would remain in-place. Some of the materials from the old footings would be used as filler in the new footings. All of the disturbed areas would be revegetated using native seeds and soils stabilized using jute matting.

The new terminal structures would be installed with a crane; and the towers would be placed via helicopter. The new top terminal site would require constructing a 310 foot gravel road. This road would remain on-site post-implementation in order to maintain the lift equipment at the top terminal.

The bottom terminal would include a water-tight vault in order to operate the loading conveyor. The vault would include a drainage pipe located at 4-feet above the bottom of the structure so the water could drain at the surface level, rather than underground. The vault is approximately 60-feet by 8-feet and 7.5-feet deep. The loading conveyor would be surrounded by drainage rock to keep the vault as dry as possible and to allow water to easily pass laterally around the structure downhill. Appropriate measures would be taken to ensure that petroleum-based products do not enter the groundwater (e.g., absorption booms).

Approximately 730 feet of a new power and communication line would be buried from the bottom of the Vista Ski Lift to the top of the new proposed Buttercup terminal. This utility line would run under an existing road and the short road proposed in this project. Another utility line would be buried under an existing roadway from the MHM's mountain shop to the bottom of the new proposed Buttercup terminal. Trenching the utility lines would occur during the dry season. Vegetation and topsoil would be carefully removed and replaced after filling the trench back in.

See Section 2.2, Alternative 2 – Proposed Action for additional information.

1.6 Decision Framework

The Responsible Official for this project is the Hood River District Ranger on Mt. Hood National Forest. Based on the analysis in this document, and considering the public comments received, the Responsible Official will consider the following.

- Would this project be implemented as proposed (Alternative 2), as modified by an alternative (Alternative 3), or not at all (Alternative 1)?

- What Project Design Criteria/Mitigation Measures (PDC) and monitoring requirements would the Forest Service apply?

Factors influencing the District Ranger's decision and selection of an alternative include:

- How well the alternative meets the purpose and need for action;
- Potential effects of replacing, realigning and extending the Buttercup Ski Lift as well as the effects of implementing the connected actions to the environment;
- Consistency with the Forest Plan, as amended, and consistency with the 1997 ROD for the Mt. Hood Meadows Ski Area Master Plan while also minimizing environmental impact; and,
- Balancing the winter recreation opportunities within the Mt. Hood Meadows Ski Resort permit area.

1.7 Public Involvement

Buttercup Lift Replacements was listed in the Mt. Hood National Forest quarterly planning newsletter (Schedule of Proposed Actions [SOPA]) beginning in January 2012. No comments were received through this effort.

The Forest Service conducted public scoping to identify any concerns with the proposed activities. The Buttercup Lift Replacement project was published on the Mt. Hood National Forest website in November 2011. A scoping letter was distributed in December 2011 to approximately 70 individuals and organizations, including local, state, tribal and federal governmental agencies; environmental groups; and local non-profit organizations including watershed groups. Two comments were received through these efforts from Pacific Northwest Ski Areas Association and NW Ski Club Council.

A legal notice announcing the availability of a draft Decision Memo for the Buttercup Lift Replacement project for review and comment was published in *The Oregonian* (newspaper of record) on December 18, 2012. The 30-day comment period ended on January 18, 2013. This comment period was provided pursuant to the March 19, 2012, judicial ruling in Sequoia ForestKeeper v. Tidwell., order issued by the U.S. District Court for the Eastern District of California in Case Civ. No. CV F 11-679 LJO DLB. Through this effort, the Forest Service received three comments from Mt. Hood Meadows Ski Resort, Friends of Mount Hood and Pacific Northwest Ski Areas Association. Copies of these letters are in the Buttercup Lift Replacement project file.

Based on the substantive comments received during this comment period, an additional action alternative (Alternative 3) was added and the project was then analyzed in an environmental assessment. As a result, the Forest Service offered a second notice and comment period for this project under 36 CFR 215. A legal notice announcing the availability of the Buttercup Ski Lift Replacement Preliminary Analysis for review and comment was published in *The Oregonian* (newspaper of record) on July 19, 2013. The 30-day comment period ended on August 19, 2013. Four individuals and organizations submitted written comments within the comment period. The comments were received from an individual, Mt. Hood Meadows Ski Resort, Pacific Northwest Ski Areas Association, and Friends of Mount Hood. Copies of these letters are in the Buttercup Ski Lift Replacement project file. Substantive comments received are summarized along with Forest Service responses in Appendix B.

1.8 Issues

Issues serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the Responsible Official and public to understand. Issues are best identified during scoping early in the process to help set the scope of the actions, alternatives, and effects to consider; but, due to the iterative nature of the NEPA process, additional issues may come to light at any time. Issues are statements of cause and effect, linking environmental effects to actions, including the Proposed Action (Forest Service Handbook 1909.15, 12.4). Issues are used to generate additional action alternatives to the Proposed Action.

Through public involvement efforts, one issue was brought forward that generated an additional alternative. Alternative 3 – Detachable Quad Lift was designed to address the impacts to Riparian Reserves. No other issues were identified during the internal or external public involvement efforts.

Impacts to Riparian Reserve

During the first notice and comment period, the Forest Service received the following comment: "This design includes an approximate 2,400 cubic foot underground vault to be installed in a riparian reserve. It would be worthwhile to know if there are alternative loading systems that would meet the goals of this lift without the need of a vault." Part of the loading conveyor in the Proposed Action is located within a Riparian Reserve.

Hydrologic features in the MHM Permit Area consist of several small streams, permanent snowfields at higher elevations, and wet meadows in areas of lower elevation. The existing Permit Area is drained by the East Fork Hood River and three main tributaries of the East Fork: Mitchell Creek, Meadows Creek, and Clark Creek. Due to these hydrologic features, the Permit Area includes Riparian Reserves as a designated land use allocation under the Northwest Forest Plan. Riparian Reserve includes areas along rivers, streams, wetlands, ponds, lakes, and unstable or potentially unstable areas where the conservation of aquatic and riparian-dependent terrestrial resources receives primary emphasis.

A second action alternative (Alternative 3) was designed to address this issue by removing the vault needed for the loading conveyor system that was located within the Riparian Reserve. Measures for comparing alternatives include the following.

- Riparian Reserve Disturbance (Acres);
- Increase in Impervious Surface (Percent);
- Risk to Water Temperature;
- Risk to Increased Sediment; and,
- Risk to Increased Chemical Contaminants.

Discussion of this issue and measures can be found in Section 3.4, Water Quality.

2.0 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter of the environmental assessment includes a description of the range of reasonable alternatives developed to response to the purpose of and need for action described in Chapter 1. This chapter describes the no action alternative, Proposed Action (Alternative 2) and one action alternative (Alternative 3). Also, described in this chapter are the Project Design Criteria/Mitigation Measures and monitoring requirements that would be implemented to minimize or prevent adverse effects within the permit area. Lastly, this chapter discusses consistency with the Mt. Hood Land and Resource Management and Mt. Hood Meadows Ski Area Master Plan.

2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, the Buttercup Ski Lift would not be replaced or extended. Long lines and high demand on the Mt. Hood Express lift would continue. A shortage of beginner/novice terrain would remain within MHM Permit Area and beginner/novice terrain would continue to be inaccessible by the existing ski lift. Skier demand would continue to exceed the capacity of the existing Buttercup Ski Lift. Buttercup provides access to Vista Express and Easy Rider lifts as well as the Buttercup ski tertian. The unbalance of capacity would continue to create long waiting lines at the bottom, leading to a lower quality experience for visitors. A safer off-load location would not be created. The existing top terminal is located in a high traffic area; as a result, the lift and associated unload area concentrate traffic creating congestion and increasing the risk of skier collisions. All current operations associated with the Buttercup Ski Lift would remain unchanged under this alternative.

2.2 Alternative 2 – Proposed Action

The Proposed Action (Alternative 2) is to install a fixed grip ski lift with a loading conveyor, to change the alignment and extend the ski lift and to add new terminal sites for the Buttercup Ski Lift. The construction associated with changing the alignment, extending the lift, and adding a new terminal site would include the following.

- Remove the existing towers over-the-snow with an excavator.
- Remove the lower terminal footings and re-grade terminal sites. Access for removing and regrading the existing footings would be via existing roads.
- Use excess material to restore the cut at the top terminal site. Excess material could also be used at the bottom terminal site.
- Remove completely the bottom footing to minimize the long-term effects to groundwater.
- Fracture and leave in-place the remaining towers to allow for improved groundwater distribution. Some of the materials from the old footings would be used as filler in the new footings.
- Revegetate all disturbed areas by sowing seeds collected from native sedges and forbs

within the Mt. Hood Meadows Permit Area, and stabilize soils by covering disturbed areas with jute matting.

- Install new terminal structures with a crane. The towers would be placed via helicopter. The helicopter staging area would be at either the Main or Sunrise Parking Lots.

- Remove three hemlock trees near the top of the proposed lift. Two trees are approximately 28-inches diameter at breast height (dbh), and the third is 25-inches dbh.

Constructing the new top terminal site would require constructing a 310-foot gravel road. This road would remain on-site post-implementation in order to serve as an access road and maintain the lift equipment at the top terminal. The average grade of the road to the top terminal is approximately 14 percent. An existing road would be used to be used to access the bottom terminal. The average grade of this road is 4 percent. Some road maintenance would be required on these roads.

In addition to the construction activities associated with the lift replacement, the bottom terminal would include a water-tight vault in order to operate the loading conveyor. The vault is approximately 60-feet by 8-feet and 7.5-feet deep. The loading conveyor would be surrounded by drainage rock to keep the vault as dry as possible and to allow water to easily pass laterally around the structure downhill. Appropriate measures would be taken to ensure that petroleum-based products do not enter the groundwater (e.g., absorption booms). The vault would include a drainage pipe that would drain to a nearby sewage line. The sewage line is located near the ski lift, approximately 15-feet from the edge of the disturbed area. The conveyor would be constructed when no groundwater is present in the monitoring sites. Also, the conveyor would be covered with a tarp when it is not in use to limit water entering the vault.

A connected action for this project includes the construction of approximately 730 feet of a new power and communication line that would be buried from the bottom of the Vista Ski Lift to the top of the new proposed Buttercup terminal. This utility line would run under an existing road and the short road proposed in this project. Another utility line would be buried under an existing roadway from the MHM's mountain shop to the bottom of the new proposed Buttercup terminal. Trenching the utility lines would occur during the dry season. Vegetation and topsoil would be carefully removed and replaced after filling the trench back in.

In total, about 1.34 acres would be disturbed (see Figure 2). MHM would implement the project in coordination with the Forest Service. The Forest Service would monitor the project and provide technical guidance as needed before, during, and after implementation of the project. This alternative would cost between $2.0 to $3.0 million to install based on personal communications with the Forest Service National Ropeway Services Team (Fleming 2013) and Mt. Hood Meadows Ski Resort (Warila 2013).

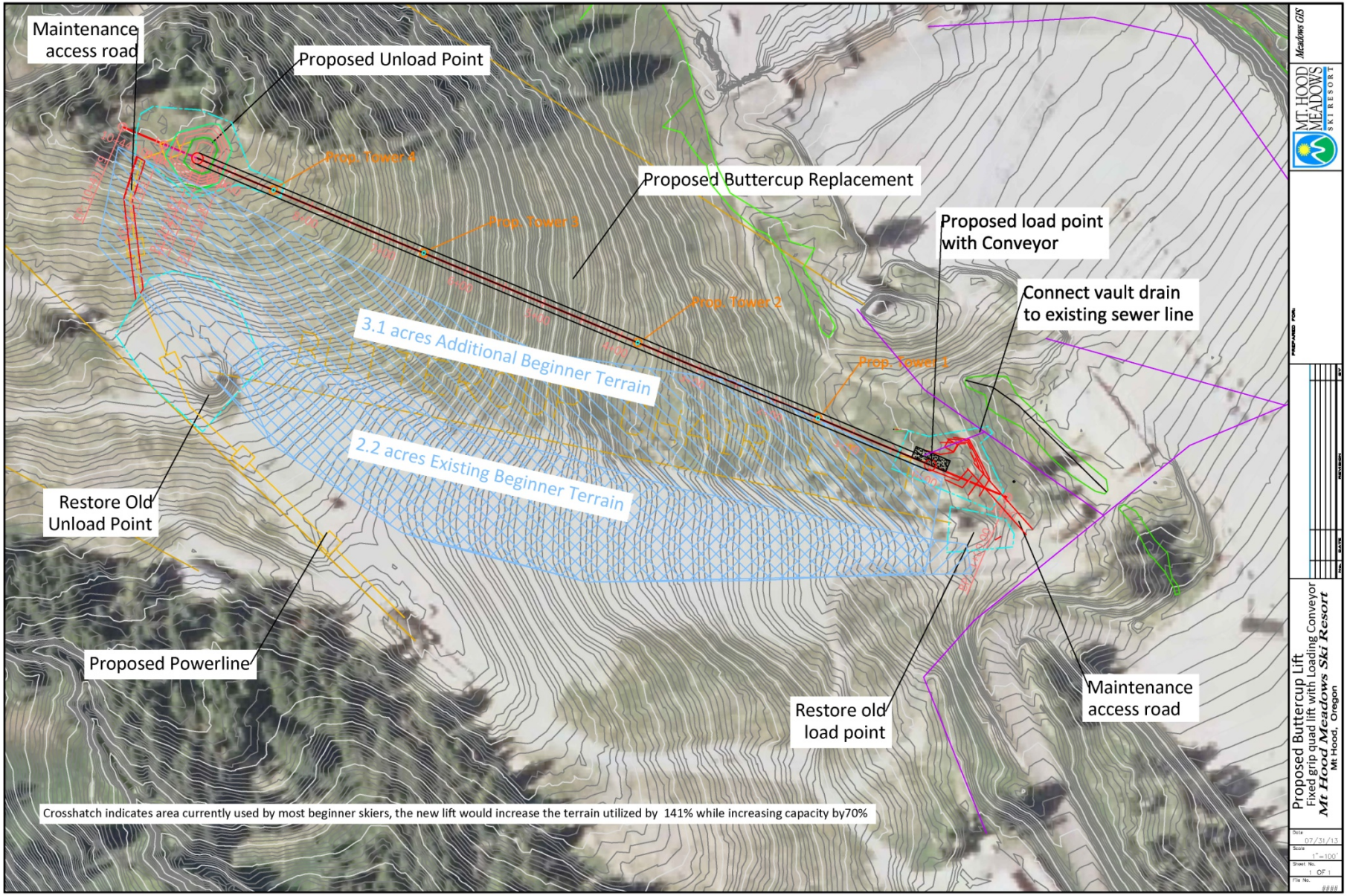


Figure 2: Proposed Action Map for Buttercup Lift Replacement

2.3 Alternative 3 – Detachable Quad Lift

Alternative 3 would install a detachable quad lift, change the alignment and extend the ski lift, and add new terminal sites for the Buttercup Ski Lift. The primary difference between Alternatives 2 and 3 is the type of lifts to be installed and the resulting changes in the required construction activities. The location of the ski lift, including the alignment and extension for Alternative 3, is the same as the Proposed Action. The locations of the terminals and footings would not change. This ski lift does not include any loading conveyor. The construction activities common to both alternatives include the following.

- Remove the existing towers over-the-snow with an excavator.
- Remove the lower terminal footings and re-grade terminal sites. Access for removing and regrading the existing footings would be via existing roads.
- Use excess material to restore the cut at the top terminal site. Excess material could also be used at the bottom terminal site.
- Remove completely the bottom footing to minimize the long-term effects to groundwater.
- Fracture and leave in-place the remaining towers to allow for improved groundwater distribution. Some of the materials from the old footings would be used as filler in the new footings.
- Revegetate all disturbed areas by sowing seeds collected from native sedges and forbs within the Mt. Hood Meadows Permit area, and stabilize soils in disturbed areas by covering with jute matting.
- Install new terminal structures with a crane. The towers would be placed via helicopter. The helicopter staging area would be at either the Main or Sunrise Parking Lots.
- Remove three hemlock trees near the top of the proposed lift. Two trees are approximately 28-inches diameter at breast height (dbh), and the third is 25-inches dbh.

Constructing the new top terminal site would require constructing a 310-foot gravel road. This road would remain on-site post-implementation in order to serve as an access road and maintain the lift equipment at the top terminal. The average grade of the road to the top terminal is approximately 14 percent. An existing road would be used to access the bottom terminal. The road has been scarified and previously closed, so it would need to be re-opened to provide access to the bottom terminal; the average grade of the road is 4 percent. Minimal road maintenance would be required on the roads to the top and bottom terminals.

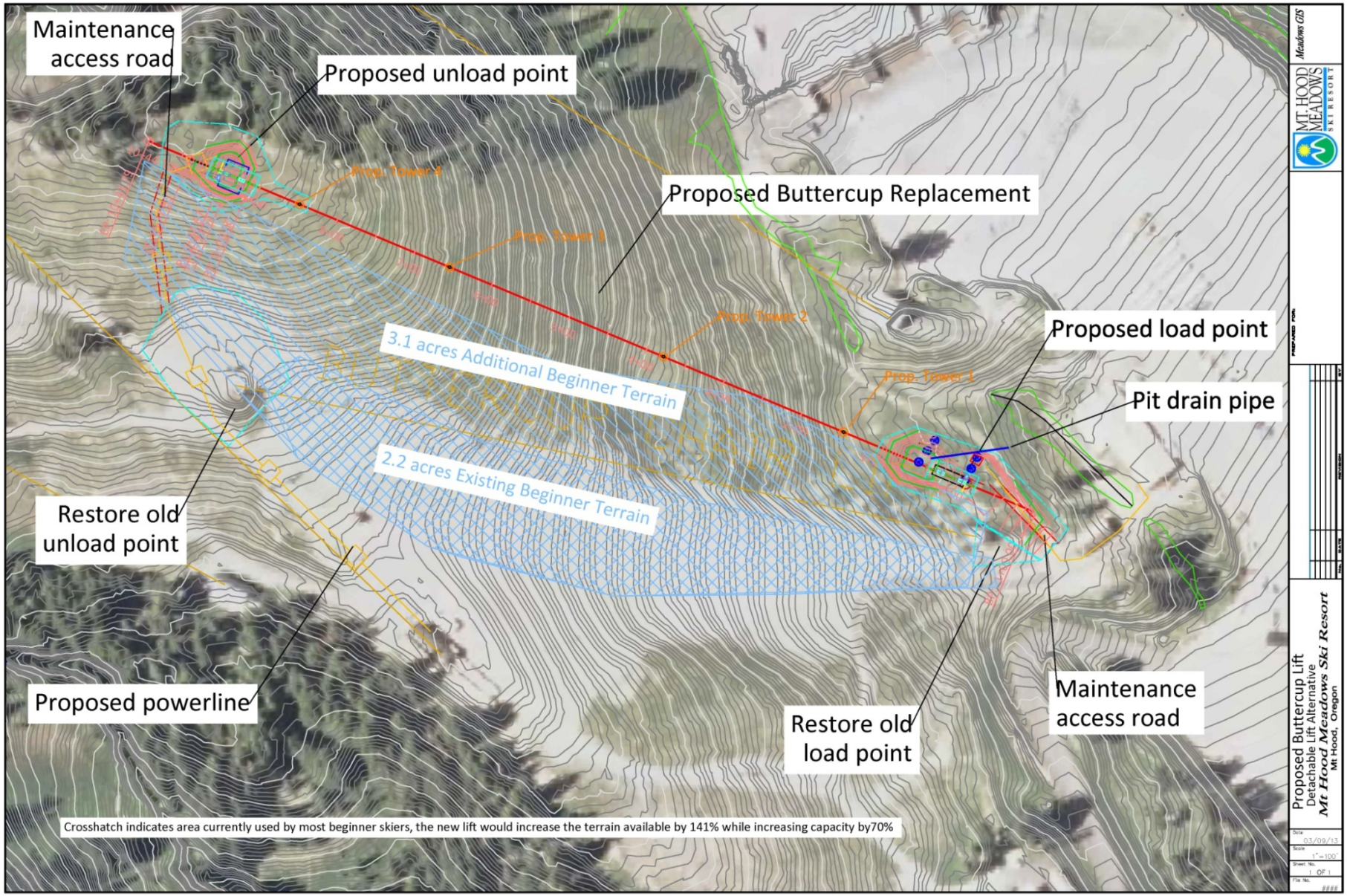


Figure 3: Alternative 3 Map for Buttercup Lift Replacement

In addition, installing a detachable quad lift would include the following.

- The detachable quad lift would require deeper excavation at the bottom terminal in order to accommodate the larger footings needed for the larger detachable station. The bottom of the footing is approximately 13-feet below grade, 12-feet wide by 40-feet long by 2-feet thick. The foundation on top of the footing is 5-feet wide by 40-feet long by 12.5-feet tall. These footings would be the same size as the footings for Mt. Hood Express and Shooting Star Ski Lifts which also have height adjustable stations.

- The detachable quad lift would require a "pit" for skier clearance to load the terminal. The pit would include a drain pipe to prevent them from filling up with water. The pit would be similar to existing pits on Mt. Hood Express and Hood River Express Ski Lifts. The pit would be 25-feet by 25-feet by 4.5-feet deep with sloped sides; as a result, it would encompass approximately 4363 square feet.

A connected action for this project includes the construction of approximately 730 feet of a new power and communication line that would be buried from the bottom of the Vista Ski Lift to the top of the new proposed Buttercup terminal. This utility line would run under an existing road and the short road proposed in this project. Another utility line would be buried under an existing roadway from the MHM's mountain shop to the bottom of the new proposed Buttercup terminal. Trenching the utility lines would occur during the dry season. Vegetation and topsoil would be carefully removed and replaced after filling the trench back in.

In total, about 1.50 acres would be disturbed (see Figure 3). MHM would implement the project in coordination with the Forest Service. The Forest Service would monitor the project and provide technical guidance as needed before, during, and after implementation of the project as described in the section below. This alternative would cost between $3.6 to $6.0 million to install based on personal communications with the Forest Service National Ropeway Services Team (Fleming 2013) and Mt. Hood Meadows Ski Resort (Warlia 2013).

2.4 Project Design Criteria/Mitigation Measures

The National Environmental Policy Act defines "mitigation" as avoiding, minimizing, rectifying, reducing, eliminating or compensating project impacts presented in the action alternatives. These project design features are used to minimize the environmental impacts of the action alternatives. The following are a required component of all action alternatives to address resource management concerns.

Soil Resources

S-1. Erosion cloth/wattles and seed used on the fill slope if its height exceeds three feet, otherwise seed and mulch should be sufficient.

S-2. Seed and mulch the bare ground around the terminal site. Erosion cloth/wattles and seed used to cover bare ground around the terminal if they occur within riparian reserves. Cut and fill slopes would be stabilized by prompt revegetation and grading

to an approved slope gradient (about 2:1) or terracing where necessary to reduce the potential of long-term erosion and slope failures.

S-3. Erosion control plans to reduce erosion and soil compaction would be submitted to the Forest Service for approval for each phase of construction, restoration and maintenance. If construction takes two or more years, interim erosion control methods would be identified.

S-4. Land disturbance would be limited to areas to be developed. The acreage that would have to be reclaimed due to construction conveniences would be minimized.

S-5. Construction and grading would be scheduled to minimize soil exposure during periods of snowmelt and rainy periods.

S-6. To minimize tree stump removal, trees would be flush cut to the extent feasible. Stumps may be ground down to reduce height, but not dug out and removed.

Hydrology

H-1. Project construction and maintenance activities should be avoided in particularly sensitive areas, areas that are consistently saturated or have perennially shallow water table conditions (i.e. wetlands), and critical areas of groundwater recharge/discharge.

H-2. Major changes to groundwater movement would be avoided. Implementation of the terminal vault and lower terminal footing installation shall occur when the groundwater drill sites are dry (mid-August to mid-October).

H-3. Appropriate buffers would be established to protect wetland and riparian values for all wetland units and surrounding areas where ground disturbance may have potential impacts on wetland values.

H-4. In wet meadow areas traversed by ski lifts and trails, special maintenance plans to minimize disturbance would be prepared for Forest Service approval.

H-5. Establish and maintain construction area limits to the minimum area necessary for completion of the project and confine disturbance within this area.

H-6. Erosion cloth/wattles and seed should be used on fill slopes if their height exceeds three feet, otherwise seed and mulch should be sufficient.

H-7. Seed and mulch the bare ground upon construction completion. Erosion cloth/wattles and seed should be used to cover bare ground if within Riparian Reserves[1]. Cut and fill slopes would be stabilized by prompt revegetation and grading to a slope gradient or terracing approved by the Forest Service to reduce the potential of long-term erosion and slope failures (MHM ROD, Soils #2, page A-4).

[1] Riparian Reserve refers to the Northwest Forest Plan Riparian Reserve designation.

H-8. Install sediment and stormwater controls prior to initiating ground disturbing activities to the extent practicable.

H-9. For construction areas immediately adjacent to a stream or other wet area, or where fill is near a wetted stream, use appropriate erosion/sediment control barriers between the project and the stream.

H-10. Maintain erosion and stormwater controls as necessary to ensure proper and effective function by: Preparing for unexpected failures of erosion control measures; and, Implementing corrective actions without delay if failures are discovered to prevent pollutant discharge to nearby water bodies.

H-11. Dispose of waste material in stable sites out of the flood prone area and leave in a stable configuration that limits surface erosion and off-site movement of soil. Waste material other than hardened surface material (asphalt, concrete, etc) may be used to restore natural or near-natural contours. Material disposal areas would be approved by the Forest Service prior to use.

H-12. Inspect construction sites to verify that erosion and stormwater controls are implemented and functioning as designed and are appropriately maintained. Construction sites would be inspected a minimum of twice a week and within 24 hours of significant storms (0.5 inches/24 hour, or where runoff is generated). In addition, inspections should occur after construction is complete until areas of bare soil are completely covered by natural vegetation growth.

H-13. Mt. Hood Meadows Ski Resort would acquire all appropriate Local, State and Federal Permits for this project including, but not limited to, National Pollutant Discharge Elimination System (NPDES) Permit Storm Water Permit for Discharge from Construction Activity and a Clean Water Act (CWA) 404 permit from the Army Corps of Engineers when dredge or fill material would be discharged to waters of the U.S.

Invasive Plants

N-1. Develop and implement a post-construction site vegetation plan using suitable species and establishment techniques to revegetate the site in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.

N-2. All heavy equipment that has operated outside the Mt. Hood Meadows permit area must be cleaned with pressurized water prior to entering National Forest System Lands. Forest Service personnel should be notified to inspect off-road equipment prior to start of work to ensure it is free of all soil, seeds, vegetative matter, and other debris that could hold or contain seeds (WO- CT6.36). All subsequent move-ins of equipment to the project area should be treated in the same manner as the initial move-in. This requirement does not apply to service vehicles, water trucks, pickups, cars, and/or similar vehicles (R6/SPS-601.01 Work).

N-3. The Mt. Hood Meadows Annual Operating Plan (AOP) requires MHM to mitigate and monitor invasive plant species (AOP Vegetation Management Item #23). Mt. Hood Meadows should continue to monitor the presence of knapweed in the flower beds around the Mt. Hood Meadows Day Lodge (with the help of the Forest Service) and should pull or dig plants before they bloom July through September to ensure the species does not spread. Forest Service personnel are available to assist MHM personnel with the identification of knapweed and other invasive species of concern, as needed.

N-4. Rock and soil imported to the project area must come from a weed-free source that has been certified by a Forest Service botanist, range specialist, or residing county Weed and Pest Control Department official.

N-5. Use certified weed-free or weed-seed-free hay, straw, or wood fiber if mulch is required to prevent erosion. Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g. road embankments, powerline trenches, tower footings, etc.).

Vegetation Management

VM-1. Clearing and construction practices that minimize surface disturbance and vegetation removal would be utilized.

VM-2. The use of native species for landscaping and reclamation would be encouraged wherever possible in an effort to re-establish native vegetation over time.

VM-3. Use seed collected from native plants within the Mt. Hood Meadows Permit Area for restoration of disturbed areas. Seed may be collected from July to September and sowed directly on-site, or consult with Forest Service personnel for an immediate supply of local native grass seed available from the Forest Service.

Wildlife

W-1. Any raptor nests observed in the area would be protected until evaluated by a Forest Service wildlife biologist. Disturbance of raptors or raptor nests would be prohibited except as specifically permitted by the U.S. Fish and Wildlife Service and Oregon Department of Fish and Wildlife. Habitat protection zones would be established, pursuant to Forest Plan standards, for raptor nesting areas.

W-2. Snags and trees that would be cut for the lift expansion and woody material would be left on-site to benefit species dependent upon them as habitat. The cut snags and trees may be moved to another location, if necessary, for ski run maintenance, or safety reasons.

W-3. Disturbances to special or unique habitats including springs, seeps, wallow areas, natural mineral deposits used as licks, and talus would be avoided. If significant disturbances to any of these habitats would occur during development, a Forest

Service wildlife biologist would be notified so that site-specific mitigation can be developed and implemented prior to disturbance.

Visual Resources

V-1. All utilities would be installed underground, except where technically infeasible.

V-2. Non-reflective materials would be used for exterior surfaces that blend with the environment. Facilities with reflective exterior surfaces (metal, glass, plastic, etc.) which do not blend with the summer environment should be temporarily removed, covered, painted, stained, chemically treated, etched, sandblasted, corrugated, or otherwise treated in a manner to meet solar reflectivity standards in Forest Service Manual 2380.

V-3. Glass on the terminals should be less than 15 percent visible light reflectivity.

V-4. Facilities would be constructed of materials which blend with the earthtone colors of the environment. Buildings, structures, facilities, and utilities would be constructed of natural materials and/or painted, stained, or modified to achieve the required visual blending. Exterior colors, shapes, and textures of all facilities, except when required for safety, would be subordinate to the surrounding landscape. All exterior colors and materials would be approved by the authorized Forest Service representative prior to construction.

V-5. The best available glazing technology would be used to subdue light transmission to the exterior of facilities. Shading devices would be used as appropriate to eliminate exterior light transmission.

V-6. Round off and fracture the old square concrete footings in the lift line to resemble natural boulders.

Implementation

I-1. If cultural resource sites or materials are encountered during project construction, all activity in the immediate area would cease and an archaeologist consulted. The archaeologist would determine the significance of the materials and specify appropriate mitigation measures in consultation with the Confederated Tribes of Warm Springs.

I-2. A phased development plan would be submitted for Forest Service approval prior to implementation. This plan would detail specifically how and when development of authorized facilities would occur.

In addition to these PDC, all of the applicable required mitigation and monitoring listed in Appendix A of the ROD for Mt. Hood Meadows Ski Area Master Plan/Access Road Final Environmental Impact Statement would apply. Some of the mitigation measures have been here for emphasis as related to this project.

2.5 Monitoring Requirements

Monitoring is critical for evaluating the effectiveness of management decisions and the accuracy of analysis assumptions and conclusions. The Master Plan and Forest Plan determined the monitoring requirements for this project. Each of the monitoring components is described below.

Master Plan Monitoring

Monitoring is critical for evaluating the effectiveness of management decisions and the accuracy of analysis assumptions and conclusions. As directed by the Master Plan, "monitoring and enforcement of required mitigation measures by the Forest Service will occur though the Annual Operating Permit and the Special Use Permit. A monitoring program will be developed as part of the environmental analysis required for each phase of development and implemented as soon as possible after approval of each phase to determine the effectiveness of mitigation measures" (page A-1).

The Special Use Permit Administrator responsible for oversight of the MHM permit would act as the District Ranger's representative and would enlist the assistance of various resource specialists to monitor the project during implementation and for post-development monitoring. The resource specialists include, but are not limited to, a fisheries biologist, hydrologist, soil scientist, engineer, archeologist, recreation specialist, botanist, and wildlife biologist. At a minimum, all monitoring would consist of pre-construction photos of a good range of photos that document phases of the project. Photos and reports would document effects to the project area during construction and post-construction periods into the first growing season after the project and subsequent seasons during which the successfulness of restoration efforts are determined. When a question arises, the permit administrator contacts the appropriate specialist for follow-up review and guidance.

If Alternative 2 is selected by the Responsible Official, groundwater monitoring would be conducted to ensure that there was no contamination resulting from the loading conveyor vault and that local groundwater levels are maintained. If contamination was detected, additional mitigation measures would be put into place to ensure that the groundwater remained clean and uncontaminated.

Forest Plan Requirements

Monitoring is also conducted at the Forest level as part of the Forest Plan implementation, including monitoring of noxious weeds and best management practices. The monitoring of noxious weeds and invasive plants would be conducted where appropriate to track changes in populations over time and corrective action would be prescribed where needed. BMP monitoring is conducted on projects in various stages of completion (see Appendix A for more details on BMP monitoring).

According to The National Best Management Practices for Water Quality Management on National Forest System Lands - Volume 1: National Core BMP Technical Guide (April 2012), monitoring is one of four steps outlined in the BMP process. Monitoring is used to inform and improve management activities and share with other appropriate Federal, State and local agencies. The Technical Guide states "The Forest Service Nonpoint Source Strategy uses "programmatic monitoring" to evaluate BMP implementation and effectiveness; that is, aside

from project administration described above, BMPs are not monitored on every project or activity that occurs on National Forest System lands. Projects to monitor or specific monitoring sites are selected in a manner that results in objective and representative data on BMP implementation and effectiveness. Often, a random or systematic random selection procedure is used to choose monitoring locations across a forest or grassland where specific activities or BMPs are targeted." This project would go into a pool of similar projects to be selected for project level BMPs implementation and effectiveness monitoring as per the National BMP Monitoring Protocol. If selected an Interdisciplinary Team (IDT) would evaluate whether the site-specific BMPs were implemented and the effectiveness of the BMPs. Monitoring for each BMP is outlined in Appendix A: Best Management Practices for Water Quality Protection.

In fiscal year 2013, BMP monitoring will be competed on 10 different projects on the Mt. Hood National Forest. One of the projects selected is the new Stadium Lift at the Mt. Hood Meadows Ski Area. This project was analyzed as part of the Mt. Hood Meadows Ski Resort Enhancements Environment Assessment and Decision Notice (March 2011). This monitoring will examine whether BMPs were implemented as planned and the effectiveness of those BMP to reduce or eliminate detrimental effects to water quality. Results from this monitoring will be used to supplement existing monitoring and experience to plan and implement future ski area projects, including this project as appropriate.

2.6 Comparison of Alternatives

This section provides a summary of the alternatives by proposed activities. Table 2-1 compares the alternatives by purpose and need components, alternative design including economics and issues. Table 2-2 provides more details on the disturbance to Riparian Reserve by alternative.

Table 2-1: Comparison of Alternatives

Action	Alterative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Detachable Quad Lift
Purpose and Need Component			
Beginner/Novice Terrain Accessible (acres)	2.2	5.3	5.3
Improve Safety at Off-load Location	No	Yes	Yes
Alternative Design – Features of Ski Lift			
Type of Ski Lift	Fixed Grip Two Seater	Fixed Grip Quad	Detachable Quad
Loading Conveyor	No	Yes	No
Speed (feet per minute)	310	400	800
Capacity (passengers/hour)	1200	2059	1800
Ride time (minutes)	3.0	2.5	1.4
Acres of New Disturbance	0.0	1.34	1.50
Costs of Installation	$0	$2.0 to $3.0 million	$3.6 to 6.0 million
Issue (Impacts to Riparian Reserves)			
Riparian Reserve Disturbance (Acres)	0.0	0.3	0.5
Increase In Impervious	Upper East Fork	Upper East Fork	Upper East Fork

Action	Alterative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Detachable Quad Lift
Surface (Percent)	Hood +0.0%	Hood +0.0%	Hood +0.0%
Risk of Some Increased Water Temperature?	None	None	None
Risk of Some Increased Sediment?	None	Low	Low
Risk of Some Increased Chemical Contaminants?	None	Low	Low

The average costs associated with installation of ski lifts is variable, but the estimated costs associated with the construction of new lifts range from $1.5 million to $6.0 million (Fleming 2013). A fixed grip two or three seat lift costs approximately $1.5 million to install; a fixed grip four seat lift with loading conveyor costs approximately $3.0 million to install; and, a detachable four seat lift costs $6.0 million to install. As such, the estimated installation costs for Alternative 2 (fixed grip quad with loading conveyor) would be $3.0 million and Alternative 3 (detachable quad) would be $6.0 million. The preliminary estimates received by Mt. Hood Meadows Ski Resort confirm that the installation costs of Alternative 3 ($3.6 million) are approximately double the costs of installing Alternative 2 (less than $2.0 million) (Warila 2013).

Table 2-2: Comparison of Impacts to Riparian Reserve

Activity	Sub-Watershed	Acres in Riparian Reserve by Alternative		
		1	2	3
New Lower Terminal Installation	Upper East Fork Hood River	0.0	0.2	0.4
Removal of Old Lower Terminal	Upper East Fork Hood River	0.0	0.07	0.05
New Utility and Drainage Line	Upper East Fork Hood River	0.0	0.02	0.02
TOTAL		**0.0**	**0.3**	**0.5**

2.7 Alternatives Considered, but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Some of reasonable alternatives may be outside the scope of this environmental assessment, may not meet the purpose and need for action, may not reasonably feasible or viable, may be duplicative of the alternatives considered in detail, or may be determined to cause unnecessary environmental harm. Public comments received in response to the Proposed Action as well as the preliminary effects analysis conducted by the interdisciplinary team did **not** suggest any alternative methods for achieving the purpose and need that were considered, but eliminated from detailed study

3.0. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter presents information on the physical, biological, social, and economic environments of the affected project area, and the potential direct, indirect and cumulative effects to those environments due to the implementation of the alternatives. Each resource area discloses the direct, indirect and cumulative effects for that resource area.

The National Environmental Policy Act defines these as:

- **Direct**: Effects which are caused by the action and occur at the same time and place
- **Indirect**: Effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable
- **Cumulative**: Impacts that result from the incremental impact of an action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions

The Environmental Assessment herby incorporates by reference the project record (40 CFR 1502.21). The project record contains specialist reports, biological evaluations, and other technical documentation used to support the analysis and conclusions in this Environmental Assessment. Specialist reports were completed for vegetation resources, transportation resources, geology, soils, water quality, fisheries, wildlife, botany, invasive plants, recreation, visual quality, fuels, and heritage resources. Separate biological evaluations were completed for botanical species, aquatic species, and terrestrial wildlife species. Full versions of these reports are available in the project record, located at the Hood River Ranger District office in Mount Hood/Parkdale, Oregon.

Each of the specialist reports and biological evaluations conduct an analysis of cumulative effects resulting from this project. Table 3-1 lists the projects that the IDT considered in their analysis.

Table 3-1: List of Projects Considered in Cumulative Effects Analysis

Past Activities
Annex Wetland Restoration at Sunrise
Bluegrass Ridge and Gnarl Complex Fires
Buttercup Ski Lift Grading Project
Highway 35 Betterment Projects
Past Mt. Hood Meadows Ski Area Projects, including paving Sunrise and Hood River Meadows parking lots
Stadium Lift, Blue Wetland Enhancement and Access Road Culvert Replacement
Ongoing Activities
Avalanche Control
Existing Parking Lot Maintenance, including snow storage and snow removal
General Road Maintenance, including winter road treatments
General Ski Area Activities (e.g., ski run maintenance, trail grooming, hazard tree removal, and sign replacement)

Ongoing Activities
Highway 35, Forest Service Road 3555 and 3545 Sanding for Vehicle Traction
MHM Administrative Building Operation and Maintenance
Oregon Department of Transportation (ODOT) Sand Shed Operation and Maintenance
Pre-commercial Thinning
Teacup Grooming Activities
Future Activities
Highway 35 Turn Lane Construction and connected actions
Meadows Creek Highway 35 and Teacup Roads Culvert Replacements
Sahalie Falls Bridge Stabilization
Sunrise Maintenance Shop Construction and connected actions
Twilight Parking Lot Construction and connected actions

3.1 Recreation

More information is available in the project record including the full recreation analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.1.1 Methodology

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 alternatives. The effects analysis for this report is based on published information, field surveys, and professional experience. Past projects relating to ski resorts lift replacements on the Forest were reviewed including the Stadium Lift Replacement. First the existing conditions will be discussed, then the effects of the alternatives are discussed, including cumulative effects. The recreation effects analysis area defined for the recreation analysis covers the area within Mt. Hood Meadows Permit Area. 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 Buttercup Ski Lift Replacement would occur within the proposed project area. The indirect effects of the Buttercup Ski Lift Replacement 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.

3.1.2 Existing Condition

Buttercup Ski Lift

Since the opening of Mt. Hood Meadows Ski Resort (MHM) in 1967/68 skier visitation has grown from approximately 55,000 to 500,000. Currently, MHM has 2,150 skiable acres and 13 lift chairs (6 high speed quads, 5 double chairlifts, and 2 snow conveyers). The ski development has grown to 87 trails with the longest run being 3.2 miles. The uphill lift capacity is 16,145 people per hour. MHM is currently operating within the designed capacity of 13,900 (13,100

alpine, 800 Nordic) People At One Time (PAOT) for winter use as authorized in the Master Plan. The existing percent of acres by ski difficulty ratings are listed in Table 3-2. Currently, only 10 percent of the permit is within the beginner difficulty level.

Table 3-2: Existing percent of acres by Skier Difficulty Ratings.

Difficulty	Percent of Acres
Beginner	10%
Intermediate	55%
Advanced	15%
Expert	20%

The Buttercup Ski Lift is a double fixed grip chairlift that was built in 1979. The current vertical rise of the Buttercup Ski Lift is 122 feet. The primary purpose of the lift is to provide beginner terrain for skiers and snowboarders. The majority of riders on the Buttercup Ski Lift are novice riders and for some it might even be their first time riding a chairlift.

Buttercup Alignment

The current location of the top terminal for the Buttercup Ski Lift is congested. The congestion is caused by the upper portion of Buttercup and the lower portion of the Vista Ski Lifts converging. Many more advanced skiers riding the Vista Ski Lift pass through the top terminal of the Buttercup Ski Lift. The conversion of more advanced skiers with novice skiers creates a safety issue between the different levels of skiers in a concentrated area.

Forest Service Trails

The entrance gate is closed in the summer months, which limits travel to foot traffic in the Permit Area. Hiking continues to be one of the most popular recreational activities on the Forest. Within MHM Permit Area, several hiking trails (or portions of trails) exist, including the Umbrella Falls Trail #667 (3.5 miles), Sahalie Falls Trail # 667C (1.7 miles) and Elk Meadows Trail #645 (9.3 miles) Timberline Trail #600 (24.5 miles). Timberline and Umbrella Falls trails are the only two trails within close proximity to the project area. Existing trail users in the MHM Permit Area see or hear some ski area related operations and maintenance during the summer months.

Dispersed Recreation

The Permit Area is used daily by those driving for pleasure, viewing the scenery, accessing hiking trails (day use and overnight backpacking), viewing wildlife, picnicking, gathering huckleberries, and others forest products.

3.1.3 Effects Analysis/Environmental Consequences

Alternative 1 (No Action) – Direct and Indirect Effects

Buttercup Ski Lift

The current double fixed grip chairlift would continue to run and chairlift capacity would remain the unchanged. The chair would remain difficult for novice skiers to load. The aging chair would require more maintenance in order to run safely.

Buttercup Realignment
Without realigning Buttercup Ski Lift, MHM would not be able to facilitate an increase in beginner terrain, experience, or rider safety. The top terminal would remain a congested area which increases the risk of skier collisions.

Forest Service System Trails
There would be no direct or indirect effects to hiking trails in the Permit Area because none of the proposed activities (i.e., constructing a new chairlift) would occur.

Dispersed Recreation
There would be no direct or indirect effects to dispersed recreation in the Permit Area because none of the proposed activities (i.e., constructing a new chairlift) would occur.

Alternative 2 (Proposed Action) – Direct and Indirect Effects

Buttercup Ski Lift
Alternative 2 (Proposed Action) would replace the current fixed grip double chairlift with a fixed grip quad chairlift and a loading conveyor. A loading conveyor is a continuously moving conveyor belt for transporting the riders to the loading point where they are met by a chair which moves at a slightly higher speed. One key component of a loading conveyor is gates that open and close to ensure correct timing with the chairlift. The loading conveyor would be located at the lower terminal which would assist first time riders and small children uploading chairs. The loading conveyor would decrease the number of times the chairlift is slowed or stopped per day and would also increase skier safety by eliminating most loading accidents. The combination of a quad chairlift and the reduction in slows and stops per day would increase chairlift capacity. Table 3-3 shows the differences between the existing condition and the new lift as related capacity and ride time. Beginner skiers and snowboarders would find the new chairlift more desirable and accommodating compared to the Alternative 1 (No Action).

Table 3-3: Existing condition compared to Alternative 2 (Proposed Action)

Alternative	Beginner Terrain (acres)	Type of Ski Lift	Capacity (passengers/hour)	Ride Time (minutes)
Existing Condition	2.2	Fixed Grip Double	1200	3.0
Alternative 2 Proposed Action	5.3	Fixed Grip Quad	2059	2.5

Buttercup Realignment
The Alternative 2 realignment would provide an improved rider experience for the beginner skiers/snowboarders. The proposed realignment would allow for better dispersal of riders and improve rider safety at the upper terminal. Alternative 2 realignment would provide additional rider options, disburse skiers, and create a buffer between the Buttercup and Vista Ski Lifts, therefore increasing overall beginner rider experience and providing access to more beginner terrain.

Forest Service System Trails
The construction of a new chairlift would increase human caused sights and sounds above the current level for existing recreation users. The impact to users would be short-term; construction would take place during the summer months for one construction season. The majority of the construction noise would come from helicopters setting towers. In addition, all of the construction would take place below the Timberline Trail. Hikers on the Timberline and Umbrella Falls trails would only be exposed to the increased sights and sounds for a short period of time while they travel through the MHM Permit area.

Dispersed Recreation
Alternative 2 would reduce the quality of the recreation experience for those recreationalists that gather in or around the Buttercup Ski Lift during the lift replacement construction. The construction of the Buttercup Ski Lift would displace some recreationalists in and around the MHM Permit Area. Implementation of the chairlift would contribute to additional human caused sights and sounds that are currently not present in the area. Again, the impact to users would be short-term; construction would take place over one summer. In the short term, the project may disperse people to less developed areas in the MHM vicinity.

Alternative 3 – Direct and Indirect Effects

Buttercup Ski Lift
Alternative 3 would replace the current fixed grip double chairlift with a detachable quad or high-speed chairlift. Detachable quads run at much faster speeds than a fixed grip chairlift, because the chairs move at a much faster speed than riders can safely unload the lift detaches at the terminals. The detached chair moves much slower through the terminals allowing riders to load and unload at a much safer speed. The chairlift reduces speed even slower than a typical fixed grip beginner chair. A typical detachable chair speed moving through terminal is 200 feet per minute. The detachable chairlift would assist first time riders and small children uploading and unloading chairs. The detachable lift would decrease the number of times the chairlift is slowed or stopped per day and would also increase skier safety by eliminating most loading accidents. The combination of a quad chairlift and the speed of the detachable chairlift would increase capacity of the Buttercup Ski Lift. Table 3-4 shows the differences between the existing condition and the new lift as related capacity and ride time.

Table 3-4: Existing condition compared to Alternative 3

Alternative	Beginner Terrain (acres)	Type of Ski Lift	Capacity (passengers/hour)	Ride Time (minutes)
Existing Condition	2.2	Fixed Grip Double	1200	3.0
Alternative 3 Proposed Action	5.3	Detachable Quad	1800	1.4

Buttercup Realignment
Effects on the Buttercup realignment would be the same as described under Alternative 2.

Forest Service System Trails
Effects on the Forest Service System Trails would be the same as described under Alternative 2.

Dispersed Recreation
Effects on the Dispersed Recreation would be the same as described under Alternative 2.

Cumulative Effects

The replacement of the Buttercup Ski Lift would not have long term negative effects to the recreation resource, but would have some short term cumulative effects. All cumulative effects projects shown in Chapter 3 of the Environmental Assessment (EA) were considered, no other known past, ongoing or reasonably foreseeable actions would cumulatively affect recreation opportunities within the MHM Permit Area. All long term effects of the project would benefit the recreation resource and beginner ski terrain. The following effects would overlap in time and space (Table 3-5).

3.1.4 Consistency Determination

The ROD and Master Plan define the desired future condition for an MHM permit area which includes:

- Improve the balance of skiing terrain through new chair and surface lifts and additional terrain. (ROD p. 8).
- Improve the quality of the recreational experience through expanded/upgraded facilities and access road improvements (ROD p. 8).
- Both alternatives would implement the MHM master plan providing improved skiing terrain and recreational experience.

The Forest Plan outlines management 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. (Four-34)
- Be primary advocates and providers of outdoor recreation opportunities that are appropriate to a large natural forest setting. (Four-34)
- Enable people to learn and grow in their outdoor experience. (Four-34)

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." "The trail system shall be developed and designed to disperse recreational use, and provide a range of difficulty levels consistent with the Management Area management direction (A11-010)." Mt. Hood Meadows recreation offering is consistent with the direction for A11 – Winter Recreation.

Table 3-5: Recreation Cumulative Effects

Project/Activity	Potential Effects	Overlap		Measurable Cumulative Effect	Recreation Effects
		Time	Space		
Stadium Lift realignment	Increased beginner/intermediate skiing terrain	Yes	Yes	Yes	The Stadium Lift realignment and the Buttercup Ski Lift improvement would improve skier experience for beginner/ intermediate riders.
	Skier Safety	Yes	Yes	Yes	The Stadium Lift realignment and the Buttercup Ski Lift improvements would disperse riders and alleviate some of the congestion therefore improving rider safety.
	Capacity (passengers/hour)	Yes	Yes	Yes	The Stadium Lift realignment and the Buttercup Ski Lift improvements would increase capacity (passengers/hour). This is consistent with the Mt. Hood Meadows Ski Area Master Plan Record of Decision.
Mt. Hood Meadows Parking Improvements EIS	Increased Noise	Yes	Yes	Yes	The current ski area operation, the new construction of Mt Hood Meadows Parking Improvements and the Buttercup Ski Lift replacement may coincide with each other. The combined construction activities would detract from the natural environment and recreation experience of hikers and backpackers in the area. The effect to users would be short-term.
	Displacement of recreationalists	Yes	Yes	Yes	During construction hikers and recreationalists would be dispersed out of the MHM Permit Area. The effect to users would be short-term.

3.1.5 Summary of Effects

Buttercup Ski Lift
Alternative 2 and 3 would replace the current Buttercup Ski Lift. Alternative 2 and 3 would increase the current capacity and provide safer uploading for beginner skiers. Alternative 2 would have the greatest increase in skier capacity. Alternative 3 would reduce ride time and would provide safer unloading of chairs than Alternative 2. All action alternatives would increase safety and quality of rider experience. Both action alternatives would improve rider experience by providing access to additional terrain and the ride times would not have a measurable impact on this experience. Table 3-6 shows the differences between the alternatives as related to capacity and ride time.

Buttercup Realignment
Alternative 2 and 3 would allow for better dispersal of riders and improve rider safety at the upper terminal. Alternative 2 and 3 would increase beginner ski terrain by 3.1 acres.

Forest Service System Trails
Alternative 2 and 3 would increase human caused sights and sounds above the current level for existing recreation users. The impact to users would be short-term; construction would take place during the summer months for one construction season.

Dispersed Recreation
Alternative 2 and 3 would reduce the quality of the recreation experience during construction, and may displace some recreationalists in and around the MHM Permit Area.

Table 3-6: Comparison of Alternatives

Alternative	Beginner Terrain (acres)	Type of Chairlift	Capacity (passengers/hour)	Ride Time (minutes)
Alternative 1 No Action	2.2	Fixed Grip Double	1200	3.0
Alternative 2 Proposed Action	5.3	Fixed Grip Quad	2059	2.5
Alternative 3	5.3	Detachable Quad	1800	1.4

3.2 Visual Resources

More information is available in the project record including the full visual resources analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.2.1 Methodology

The effects analysis for this report is based on published information and field surveys. The area

used for this analyze is Mt. Hood Meadows Permit Area. Analysis of the project area was completed by using Geographic Information System (GIS) data maintained by the Mt. Hood National Forest (Forest). Past projects relating to ski resorts lift replacements on the Forest were reviewed including the Stadium Lift Replacement. First the Existing Condition will be discussed, then the effects of the Alternatives are discussed, including cumulative effects.

Overall guidance was obtained from the Visual Management System (Agriculture Handbook 462), and National Forest Landscape Management Ski Areas (Agriculture Handbook 617). Effects are evaluated with the Visual Quality Objectives (VQOs) outlined in the Land and Resource Management Plan (Forest Plan) and the Master Plan which amended the VQOs within the Permit Area.

The Agriculture Handbook 462 provides the following definitions of VQO categories.

- Preservation (P): This VQO allows ecological changes only. Management activities, except for very low visual impact recreation facilities, are prohibited.

- Retention (R): This VQO provides for management activities under retention activities may only repeat form, line color, and texture which are frequently found in the characteristic landscape which are not visually evident.

- Partial Retention (PR): Management activities remain visually subordinate to the characteristic landscape. Activities may repeat or introduce form, line, color, or texture common to the characteristic landscape and may change their qualities of size, amount, intensity, direction, pattern, etc., so long as they remain visually subordinate to the characteristic landscape.

- Modification (M): Under the modification VQO management activities may visually dominate the original characteristic landscape however, they should borrow from naturally established form, line, color and texture so completely and at such a scale that the visual characteristics are compatible with the natural surroundings.

3.2.2 Existing Condition

The proposed project is in the Mt. Hood Meadows Ski Resort (MHM) Permit Area. The physical landscape is dominated by Mount Hood, a Volcanic Peak that consists of glaciers, irregular rock forms, snow, and avalanche paths. Vegetation varies throughout the Permit Area; consisting of alpine meadows, subalpine fir, mountain hemlock, and white bark pine trees. The MHM is a developed ski resort that consists of several chairlifts, skier service buildings, and maintenance shops.

The proposed project would affect an area that has currently been developed and cleared for existing ski runs, lifts, and roads. The project area already has a color and texture contrast between the existing ski area and the natural environment (see Figure 4). A variety of methods have been incorporated to lesson visual impacts including: feathering and shaping of ski run edges; thinning and establishment of glades within the timber; creating natural appearing openings; and, tree islands. From a distance, MHM looks natural with only a few-modifications.

The Timberline and Umbrella Falls trails travel through the MHM Permit Area. They are popular summer trails for both day hikers and backpackers. The trails offer spectacular views of the surrounding foothills and Mount Hood. The prescribed VQO for the Timberline and Umbrella Falls Trail within A-11 allocation is **modification** (see Table 3-7). Under the modification VQO, management activities may visually dominate the original characteristic landscape.

Table 3-7: VQOs for A11 Winter Recreation Management Areas (Forest Plan)

Observation Areas	Near Foreground (within 660')	Far Foreground (660' to 1320')	Middleground (1320' to 5 miles)	Background (greater than 5 miles)
Sensitivity Level I Trails	R (PR for ski lift facilities)	PR	M	--
Sensitivity Level II Trails	PR	M	M	--
Sensitivity Level III Trails	M	M	M	--
View Routes	R (PR for developed ski areas)		PR	PR
Timberline Trail and Umbrella Falls Trail*	M*	M*	M	--

*Timberline and Umbrella Falls trails foreground VQOs within the Mount Hood Meadows ski area were amended by the 1996 Meadows ROD from Partial Retention to Modification.

Figure 4: Existing Buttercup Ski Lift towers and terminal.

3.2.3 Effects Analysis/Environmental Consequences

Alternative 1 (No Action) – Direct and Indirect Effects
No action would result in no change to the VQO or the existing conditions in the project area.

All Action Alternatives – Direct and Indirect Effects

View Routes
Topography and vegetation screen the lower development of MHM along the Highway 35, 26 and Forest Service Road 48 viewshed. All actions would occur within 5 miles of Highway 35. The proposed project would not be visible from key viewpoints. Existing development from MHM meets the prescribed VQO of Partial Retention as viewed from the Highway 35 and 26 corridors (see Figure 5).

Trail Visual Quality Objectives
VQOs are assessed from the Forest Service trails system. Distance zones are prescribed unless screened by vegetation or topography. The Record of Decision (ROD) amended the VQO for the Mount Hood Meadows ski area as seen from Timberline and Umbrella Falls trails from partial retention to modification in the foreground. Under the modification VQO, management activities may visually dominate the original characteristic landscape. The action alternatives to upgrade and realign Buttercup Ski Lift would be in the middle ground of the Timberline Trail. The earthtone terminals and towers would blend with the surrounding natural landscape as viewed from the Timberline trail and Umbrella Falls trail; meeting the Modification VQO. There would be no effects from the action alternatives on visual quality as shown in Table 3-8.

Table 3-8: Scenic Direct and Indirect Effects Summary

Viewpoint	Type of Effect	In Compliance with Forest Plan VQO?
Highway 26 and 35	No Effects	Yes
Road 48	No Effects	Yes
Middleground Trails	No Effects	Yes
Timberline Trail and Umbrella Falls Trail	No Effects	Yes

Figure 5: Proposed top terminal of Buttercup lift chair. The chairlift would look very similar to the Vista Ski Lift seen in the background.

Cumulative Effects

All projects shown in Chapter 3 of the Environmental Assessment (EA) were considered. The replacement of the Buttercup Ski Lift would not have direct or indirect effects to the VQO; therefore, would not have cumulative effects to the VQO. The extension of the lift in combination with future development of the Twilight Parking Lot would add to the overall development within the Permit Area; however, the lift replacement in combination with the Twilight Parking Lot would not likely result in development which exceeds the VQO.

3.2.4 Consistency Determination

USDA Forest Service Manual 2300, Chapter 2380 Landscape Management, 2380.3 Policy. It is Forest Service policy to:

1. Inventory, evaluate, manage, and, where necessary, restore scenery as a fully integrated part of the ecosystems of National Forest System lands and of the land and resource management and planning process;
2. Employ a systematic, interdisciplinary approach to scenery management to ensure the integrated use of the natural and social sciences and environmental design;
3. Ensure scenery is treated equally with other resources; and,
4. Apply scenery management principles routinely in all National Forest System activities.

This project is consistent with the Forest Service manual direction.

USDA Forest Service 1990. Land and Resource Management Plan, Mt. Hood National Forest. Identifies Visual Quality Objectives for management areas, as seen from identified view routes, points and trails. This project is consistent with these Forest Plan Standards and guidelines.

Record of Decision, Mount Hood Meadows Ski Area Master Plan Final Environmental Impact Statement, Forest Plan Amendment No. 10, Decision and Required Mitigation

The ROD amended the VQO for the Mount Hood Meadows ski area as seen from the Timberline and Umbrella Falls trails from Partial Retention to Modification in the foreground. The ROD also identified required mitigations for visual resources. This project is consistent with this manual direction.

3.2.5 Summary of Effects by Alternative

All of the alternatives would be in compliance with the Forest Plan VQO as shown in Table 3-9.

Table 3-9: Summary of Visual Effects

Viewpoint	Type of Effect	In Compliance with Forest Plan VQO?
Highway 26 and 35	The proposed Buttercup Ski Lift Replacement would not be visible from Highway 26 and 35.	Partial Retention VQO - Yes
Road 48	The proposed Buttercup Ski Lift Replacement would not be visible from Road 48.	Partial Retention VQO - Yes
Middleground Trails	The proposed Buttercup Ski Lift may be visible from some trails.	Modification VQO - Yes
Timberline Trail and Umbrella Falls Trail	The proposed Buttercup Ski Lift would be visible from the Timberline Trail.	Modification VQO - Yes

3.3 Soil Productivity

More information is available in the project record including the full soil productivity resources analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.3.1 Methodology

Assumptions
Project design criteria/mitigation measures (PDC) would be followed and be as effective as predicted in order to reduce impacts.

Methodology
Impacts to soil resources are disclosed with appropriate PDC based on the Mt. Hood National Forest Land and Resource Management Plan (Forest Plan), as amended by the Northwest Forest Plan. Impacts such as soil disturbance caused by equipment operations as outlined in the Proposed Action would be measured relative to the existing conditions. Guidance for recovering exposed sites is described in Forest Plan Standard and Guideline FW-025 (page Four-49) states that “In the first year following surface disturbing activities, the percent effective groundcover by soil erosion hazard class should achieve at least the levels [shown below].”

Table 3-10: Forest Plan Standards for Soil Erosion Hazard Class

Soil Erosion Hazard Class	Effective Ground Cover
Low to Moderate	60%
Severe	75%
Very Severe	85%

The table above links effective groundcover, which may include vegetation, erosion control blankets, rocks, or gravel to erosion hazard class. The goal for achieving effective groundcover, therefore, also mitigates the erosion hazard. To mitigate the soil erosion hazard for the proposed projects in this analysis, a minimum effective groundcover of 60% needs to be achieved.

3.3.2 Existing Condition

General Overview

Geologic processes on Mt. Hood have created a mixed and highly varied combination of bedrock covered by many types of soil materials (1990 Mt. Hood Meadows Ski Area Master Plan FEIS, pIII-10). Soil types at Mt. Hood Meadows Ski Resort (MHM) Permit Area reflect this variety, ranging from deep loamy glacial soils to poorly drained soils in meadow areas to shallow soils on steep slopes. These soils have developed mainly in glacial deposits with a wind deposited volcanic ash covering. A thin layer of decomposing organic matter, one to two inches thick, typically overlies the surface where conifers are present. Grass/forb dominated meadows tend to have well-developed topsoils down to about six inches. Soils in the uppermost elevations are composed primarily of mixed sand and rock with very little vegetative cover. The depth of soil ranges from deep (greater than 50 inches) to very shallow (less than 20 inches). The major portion of the Permit Area has moderately deep to deep soils, especially in the lower elevations around the proposed lower terminal location.

Buttercup Ski Lift Replacement Area

The area where the replacement lift is proposed is dominated primarily by two main soil types. Both are described in the 1979 Mt. Hood National Forest Soil Resource Inventory (SRI). First is soil type 379, occurring above the meadow area just below the proposed bottom terminal. This is a sandy, very well-drained soil with a mix of meadows and conifer stands. This soil is very stable as long as surface cover is present. Some very small rock outcrops are present near the top of the proposed lift line. Soil type 3 occurs just below the proposed bottom terminal and is a small delineated wetland. Since no ground disturbing activity is proposed on soil type 3, this analysis will occur wholly on soil type 379.

Information on soil type 379 obtained from the 1979 Soil Resource Inventory Report includes the following:

- Surface Soil Erosion Potential of Slight; and,
- Subsoil Erosion Potential of Moderate.

Based upon field observations and previous experience on this soil type, the above ratings are accurate. The area is currently stable and is meeting soil groundcover standards.

3.3.3 Effects Analysis/Environmental Consequences

Direct and Indirect Effects

No Action Alternative
No ground disturbing activities would occur. The area around the current lift would continue to meet groundcover standards and; therefore, remain stable for the short- and long-term.

Alternatives 2 and 3
Effective groundcover goals (FW-025) are expected to be met for all aspects of the construction of the new lift and deconstruction of the existing lift in the short- and long-term. Experience with previous projects such as the half pipe and grading of the current Buttercup run has shown the area to be stabilized within the first year following disturbance through the use of surface covering erosion matting and seeding.

For clarity, this analysis will be broken down into the component of the construction as follows.

- Lower terminal construction and Load Assistance Device installation: The construction of the proposed new lower terminal would occur on a flat site west of the main lodge outside of the wetland area. Access to the construction site is on an existing road. A short-term direct impact is the risk of erosion due to the bare ground during the construction at the terminal and load assistance device. The amount of any eroded material would be small, and should not move far due to the groundcover surrounding the site. A small short-term groundwater study was conducted to ensure the construction was not occurring in, or would impact the small wetland downslope. This study is included in the project record, and showed the area is not a wetland, nor would the project impact the wetland nearby. A conveyor vault would not need to be constructed to facilitate the type of lift in Alternative 3.

- Tower installations: The footings for these towers would be dug with equipment, and the concrete poured by helicopter. Access to each of the proposed tower location is on already disturbed land. Excavated soil material is then laid back around the poured concrete up to the foundation edge, with the remaining soil spread around the tower, seeded and mulched. No adverse long-term indirect impacts are expected. The only short-term direct impact is the very slight risk of erosion due to the bare ground around the tower footings. If any material did erode, the amount would be extremely small and likely only move a matter of a few feet.

- Upper terminal construction: The upper terminal construction would occur on very well drained soils. No adverse long-term indirect impacts are expected. Since the ground is so well drained and rocky, the chances of water erosion are extremely small.

- Utility lines and road access to top terminal: Previous experience with utility line trenching along existing roads has shown that no problems with soil erosion would be expected. The short road needed to access the top terminal location would be close to the contour and graveled a construction practice that has shown to be effective to ensure minimal soil erosion in the short- and long-term.

Cumulative Effects
A list of projects considered in this section is located in Chapter 3. The area considered are the disturbance limits defined on the alternative maps. The time perimeter is one year based on previous projects in this area, which take approximately one year to achieve effective groundcover standards. No direct and indirect effects are expected to cumulate in time or space with the listed previous projects, therefore no cumulative effects are expected.

3.3.4 Consistency Determination

The proposed action is consistent with all applicable laws, regulations, Mt. Hood Meadows Master Plan, and all pertinent Forest Plan Standards and Guidelines for soil resources.

3.3.5 Summary of Effects by Alternative

In Alternative 1 (No Action), the area around the current lift would continue to meet groundcover standards, and therefore remain stable for the short and long term.

In Alternatives 2 and 3 (Proposed Action and Detachable Quad Lift), the effects would be the same at the conclusion of the construction. Despite the slightly larger footprint of the lower terminal in Alternative 3, the same erosion control/groundcover methods would be achieved. Alternative 3 does not include the conveyor vault. Any small, localized changes to groundwater recharge described the in Alternative 2 would not be present in Alternative 3.

3.4 Water Quality

More information is available in the project record including the full water quality analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.4.1 Methodology

The following effects analysis utilizes research, relevant monitoring, field data and modeling to provide a context, amount and duration of effects for each of the alternatives. GIS analysis was completed for a variety of site conditions and parameters in the project area. The Aggregate Recovery Percentage (ARP) model was used to determine whether watersheds in the planning area would meet Mt. Hood National Forest Land and Resource Management Plan (Forest Plan) standards. The ARP model is a standard tool used by many Forest Service resource specialists throughout the Pacific Northwest. The model calculates the “hydrologic recovery” of a watershed, which is based on the amount of human caused vegetation disturbance. This disturbance usually results from vegetation removal and road building. Some considerations about strengths and weaknesses associated with the analysis approach discussed in the following table.

Table 3-11: Strengths and Weaknesses of the Water Quality Analysis Approach

Analysis Approach	Strength	Weakness
Aggregate Recovery Percentage (ARP) Model	Gives a good general idea about potential hydrologic recovery in a basin. Model works well when followed up with field data such as stream surveys.	Model utilizes a number of GIS results and a growth simulation model to determine recovery. These may differ somewhat from what is actually on the ground due to mapping inaccuracies and actual site conditions.
GIS Generated Site Data	Provided more site-specific data for effects analysis. This led to a more accurate effects analysis.	Since layers in GIS are updated as new, more accurate data becomes available, there may be some inaccuracies in current mapping. Accuracy depends on the level of field verification.
Effectiveness of Aquatic Project Design Criteria and Best Management Practices	Effectiveness of various erosion control measures in reducing erosion is generally well documented or has been observed in the field. General effectiveness of buffers in reducing sediment and other impacts is generally well documented.	Effectiveness of various buffer widths on reduction of effects to surface water is not extensively documented in a wide variety of physical settings.
Stream Inventories	Provided more site-specific data for effects analysis. This data has been collected in a Nationally standardized protocol by trained resource professionals.	Some of the inventories are older and some conditions may have changed between the time the data was collected and the present time.

The following assumptions are utilized in the Water Quality Analysis:

- All Best Management Practices (BMP) and Project Design Criteria (PDC) listed in EA, Chapter 2 would be implemented and effective as described in the appendix;
- The areas of impact outlined in EA, Chapter 2 are actual areas of disturbance;
- Monitoring effectiveness of PDC and compliance would be a component of project implementation;
- A large chemical spill (gas, oil or other material) would not be considered in this analysis because it is not a planned activity; and,
- All surface water areas have been identified through field work

3.4.2 Existing Condition

Water Quality

Hydrologic features in the Mt. Hood Meadows (MHM) Ski Resort Permit Area consist of several small streams, permanent snowfields at higher elevations, and wet meadows in areas of lower elevation. The existing Permit Area is drained by the East Fork Hood River and three main tributaries of the East Fork: Mitchell Creek, Meadows Creek, and Clark Creek.

The drainage areas within the Permit Area are all small (less than 3 square miles) and high in gradient (greater than 10 percent slope). The drainage pattern consists of a series of streams running in a southeast direction. The stream courses are generally well defined and typically shallowly incised. Streams in the area carry a heavy natural sediment load which originates mainly from upper elevation glacial action, wind and surface erosion, and mass failures. This heavy natural sediment load is a major influence on the character of these streams. In steep areas, the channels are typically cut to bedrock and the sides are steep and unstable. On flat reaches, the sediment load is deposited in deltas.

The area considered in this analysis is the Upper East Fork Hood River since the proposed project occurs in this sub-watersheds. Upper East Fork Hood River sub-watershed is 8101 acres in size. This 7th field watershed was used as the basis for the site-specific analysis, while the Upper East Fork Hood River 6th field sub-watershed was used for other, larger scale cumulative effects analysis and compliance with the Northwest Forest Plan (NWFP) Aquatic Conservation Strategy (ACS) Objectives.

There are many streams, springs and wetlands located within this sub-watershed. The primary streams include East Fork Hood River and Mitchell Creek. There are approximately 47 miles of stream in the National Forest portion of this 7th field watershed in the following categories: 28 miles of perennial streams (flow year around) and 20 miles of intermittent streams (streams that dry up for part of the year and do not contain fish).

Rivers, streams, and lakes within and downstream of the treatment areas are used for boating, fishing, swimming, and other water sports. Additionally, the Forest streams provide habitat and clean water for fish and other aquatic biota, each with specific water quality requirements. The Clean Water Act (CWA) protects water quality for all of these uses.

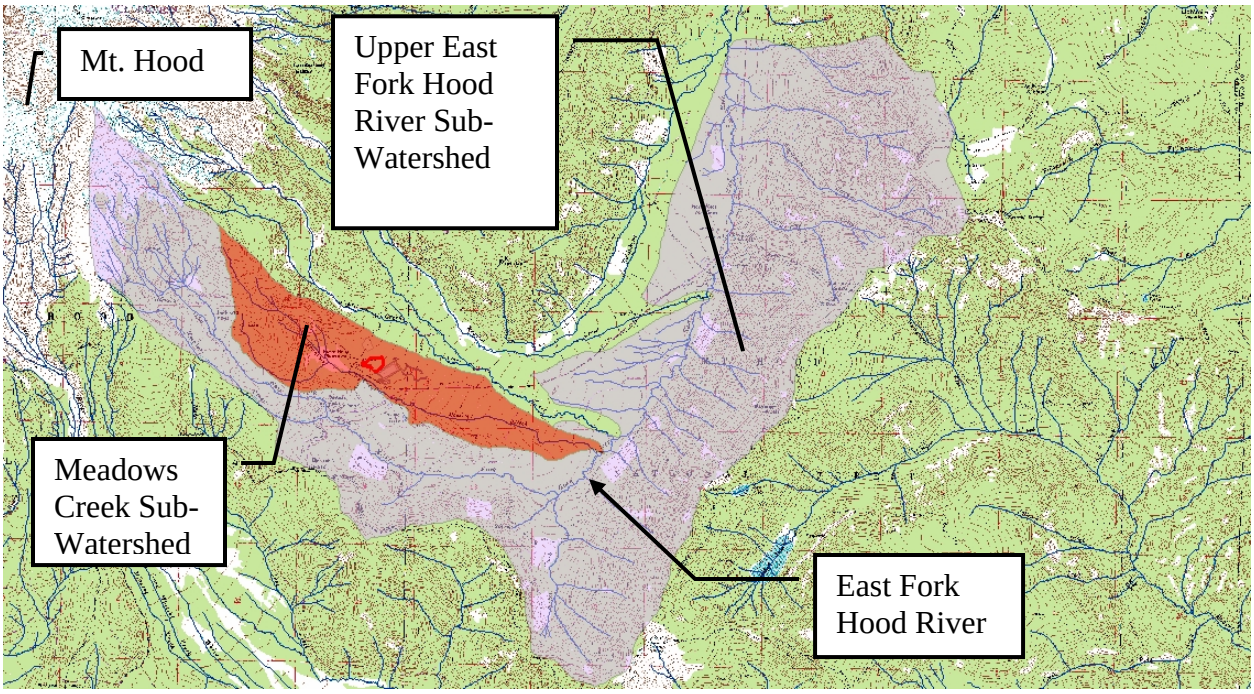


Figure 6: Map of the Water Quality Analysis Area (7th field watershed used in the Water Quality Analysis)

The CWA requires States to set water quality standards to support the beneficial uses of water. The Act also requires States to identify the status of all waters and prioritize water bodies whose water quality is limited or impaired. For Oregon, the Department of Environmental Quality (DEQ) develops water quality standards and lists water quality limited waters. In addition, Region 6 of the Forest Service has entered into a Memorandum of Agreement (MOA) with the Oregon State DEQ to acknowledge the Forest Service as the Designated Management Agency for implementation of the CWA on National Forest System lands. In an effort to support the CWA, the Forest conducts a variety of monitoring and inventory programs to determine status of meeting state water quality standards as well as other regulatory and agency requirements. In an average year, approximately 50 sites are monitored for water temperature throughout the Forest. In addition, other water quality monitoring occurs at various locations throughout the Forest depending on the year. This could be turbidity monitoring, instream sediment sampling, water chemical sampling, or surveys of physical stream conditions. Currently, approximately 25 miles of physical stream habitat is surveyed every year and to date approximately 1200 miles of stream have been surveyed. Some of the information collected during these surveys includes the number of pools and riffles, amount of large wood, riparian area condition and types, and numbers of fish and other aquatic organisms.

By direction of the CWA, where water quality is limited, DEQ develops Total Maximum Daily Load (TMDL) plans to improve water quality to support the beneficial uses of water. For water quality limited streams on National Forest System lands, the U.S. Forest Service provides information, analysis, and site-specific planning efforts to support state processes to protect and restore water quality. Once the TMDL plan is completed and accepted by the Environmental Protection Agency (EPA), streams would be removed from the 303(d) list and stream recovery

would be achieved through an implementation plan. The TMDL plan for water temperature for streams in the Permit Area (West Hood Sub-basin) was completed and accepted by the EPA in 2002. In this document, DEQ concluded that standard and guidelines in the Forest Plan and the Northwest Forest Plan "meet the requirements of a TMDL management plan" (ODEQ 2001).

Stream Temperature
Water temperature data has been collected on Mitchell Creek and the East Fork Hood River since 1992 and Meadows Creek in 2001 through 2005. Maximum stream temperatures at the stations ranged as follows: Mitchell Creek = 32 to 58 degrees Fahrenheit (^{o}F); East Fork Hood River = 35 ^{o}F to 60^{o}F. All of these stream temperatures are below State of Oregon water quality standards of 64.4^{o}F for the 7-day average maximum (salmon and trout rearing and migration).

Sediment
Turbidity measurements are taken hourly and suspended sediment daily at both monitoring stations mentioned above. Turbidity is the measure of the ability of light to pass through water, and is influenced by the amount of suspended sediment in the water sample (MacDonald et al., 1991). An analysis of this data was included in the East Fork Hood River Watershed Analysis. Results indicate that sediment "moves in these basins unevenly, in pulses" (W.A., H-6). No significant bank erosion or scour was noted for the period of record in the stream channels draining these stations, so the analysis concluded that primary sediment sources are "one or more of the following: naturally non-vegetated areas, human-disturbed areas, and aeolian (wind-deposited)". The analysis stated that the division between natural and human-caused erosion and sedimentation is "unclear". Eighteen months of suspended sediment data was compared between the control basin (Mitchell Creek) and the "managed" basin (East Fork Hood River) and each basin had approximately equal annual sediment load per unit land area. According to the analysis, the natural sediment load in both basins is "very high".

Roads and culverts are likely responsible for a large part of the anthropogenic sediment production in this area (W.A., H-6). Road density (miles of road per square mile of basin) can be used as a general indicator of the amount of potential sediment production associated with roads. Road densities within a sub-watershed that exceed 3.0 miles per square mile indicate areas that should be examined more closely for specific sediment related problems, although it is possible to have isolated areas of road instability even in areas of low road density. This road density value is also terrain dependent as lower road density on steeper terrain (greater than 55 percent slope) may be a concern while higher road density on gentler terrain may not be a concern. This is due to higher landslide and erosion concerns on steep terrain. This value is based on several years of observations by local area Forest Service hydrologists, fish biologists, and earth scientists. The road density for the project area Upper East Fork Hood River sub-watershed is 2.4 miles per square mile.

Chemical Contaminants
At least two types of hydrocarbon products are potential contaminants to the aquatic environment from runoff of the Buttercup Ski Lift. These are:

1) lubricants (gear oil and chassis lube); and,
2) hydraulic fluid.

Lubricants and hydraulic fluids are nearly insoluble in water.

Two monitoring efforts were completed in 2004 and 2005 to determine potential oil and grease contamination in East Fork Hood River and Mitchell Creek. East Fork Hood River adjacent to and downstream of the Hood River Meadows Main parking lot was monitored in 2005 and Mitchell Creek adjacent to and downstream of the Hood River Meadows (HRM) Parking Lot was monitored in 2004. Samples were collected during precipitation events at three sites on the East Fork Hood River and four sites on Mitchell Creek. Sampling next to the Main Parking Lot on the East Fork was completed prior to installation of the stormwater management system on the Main Parking Lot.

Six water samples were collected during two rain storms in April 2005 in the East Fork Hood River. Two samples taken from the April 6, 2005 rain event contained 0.4 ppm of hydrocarbons heavier than C24. These are heavier hydrocarbons, usually motor oil or weathered diesel (personal communication with Pyxus Laboratories, 2012). The rest of the samples were below the detection limits. As mentioned above, this sampling was completed prior to installation of the stormwater management system on the Main Parking Lot. Sampling post-stormwater system installation has not been completed to date.

Sixteen water samples were collected over four rain storms in late winter and spring 2004 in Mitchell Creek. All of the samples except for one sample collected on January 23, 2004 were below the detection limit of 3 ppm. Possible sample contamination for the January 23, 2004 sample is suspected as it contains 3 mg/l of polar oil and grease, which are animal fats and vegetable oils (Hood River Meadows Monitoring Report – 2004). This is something that was not expected as a possible contaminant from the Main Parking Lot.

Flow/Hydrology

Peak Flow/Vegetation
Human activities, such as tree removal and roads, can influence the amount of water available for runoff and the timing of runoff, which may translate into increased peak flows (Harr, et al 1975, 1979, Harr 1979, Jones, et al 1996 and Wemple, et al 1996). These increased peak flows can cause stream channel damage in the form of increased bank erosion, channel scour, channel widening, and sedimentation.

Currently, 6.6 percent of existing forested land within the Permit Area has been converted to non-forest area. This would equate to an aggregate recovery percentage (ARP) of 93.4 percent (see Methodology and Analysis Points section for a discussion of ARP).

Peak Flow/Impervious Surfaces
Impervious surfaces are hard surfaces, such as asphalt, concrete, rooftops, and highly compacted soils. Unlike previous areas where soil and vegetation absorb rainwater, impervious surfaces are areas that water cannot go through. Land cover that is impervious prevents rainwater from entering into the soil and forces it to run-off the land until it finds a place where it can enter the soil or is incorporated into human-made drainage systems that carry it directly to a stream, lake, or estuary. Research has shown that as the amount of impervious surface increases, the amount of runoff generated increases. This increased runoff has the potential to scour streambeds, erode stream banks and cause sediment, and other entrained pollutants to enter adjacent water bodies each time it rains (Shaver, et al., 2007).

A wealth of literature indicates relationships between the condition of aquatic habitat and biota relative to levels of impervious area (Karr and Chu 1999). Generally, this literature supports the Impervious Cover Model (ICM) (Schueler 1994), which characterizes drainages with less than 10 percent total impervious surface area as "protecting" stream health, those with 10 to 30 percent total impervious surface as "impacted", and those with more than 30 percent total impervious surface area as "degraded". These values should be used as general guidance and may be slightly different depending on local factors such as soils, geology, forest cover, or rainfall (Booth et al. 2002, Brabec et al. 2002, Jones et al. 2002).

The percent of 7th field sub-watershed that is in an impervious condition was calculated. Impervious surfaces used in this calculation include roads, parking areas and other facilities that have either roofs and/or compacted ground. Currently, Upper East Fork Hood River sub-watershed has 1.2 percent impervious surfaces and would be rated as "protecting" stream health as defined by Schueler. It should be noted that the two existing MHM parking lots in this sub-watershed have stormwater treatment facilities and the recently completed Highway 35 Betterment project includes installation of stormwater treatment measures as part of the new road. The treatment facilities mitigate concerns associated with these impervious surfaces.

Groundwater

Groundwater is found throughout the Permit Area. Groundwater depths vary considerably and range from a few feet to hundreds of feet from the ground surface. Geologic conditions, soil type and precipitation are a few factors that help determine groundwater characteristics. Generally, soils in the ski area are highly permeable and surface water infiltrates quickly. The direction and speed with which groundwater moves are controlled by the slope of the watertable and aquifer permeability. Aquifer permeability is a measure of how easy it is for groundwater to move through the geologic material that makes up the aquifer. The steeper the slope of the watertable and the higher the aquifer permeability, the faster groundwater would move through a geologic formation. Depending on conditions, it can take anywhere from several hours to many decades for groundwater to move through an aquifer. Groundwater traditionally comes in contact with surface streams, lakes or ponds in the form of seeps or springs. These seeps or springs can be sources of high quality water due to their clean, cold condition.

Six water level monitoring wells were installed in June 2012 by Mt. Hood Meadows personnel at the Buttercup Ski Lift bottom terminal location. Each well was monitored weekly throughout the summer until October 16th, 2012 to help determine groundwater levels throughout the monitoring period. The following conclusions were made by Soil Scientist, John Dodd after examining the water level data from the wells:

- The upslope wells went dry first as would be expected;
- All wells eventually went dry, which shows the water table in late summer is somewhere below 10 feet; and,
- The bottom terminal is not in a wetland, but does experience seasonal high water at the time of snowmelt.

3.4.3 Effects Analysis/Environmental Consequences

No Action Alternative (Alternative 1)
If Alternative 1 is implemented, conditions described in the existing conditions section would be maintained. No new ski lift would be constructed.

Proposed Action (Alternative 2)

Water Quality
Stream Temperature: Vegetation removal near water bodies has the potential of increasing solar radiation to surface water, which in turn may increase water temperature. The analysis utilized tools contained within the *Northwest Forest Plan Temperature TMDL Implementation Strategy* (USDA and Bureau of Land Management 2012) document to identify necessary shade so that stream temperatures would not increase as a result of vegetation removal. The document was the result of work between the US Forest Service and the BLM that identifies how to maintain sufficient stream shading to meet the Clean Water Act.

The concept of the sufficiency analysis is to maintain a primary shade zone of vegetation next to the stream and identify a secondary shade zone and other areas within the Riparian Reserves further away from the stream where vegetation may be removed while maintaining stream temperatures. In order to maintain sufficient shade next to the stream, the primary shade zone is untreated. The size of this zone is dependent on the height of the trees that would be removed and the hill slope (Table 3-12). The no-harvest buffers were developed by calculating the width of the riparian area adjacent to perennial stream channels that provides stream shade for the period of greatest solar loading (between 1000 and 1400 hours), known as the primary shade zone, and the width of the riparian area that provides shade in the morning and afternoon (0600-1000 hours; 1400-1800 hours), considered the secondary shade zone. In dense riparian stands, optimum shade can be provided by the primary shade zone alone, and the secondary shade zone may contribute little to no shade since trees in the primary shade zone are already blocking the sun's solar radiation.

Table 3-12: Width of Primary Shade Zone

Height of Tree	Hill slope <30%	Hill slope 30% – 60%	Hill slope >60%
Trees < 20 feet	12 feet	14 feet	15 feet
Trees 20 to 60 feet	28 feet	33 feet	55 feet
Trees 60 to 100 feet	50 feet	55 feet	60 feet
Trees 100 to 140 feet	70 feet	75 feet	85 feet

As an example, if the height of trees in the riparian area are predominately <20-feet tall, the primary shade zone would be 14 feet wide for an area that had 30 percent to 60 percent hill slopes next to the stream. Based on field observations in the project area, the hill slope adjacent to the wetland at the bottom of the proposed Buttercup lower terminal is less than 30 percent. This translates to a maximum primary shade zone of 85-feet for this area. There would be no direct or indirect effects to stream temperature from the proposed Buttercup Ski Lift Replacement project because the Proposed Action does not include any tree removal within the

primary or secondary shade zone along perennial streams. No tree removal within Riparian Reserves is proposed in this alternative.

Sediment: Some ground distubing activites in this alternative have the potential to dislodge soil particles, which in turn may increase erosion. These activities include excavation and installation of footings for terminals and towers as well as excavation and removal of existing tower and terminal footings. A detailed discussion of soil erosion is contained in the Soils Productivity Specialist Report available in the project record. According to the soils analysis, amounts of erosion are expected to be small due to the natural erosion potential rating for soils in the area as "slight", maintaining protective groundcover along with implentation of BMP or PDC as they are referred to in this document. These measures include using silt fence, stabilizing disturbed areas with erosion control materials after construction, and removing excavated material and placing it in stable locations away from surface water.

The chance of delivery of eroded soil material depends on a number of factors including slope, presence or absence of vegetated buffers or surface roughness factors, and distance to adjacent streams. Portions of activities in Alternative 2 would create disturbance within Riparian Reserves which is an initial indication that there could be a higher risk for sediment introduction due to proximity to surface water. These activities include excavation and installation of footings for the new lower terminal and one tower, excavation and removal of the existing lower terminal footing, installation of appoximetely 300 feet of a new power and communication line and installation of approximately 80 feet of drainage line. A total of 0.3 acres of new disturbance would occur within Riparian Reserves (see Table 3-13).

Table 3-13: New Disturbance in Riparian Reserves by Alternative

Activity	Sub-Watershed	Acres in Riparian Reserve by Alternative		Comment
		2	3	
New Lower Terminal Installation	Upper East Fork Hood River	0.2	0.4	Riparian Reserve previously disturbed by grading and vegetation removal.
Removal of Old Lower Terminal	Upper East Fork Hood River	0.07	0.05	See previous comment
New Utility and Drainage Line	Upper East Fork Hood River	0.02	0.02	See previous comment
TOTAL		**0.3**	**0.5**	

Sediment delivery potential is low for the new lift construction due to erosion control measures, plus PDC and BMP designed to minimize erosion and sedimentation. These measures include excavation during the dry time of the year in the Riparian Reserves, using silt fence, stabilizing disturbed areas with erosion control materials, seeding after construction, and removing excavated material and placing it in stable locations away from surface water. These measures have been utilized by Mt. Hood Meadows Ski Area personnel and monitored by a Mt. Hood National Forest soil scientist and hydrologist for longer than a decade and determined to be successful in minimizing erosion and potential sedimentation. The effectiveness of these

measures is also documented in the literature. Burroughs and King (1989) reported that measures such as erosion control blankets alone can reduce sediment production by 80 to 90 percent. Examples of erosion control measures utilized on past Mt. Hood Meadows Ski Area projects are shown in the Figures 7 thru 9 below.

Figure 7: Vista Ridge lift tower construction in the Riparian Reserve showing silt fence. The tower footing was dug by hand and the excavated material was moved offsite utilizing wheelbarrows that traveled on the plywood trail. The plywood was installed to minimize soil damage.

Figure 8: Close-up post construction view of the lift tower shown in the previous photo above.

Figure 9: Vista Ridge tower footing excavation adjacent to an intermittent stream. Erosion control measures include silt fence, stockpiled topsoil that was reused on the site and fill material that is stored away from the stream. Fill material was eventually flown out by helicopter and placed in a stable location away from the Riparian Reserve.

Chemical Contaminants: As discussed in the Existing Condition section, some greases and hydraulic fluids would be used operationally in the lift. These materials are currently used at the existing lift, although the amounts needed for the new lift would be somewhat greater given the increased lift size. However, the amount present at the lower terminal would actually be less than at the existing lift by design – the proposed lift gearbox and drive mechanism, which requires more lubricants and hydraulic fluid, is located at the top terminal far from any surface water. Furthermore, the new conveyor belt vault would be hooked up to existing drainage lines and meltwater within the vault would be treated in the wastewater treatment facility.

Mt Hood Meadows has a Spill Containment and Countermeasures Plan and has an annual training session for staff on this plan. The plan includes procedures and schedules for inspection, containment systems and procedures, and reporting requirements. There has never been a spill at the existing Buttercup Ski Lift facility (personal communication, Steve Warila, Executive Director of Mountain Operations and Planning, Mt Hood Meadows Ski Resort, June 6, 2013)

If a spill of lubricants or hydraulic fluid did occur at the either the upper or lower terminal, the chemical would likely remain at the site because of the spill containment response outlined in the Spill Containment and Countermeasures Plan and transport mechanisms (surface or groundwater

flow) are largely absent. Lubricants and hydraulic fluid are highly viscous, and as such, would bind to the soil. Very little would leach into the groundwater and it is unlikely any would even reach the nearby wetland. As the routing distance to water increases, less of the chemical would enter the water due to evaporation, soil binding, and chemical breakdown. Stringer Meadows is located in-between the terminal and East Fork Hood River; the meadow would trap and naturally break down any remaining contaminants. As such, given the distance from the bottom of the proposed lift to the East Fork Hood River and the presence of Stringer Meadows, the chance that any chemicals would reach the East Fork Hood River is negligible.

To summarize, the possibility of pollutant delivery to both surface and groundwater resources is negligible. This is due to PDC that include acquisition and adherence to all appropriate Local, State and Federal permits, treating any meltwater from the vault in the wastewater treatment facility, the small amount of these chemicals needed for operation of the lift, and the Mt. Hood Meadows Spill Containment and Countermeasures Plan with yearly training.

Flow/Hydrology
Peak Flow/Vegetation and Impervious Surfaces: The proposed project would remove a few trees in the 8101 acre sub-watershed so there would be no peak flow changes from vegetation removal.

As discussed in the Existing Condition section, impervious surfaces have the potential to degrade the aquatic environment if they comprise a high percentage of the watershed area. Implementation of Alternative 2 would not increase the impervious surfaces in a measurable way in the sub-watershed compared to the No Action Alternative and they would remain at 1.3 percent in Upper East Fork Hood River sub-watershed. This value is still well below the threshold of 10 percent identified in literature as potentially starting to degrade the aquatic environment. Impervious surfaces associated with the existing terminals and tower footings would be either removed or broken up to increase permeability and new footings that are slightly larger would be put in place.

Groundwater and Wetlands: There would be potential for very small, localized changes in groundwater amounts and groundwater movement to the adjacent wetland from this project. Some very localized shunting of groundwater flow would occur around the lower terminal and loading vault, but this would be mostly offset by reestablishment of natural groundwater flow patterns when the existing lower terminal footing is removed. Some loss of local groundwater recharge may occur in the vault area (approximately 480 square feet), but it would likely be undetectable in the wetland due to the small size of the vault (0.004 percent of the wetland recharge area) and implementation of PDC, such as covering the vault with a tarp when not in use. Additionally, any water captured in the vault area would be processed in the wastewater treatment plant and discharged back to the surface water system, so this water would remain available for downstream resources.

Summary of Indirect/Direct Effects
Detrimental effects to water quality would be reduced or eliminated through implementation of PDC and BMP in Alternative 2. The only portion of this project that may have some risk of direct/indirect detrimental effects to water quality or quantity is the conveyor vault and the loss of some localized groundwater recharge. This would be minimized due to the small size of this

feature compared to the total recharge area and implementation of PDC aimed at minimizing the amount of melt water that would be pumped to the water treatment facility. The table below is a summary of the changes to water quality indicators between Alternative 1 and 2.

Table 3-14: Summary of water quality indicators for Alternative 2.

Water Quality Effects Measure	Alternative 2	Change from Alternative 1	Applicable Threshold of Concern
Percent of Sub-watershed in Impervious Surfaces	1.2% in Upper East Fork Hood River	No measureable change in Headwaters East Fork Hood River due to offset from removal or breaking up existing footings and large sub-watershed size	Concern if Total Impervious Surface Greater than 10%
Acres of New Disturbance in Riparian Reserve	0.3 Acres	Increased by 0.3 Acres	No Threshold

Cumulative Effects

The table below provides a qualitative summary of potential cumulative watershed effects. It shows past, present and reasonably foreseeable future projects, effects from those projects that may result in cumulative effects with the Buttercup Ski Lift Replacement, whether these projects overlap in time and space and an assessment if a measureable cumulative effect is expected. Findings of this summary are supported by the analysis above which utilizes pertinent research, PDC, BMPs, and applicable management standards and guidelines.

Table 3-15: Cumulative Effects for Water Quality

Project	Potential Effects	Overlap in		Measurable Cumulative Effect?	Extent, Detectable?
		Time	Space		
Past MHM Ski Area Projects	Stream Temperature	No	Yes	No	Projects are completed. No remaining sediment, stream temperature and water quantity effects due to mitigation measures and project design criteria implementation on the original projects and natural recovery.
	Suspended Sediment	No	Yes	No	
	Water Quantity	Yes	Yes	No	
Highway 35 Betterment Project – Clark Creek Wetland Enhancement	Stream Temperature	Yes	No	No	Buttercup Ski Lift Replacement Project would maintain the primary shade zone so there should be no increase in stream temperature.
	Suspended Sediment	Yes	No	No	There may be an overlap in timing of this project with the Buttercup Ski Lift Replacement Project; any minor suspended sediment would not be measurable due to implementation of PDC and conformance with existing standards and guidelines in both projects. Additionally, no mixing of sediment from either project is expected due to the long distance from the project area to the confluence of Meadows Creek, Clark Creek and the East Fork Hood River.
Stadium Lift, Blue Wetland Enhancement and Access Road Culvert Replacement	Stream Temperature	Yes	Yes	No	Buttercup Ski Lift Replacement Project would maintain the primary shade zone so there should be no increase in stream temperature.
	Suspended Sediment	Yes	No	No	There may be an overlap in timing of this project with the Buttercup Ski Lift Replacement; any minor suspended sediment would not be measurable due to implementation of PDC and conformance with existing standards and guidelines in both projects. Additionally, no mixing of sediment from either project is expected due to the long distance from project areas to the confluence of Meadows Creek, Mitchell Creek and the East Fork Hood River.

Project	Potential Effects	Overlap in		Measurable Cumulative Effect?	Extent, Detectable?
		Time	Space		
Highway 35 Betterment Project – Meadows Creek Culvert Replacements	Suspended Sediment	Yes	No	No	There may be an overlap in timing of this project with the Buttercup Ski Lift Replacement; any minor suspended sediment would not be measurable due to implementation of PDC and conformance with existing standards and guidelines in both projects. Additionally, no mixing of sediment from either project is expected due to the long distance from project areas to the confluence of Meadows Creek, Mitchell Creek and the East Fork Hood River.
Sunrise and Hood River Meadows Parking Lots	Stream Temperature	Yes	Yes	No	Buttercup Ski Lift Replacement Project would maintain the primary shade zone so there should be no increase in stream temperature.
	Suspended and Bedload Sediment	Yes	Yes	No	There would be an overlap in timing of effects with activities associated with these facilities and the Buttercup Ski Lift Replacement Project. The potential for mixing would be on the East Fork Hood River, below the main parking lot and at the confluence of Mitchell Creek and East Fork Hood River. There is a low risk of sedimentation from the Buttercup Ski Lift Replacement Project due to implementation of PDC and BMP and conformance with existing standards and guidelines in both projects.
	Chemical Contaminants	Yes	Yes	No	There would be an overlap in timing of effects with activities associated with these facilities and the Buttercup Ski Lift Replacement Project. As described in the indirect/direct effects section, types and amounts of chemical use for the Buttercup Ski Lift Replacement Project would be similar to existing conditions. Additionally, effects would be minimized due to implementation of PDC and conformance with existing standards and guidelines in both projects.

Project	Potential Effects	Overlap in		Measurable Cumulative Effect?	Extent, Detectable?
		Time	Space		
Sunrise and Hood River Meadows Parking Lots (continued)	Water Quantity	Yes	Yes	No	There would be an overlap in timing of effects with these facilities and the Buttercup Ski Lift Replacement Project. As described in the effects section of this report, the Buttercup Ski Lift Replacement Project may have a very small, localized effect on groundwater recharge, but the potential effect and resulting cumulative effect would be minimized due to implementation of PDC and conformance with existing standards and guidelines in both projects.
Mt. Hood Meadows Parking Lot Improvements EIS	Suspended and Bedload Sediment	Yes	Yes	No	Depending on which Alternative is selected for the Mt. Hood Meadows Parking Lot Improvements EIS, there may be an overlap in timing of effects with these facilities and the Buttercup Ski Lift Replacement Project. The new Sunrise Vehicle Maintenance Shop would be the facility closest to the Buttercup Ski Lift. Activities associated with vehicle traction and snow management at the shop would have the potential to add more sediment to adjacent surface water in some Alternatives. As described in the effects section of this document, the amount of sediment from the Buttercup Ski Lift Replacement Project would be minimized due to implementation of PDC, BMP and conformance with existing standards and guidelines in both projects.
	Chemical Contaminates	Yes	Yes	No	There would be an overlap in timing of effects with activities associated with these facilities and the Buttercup Ski Lift Replacement Project. As described in the indirect/direct effects section, types and amounts of chemical use for the Buttercup Ski Lift Replacement Project would be similar to existing conditions. Additionally, effects would be minimized due to implementation of PDC and conformance with existing standards and guidelines in both projects.

Project	Potential Effects	Overlap in		Measurable Cumulative Effect?	Extent, Detectable?
		Time	Space		
Mt. Hood Meadows Parking Lot Improvements EIS (continued)	Water Quantity	Yes	Yes	No	There would be an overlap in timing of effects with these facilities and the Buttercup Ski Lift Replacement Project. As described in the effects section of this report, the Buttercup Ski Lift Replacement Project may have a very small, localized effect on groundwater recharge, but the potential effect and resulting cumulative effect would be minimized due to implementation of PDC and conformance with existing standards and guidelines in both projects. The Mt. Hood Meadows Parking Lot Improvements EIS has some proposed facilities located in the same sub-watershed that would increase the percentage of impervious surfaces, but the Buttercup Ski Lift Replacement Project would not increase the overall percentage of impervious surfaces due to offset from removal or breaking up existing footings and large sub-watershed size.
Highway 35 and Forest Service Road 3555 sanding for vehicle traction	Suspended and Bedload Sediment	Yes	Yes	No	There may be an overlap in timing of this project with the Buttercup Ski Lift Replacement; any minor suspended sediment would not be measurable due to implementation of PDC and conformance with existing standards and guidelines in both projects. Additionally, no mixing of sediment from either project is expected due to the long distance from project areas to the confluence of Meadows Creek, Mitchell Creek and the East Fork Hood River.

Stream Temperature: No detrimental cumulative effects are expected as a result of increased water temperature due to PDC that maintain existing primary shade vegetation adjacent to streams. As described in the direct and indirect effects section, this project would maintain existing water temperatures.

Sediment: No detrimental cumulative effects as a result of sediment introduction are expected from this project. As described in the direct and indirect effects section, PDC aimed at minimizing erosion and sedimentation reduce the potential of erosion and delivery of the material to adjacent surface water.

Chemical Contaminants: No detrimental cumulative effects are expected as a result of chemical contaminates due to PDC minimizing the amount of chemical contaminates onsite and routing stormwater runoff through treatment facilities.

Water Quantity: A peak flow analysis was completed for this project and is displayed in the Effects Section above. This project along with other projects on and off National Forest lands were included in the Watershed Impact Area calculation (Forest Plan Standard FW-067, pg. Four-55) and the sub-basin was found to be in compliance with Forest Plan Standard FW-064, as such, no cumulative effects are anticipated for water quantity. In addition, total impervious surface values for the sub-watersheds are below thresholds of concern identified in literature.

Alternative 3

Water Quality
Stream Temperature: Effects to stream temperature for Alternative 3 would be similar to those described for Alternative 2. There would be no primary shade zone vegetation removed in Alternative 3.

Sediment: Direct and indirect effects from sediment for Alternative 3 would be similar to those described for Alternative 2. There would be slightly more disturbance in the Riparian Reserves (0.2 acre increase), but PDC and BMP implementation would minimize the amount of erosion and resulting sedimentation. The increase in impacts to the Riparian Reserves are due to area needed for the towers and terminals for the detachable quad lift design. This design requires a larger footprint associated with the terminals, so the disturbance in the Riparian Reserve at the lower terminal would be slightly larger than Alternative 2.

Chemical Contaminants: Direct and indirect effects from chemical contaminants for Alternative 3 would be similar to those described for Alternative 2. As in Alternative 2, the major drive for this lift system is at the upper terminal, outside of the Riparian Reserve. In addition, this alternative does not have the conveyor vault in the design so there would not be chemicals associated with the operation of the conveyor system present with this alternative. This would slightly decrease the risk for overall chemical contamination.

Flow/Hydrology
Peak Flow/Vegetation and Impervious Surfaces: Direct and indirect effects from increase water quantity for Alternative 3 would be similar to those described for Alternative 2.

Groundwater and Wetlands: In general, direct and indirect effects from sediment for Alternative 3 would be similar to those described for Alternative 2. The only difference is that Alternative 3 does not include the conveyor vault. Any small, localized changes to groundwater recharge described in Alternative 2 would not be present in Alternative 3.

Summary of Indirect/Direct Effects
Detrimental effects to water quality and quantity would be reduced or eliminated through implementation of PDC and BMP in Alternative 3. There would be slightly more new disturbance in the Riparian Reserve in this Alternative compared to Alternative 2. The overall relative risk of detrimental indirect/direct effects to water quality for Alternative 3 is slightly greater than Alternative 2 due to more disturbance in the Riparian Reserve, but it is still low. The table below is a summary of the changes to water quality indicators between Alternative 1 and 3.

Table 3-16: Summary of water quality indicators for Alternative 3.

Water Quality Effects Measure	Alternative 3	Change from Alternative 1	Applicable Threshold of Concern
Percent of Sub-watershed in Impervious Surfaces	1.2% in Upper East Fork Hood River	No measureable change in Headwaters East Fork Hood River due to offset from removal or breaking up existing footings and large sub-watershed size	Concern if Total Impervious Surface Greater than 10%
Acres of New Disturbance in Riparian Reserve	0.5 Acres	Increased by 0.5 Acres	No Threshold

Cumulative Effects
Water quality cumulative effects for Alternative 3 would be the same as those described for Alternative 2.

3.4.4 Consistency Determination

Numerous existing plans provide guidance for projects in the form of Standards and Guidelines (S&G) and recommended Best Management Practices (BMP). These documents include the Mt. Hood National Forest Land and Resource Plan (Forest Plan), the Northwest Forest Plan (NWFP) and associated supporting documents, Mt. Hood Meadows Ski Area Master Plan and the West Hood Subbasin TMDL. A summary of applicable water quality S&G and BMP's from these documents are displayed below.

Forest Plan Standards and Guidelines (pages Four-53 through 63)

- Standards and Guidelines dealing with Air Quality – FW-40,41,42,43,44,45,46,47
- Standards and Guidelines dealing with BMPs – FW-54,55,56,57,58,59,60

- Standards and Guidelines dealing with analysis considerations – FW-61,62,63,64,65,66,67

- Standards and Guidelines dealing with maintaining good water quality (temperature and sediment) - FW-109,110,111,112,113,114,127,128,129,132,133,134,135,136

Northwest Forest Plan (NWFP) Standards and Guidelines:

- Standards and Guidelines dealing with Recreation Management (NWFP ROD pg. C-34), RM-1

- Standards and Guidelines dealing with Riparian Reserves (NWFP ROD, pg. C-31 through C-38). The primary Standards and Guidelines that pertain to this project are Recreation Management – RM-2.

- Aquatic Conservation Strategy

The Clean Water Act of 1948 (as amended in 1972 and 1987) establishes as federal policy the control of point and non-point pollution and assigns the States the primary responsibility for control of water pollution. Compliance with the Clean Water Act by National Forests in Oregon is achieved under State Law.

West Hood Subbasin TMDL: Continue to follow Mt. Hood LRMP and Northwest Forest Plan Standards and Guidelines as well as the *Northwest Forest Plan (NWFP) Temperature TMDL Implementation Strategies: Evaluation of the Northwest Forest Plan Aquatic Conservation Strategy (ACS) and Associated Tools* (2005).

In addition to the plans discussed above other documents such as the draft "Forest Service National Core Best Management Practices" (USDAFS, 2012) provide guidance about potential BMP's for this project. Those BMP's would be incorporated where appropriate.

As outlined in the effects section this project is consistent with applicable law and direction stated above. Major highlights include:

- The inclusion of Best Management Practices (BMP) to meet water quality standards and the Clean Water Act. These BMPs reduce or eliminate potential degradation from increased water temperature and sedimentation;
- Establishment of Riparian Reserves; and,
- Designing prescriptions within Riparian Reserves to contribute to attainment of Aquatic Conservation Strategy Objectives (see Section 3.6, Aquatic Conservation Strategy for more information).

Executive Order 11990 – Protection of wetlands

As documented above, wetland mapping efforts have been completed by consultants hired by Mt. Hood Meadows as well as Forest Service specialists that did field work for this project. All of the Alternatives do propose some level of entry into Riparian Reserves adjacent to a wetland. This is due to site limitations, and the incursions were avoided where possible. As outlined in the Water Quality section, PDC and BMP aimed at reducing or eliminating potential detrimental effects to water quality are included with this project.

Executive Order 11988 – Protection of floodplains

Due to the steepness of the topography, small stream size and confined nature of streams in this area, floodplain width is fairly limited. The 100-year floodplain on all first order tributaries is estimated to be less than 15 feet wide in general. On East Fork Hood River, the 100-year floodplain is estimated to be generally less than 30 feet wide, while Meadows and Mitchell Creek are about 20 feet wide. There would be no work proposed to occur in a floodplain area.

3.4.5 Summary of Effects by Alternative

All action alternatives would have some disturbance in the Riparian Reserves. Alternative 2 has less disturbance than Alternative 3.

Table 3-17: Summary of Effects by Alternative

Activity	Alternative 2	Alternative 3
Riparian Reserve Disturbance (Acres)	0.3	0.5
Increase In Impervious Surface (Percent)	Upper East Fork Hood +0.0%	Upper East Fork Hood +0.0%
Risk of Some Increased Water Temperature?	None	None
Risk of Some Increased Sediment?	Low	Low
Risk of Some Increased Chemical Contaminants?	Low	Low

3.5 Aquatics

More information is available in the project record including the full aquatics analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.5.1 Methodology

The analysis method utilized to determine the level of impact on aquatic species and habitat was as follows.

- Determine known and suspected locations of aquatic species and designated critical habitat and essential fish habitat in relation to proposed project activities.
- Assess proposed project activities (including post construction) and determine the aquatic habitat elements potentially impacted and the geographic area where effects could occur (i.e. the affected environment).
- Overlap the species/habitat locations with the affected environment and determine which species/habitat could be affected by project activities.
- When species/habitat overlaps with affected environment analyze proposed project activities in the context of the habitat elements potentially impacted. For much of this

analysis, I relied on soils and hydrology analyses to determine the potential effects to physical resource (i.e. habitat). For this project, the following was considered:

- Direct effects to aquatic fauna and habitat from construction activities;
- Potential reductions in stream shade and subsequent increases in water temperature compared to existing levels;
- Potential increases in erosion and fine sediment input to streams and wetlands compared to existing levels; and,
- Changes in peak/base stream flow compared to existing levels.

- Where changes to habitat parameters discussed above result from proposed project activities, the effects to aquatic species/habitat were analyzed and then effects to the biological resource were determined based on professional experience, applicable surveys/studies, and available literature/research.

3.5.2 Existing Condition

Existing Condition Overview

The existing, and proposed, Buttercup Ski Lift is located within the Upper East Fork Hood River 7th field sub-watershed (within the Upper East Fork Hood River 6th field watershed and the East Fork Hood River 5th field watershed). The nearest perennial stream to the ski lift is the East Fork Hood River across the Main Base Parking Lot. The existing bottom lift terminal, and the proposed location of the new lift terminal (regardless of alternative) are located within a Riparian Reserve of a small wetland (Figure 10). At its closest point, the area of disturbance for the new bottom terminal would be about 40 feet from the wetland.

A definable stream channel was located in the area during a site visit on October 15, 2011; however, the presence of the wetland located at the bottom end of a swale, or low point, that collects seasonal runoff was noted. Although there was no surface water some sedges were present at the lowest point of the swale, near the existing lift bottom terminal, indicating that groundwater was close to the surface. No evidence of sustained surface flow or ponding was found. Surface water that does seasonally collect in the wetland either evaporates or infiltrates into the soil. Some of the groundwater from this area eventually goes into a pipe underneath the Main Base Parking Lot and ends up in Stringer Meadows and ultimately the East Fork Hood River.

Figure 10: A photograph of the existing and proposed location (blue rectangle) of the Buttercup Ski Lift, including the proposed tower alignment (blue line). The wetland is not shown in this photograph, but is located approximately where the photographer stood to take the picture. The depiction of the new location is not to scale nor is it wholly accurate; it is for general reference only.

Affected Environment

The affected environment, also known as the action area, is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action [50 CFR §402.02]. For the purposes of this analysis, the affected environment is defined as all areas where ground disturbance would take place for the ski lift replacement. Since the lift location is isolated from streams, the action area does not include the East Fork Hood River or Mitchell Creek, or any other perennial or seasonal wetland in the main base area.

Aquatic Species/Habitat Present

There are no aquatic species that reside in the affected environment because there are no perennial streams or wetlands as described above. There is no aquatic fish or macroinvertebrate habitat present in the affected environment. Surveys for aquatic mollusks in the Survey and Manage category are not required as habitat is not present.

3.5.3 Effects Analysis/Environmental Consequences

There are no fish or aquatic macroinvertebrates that reside in the affected environment, nor is designated critical habitat present. As a result, none of the proposed alternatives (No Action, Proposed Action, Alternative 3) would have any direct, indirect or cumulative effect on aquatic species or habitat.

3.5.4 Consistency Determination

No federally listed aquatic species are known to reside in the affected environment; nor is there designated critical habitat, thus coordination with U.S. Fish and Wildlife Service and National Marine Fisheries Service is not required. There are no fish/aquatic organisms specific Federal, state, and county laws, regulations, or policy that would affect the proposed project.

All proposed activities regardless of alternative comply with applicable aquatic direction, recommendations, and/or standards and guidelines outlined in the following plans:

- Mt. Hood National Forest Land and Resource Management Plan (Forest Plan);
- Northwest Forest Plan (1994);
- Survey and Manage ROD (2001);
- MHM Ski Area Master Plan; and,
- East and Middle Forks Hood River Watershed Analysis.

3.5.5 Summary of Effects by Alternative

Since there are no aquatic species or habitat within the affected environment the implementation of the Buttercup Ski Lift replacement project would have **no effect/impact** on any proposed, endangered, threatened, or sensitive aquatic species or habitat regardless of the alternative.

3.6 Aquatic Conservation Strategy

In order for a project to proceed, "a decision maker must find that the proposed management activity is consistent with the Aquatic Conservation Strategy objectives" (ROD B-10) from the Northwest Forest Plan Record of Decision. The nine objectives are listed on page B-11 of the ROD. Portions of the effects analysis in this document focus on key parameters or indicators that make up elements of the nine Aquatic Conservation Strategy objectives, to determine if the project would restore, maintain, or degrade these indicators. Once this determination is made, the indicators are examined together with the Range of Natural Variability to ascertain whether the project is consistent with the objectives. A description of the range of natural variability of the "important physical and biological components" (ROD B-10) is necessary for determining whether a project "meets" or "does not prevent attainment" of the Aquatic Conservation Strategy objectives (ROD B-10). Relevant portions of the range of natural variability from the Watershed Analysis are included in the Existing Conditions section of this report. In general, natural sediment loads are high in this area and sediment tends to move unevenly, in pulses through the aquatic system. Recent debris flow activity in White River, Clark and Newton Creeks are an example of the high natural sediment load in this area.

The following table displays specific indicators that comprise the Aquatic Conservation Strategy (ACS) objectives and the effects section that covers this indicator in the Environmental Assessment.

Table 3-18: ACS Objective Indicators in the Environmental Assessment

Indicators	Analysis Found in the Effects Section of the Environmental Assessment
Water Temperature	Water Quality
Sediment	Soil Productivity, Water Quality, Aquatics
Chemical Contamination	Water Quality
Physical Barriers	N/A
Substrate	N/A
Large Woody Debris	N/A
Pool Frequency	N/A
Pool Quality	N/A
Off-Channel Habitat	N/A
Refugia	N/A
Width/Depth Ratio	N/A
Streambank Condition	N/A
Floodplain Connectivity	Water Quality, Aquatics
Peak/base Flows	Water Quality
Drainage Network Increase	Water Quality
Riparian Reserves	Water Quality, Aquatics

The following table displays the individual indicators and the effect the alternatives have on those indicators at the 5th, 6th and 7th field watershed scale. Fifth field watersheds are generally large in size (40,000 acres to 250,000 acres), while 6th and 7th field watersheds are smaller (5,000 acres to 40,000 acres and 2,000 acres to 5,000 acres respectively).

Table 3-19: ACS Objective Indicators for each Alternative The abbreviations in the table are defined as: R="Restore" which means the action(s) would result in acceleration of the recovery rate of that indicator; M="Maintain" which means that the function of an indicator does not change by implementing the action(s) or recovery would continue at its current rate; and, D="Degrade" which means changing the function of an indicator for the worse

Indicators	Effects of the Actions by Alternative		
	1	2	3
Water Quality: Temperature	M	M	M
Sediment	M	M	M
Chemical Contamination	M	M	M
Habitat Access: Physical Barriers	M	M	M
Habitat Elements: Substrate	M	M	M

Indicators	Effects of the Actions by Alternative		
	1	2	3
Large Woody Debris	M	M	M
Pool Frequency	M	M	M
Pool Quality	M	M	M
Off-channel Habitat	M	M	M
Refugia	M	M	M
Channel Conditions and Dynamics: Width/Depth Ratio	M	M	M
Streambank Condition	M	M	M
Floodplain Connectivity	M	M	M
Flow/Hydrology: Peak/Base Flows	M	M	M
Drainage Network Increase	M	M	M
Watershed Conditions: Riparian Reserves	M	M	M

All indicators would be maintained and within the range of natural variability as outlined in the effects analysis above.

3.7 Wildlife

More information is available in the project record including the full wildlife analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.7.1 Existing Conditions, including Methodology

The project area is the Mt. Hood Meadows Ski Resort Permit Area (MHM Permit Area). The project area encompasses all areas within the Permit Area that will have project actions taking place. Larger scale analysis was done at the 5th field watershed for snag and down wood by using DecAid.

Two species of wildlife classified as threatened, endangered or proposed for listing may be found on or adjacent to the Hood River Ranger District on the Mt. Hood National Forest (the Forest). There are seventeen Forest Service Region 6 sensitive species (December 2011), seven other Survey and Manage species, and seven Management Indicator Species (MIS) that may also be found on the District (Table 3-20).

Table 3-20: Survey Results of threatened, endangered, and proposed species; Forest Service Region 6 sensitive species; Survey and Manage species; and Management Indicator Species in the Permit Area (includes surveys completed for previous projects).

WILDLIFE SURVEY RESULTS		
Species	**Habitat**	**Presence**
Federally Threatened, Endangered or Proposed		
Northern spotted owl *(Strix occidentalis caurina)*	N	-
Canada lynx *(Lynx canadensis)*	N	-
R6 Sensitive Species		
Bald eagle *(Haliatus leucocephalus)*	N	-
Cope's giant salamander *(Dicomptodon copei)*	N	-
Cascade torrent salamander *(Rhyocotriton cascadae)*	N	-
Oregon spotted frog *(Rana pretiosa)*	N	-
Painted turtle *(Chrysemys picta)*	N	-
Northwestern pond turtle *(Clemmys marmorata marmorata)*	N	-
Baird's shrew *(Sorex bairdii permiliensis)*	N	-
Pacific fringe-tailed bat *(Myotis thysanodes vespertinus)*	N	-
Wolverine *(Gulo gulo luteus)*	Y	-
Pacific fisher *(Martes pennanti)*	N	-
Horned grebe *(Podiceps auritus)*	N	-
Bufflehead *(Bucephala albeola)*	N	-
Harlequin duck *(Histrionicus histrionicus)*	N	-
Gray flycatcher *(Empidonax wrightii)*	N	-
Peregrine falcon *(Falco peregrinus anatum)*	Y	-
Johnson's hairstreak *(Callophyrs johnsoni)*	N	-
Mardon skipper *(Polites mardon)*	N	-
Survey and Manage		
Great gray owl *(Strix nebulosa)*	Y	-
Larch Mountain salamander *(Plethodon larselii)*	N	-
Dalles sideband *(Monadenia fidelis minor)*	N	-
Crater Lake tightcoil *(Pristiloma arcticum crateris)*	N	-
Evening fieldslug *(Deroceras hesperium)*	N	-
Puget Oregonian *(Cryptomastix devia)*	N	-
Columbia Oregonian *(Cryptomastix hendersoni)*	N	-
Management Indicator Species		
Mule Deer (*Odocoileus hemionus*) and Elk (*Cervus elaphus nelsoni*)	Y	Y
Pileated Woodpecker *(Dryocopus pileatus)*	N	-
Pine Marten *(Martes americana)*	Y	Y
Wild Turkey *(Meleagris gallopavo)*	N	-
Western Gray Squirrel *(Sciurus griseus griseus)*	N	-
Other Species		
Snag and Down Log Associated Species	Y	Y
Neotropical Migratory Birds	Y	Y

Species that are listed as "N" for Habitat in Table 3-20 do not occur within the Permit Area or would not be impacted by this project and will not be discussed further in this analysis. Species that are listed "Y" in habitat and "-" in presence are species that have habitat present, but are not denning/nesting in the habitat available or only use the habitat is transitory.

Threatened, endangered and proposed species (Northern spotted owl)

There is no northern spotted owl habitat in the Permit Area, because the elevation of the project it is outside of the species' habitat. The helicopter staging area would be at the Main and/or Sunrise Parking Lots, which are both over the 0.5 mile distance requirement for Type 1 helicopters set by the U.S. Fish and Wildlife Service (USFWS). The project site itself is over a mile away from the nest patch putting the project and staging area outside the disruption and disturbance distances as defined by USFWS. As such, there is No Effect to spotted owls associated with this project and no consultation is required under the Endangered Species Act. Since there is no habitat present and no effect, this species will not be discussed further in this biological evaluation.

Region 6 Sensitive Species

Wolverine

Habitat

The wolverine needs large tracts of undeveloped and uninhabited areas and are considered highly sensitive to human presence. Wolverines inhabit a variety of habitats in the alpine, tundra, taiga, and boreal forest zones. They are found in coniferous, mixed, and deciduous woodlands, bogs, and open mountain as well as tundra habitats (Mitchell-Jones et al. 1999) Studies indicate that resident populations of wolverines occur primarily in areas with snow cover that persists through mid-May at the end of the wolverine denning period (Aubrey et al 2007). In the mountains of the western contiguous United States, these climactic conditions are limited to high-elevation areas in the Cascade Range.

Home ranges of adult wolverine in North America range from less than 62 square miles to over 560 square miles. The variation in home range sizes among studies may be related to differences in the abundance and distribution of food. Male home ranges are typically larger than those of females. Transient wolverines likely play a key role in the maintenance of spacial organization and the colonization of vacant habitat (Ruggerio et al. 1994). Factors that affect movements of dispersing individuals may be important to population and distribution dynamics.

Wolverine dens are made by tunneling in the snow, and may or may not be associated with trees or boulders (Magoun and Copeland 1998). Dens in Alaska were usually long, complex snow tunnels with no associated trees or boulders. In contrast, dens in Idaho were always associated with fallen trees or boulders. All dens were covered with at least 3 feet of snow. With few exceptions, wolverine dens described to date have been located in alpine, subalpine, taiga, or tundra habitat. Reports of dens in low elevation, densely forested habitats are rare.

It appears that the limiting factor for wolverine is the presence of an abundant, large mammalian prey base, and the exclusion of human presence (Hatler 1989). Wolverine habitat selection is negatively affected by human activity, including roads, infrastructure, and backcountry recreating (May et al. 2006: Krebs et al. 2007).

Wolverines are generally described as opportunistic omnivores in summer and primarily scavengers in winter. Studies have shown the importance of large mammal carrion and the availability of large mammals underlies the distribution, survival, and reproductive success of

wolverines. Over most of their range, ungulates are the main source of carrion. Large mammals are important all year, although carrion tends to be more available in the fall and winter.

Methodology
Wolverine tracks have been observed near the Highway 35 corridor. The higher elevations of the Permit Area may provide suitable denning habitat. However, the amount of human use most likely reduces the likelihood of denning in the area. Due to the wide ranging nature of wolverines, it is possible that MHM could be within a wolverine's home range and that an animal could forage there, especially during the late winter and early spring when elk and deer carcasses may be available.

Peregrine Falcon

Habitat
The Peregrine is a medium-sized raptor that has adapted to a wide range of prey and nesting locations. They feed primarily on other birds and 92 prey species have been identified at Pacific Northwest nest sites ranging in size from humming birds to western gulls (Henny and Nelson 1981). Other prey species include bats, ground squirrel, gray squirrel, chipmunks, and mountain beaver.

In Oregon, peregrines occur as resident and migratory populations. They nest on cliffs ranging from 75 to 1,500 feet in height, and within 1 mile of some form of water. The average occupied cliff size in the Cascade Mountains is 229 feet (Marshall, et al. 2003) . Cliff nests are on ledges as well as potholes and stick nests originally constructed by other raptors are common. Peregrines often use the same nest in consecutive years but some pairs also may use a different nest site each year. Nesting occurs in xeric areas of eastern Oregon, montane habitats that extend to over 6,000 feet elevation, small riparian corridors statewide, and more recently in urban habitats of the lower Willamette and Columbia rivers (Marshall, et al. 2003).

Adults remain in the vicinity of nest sites throughout the year at Pacific Northwest locales below 4,000 feet. At lower elevations, eggs are usually laid by mid-March to mid-April, but may vary at any single site up to 6 weeks. Fledging occurs late May through mid-August, depending on site elevation and weather. The peregrine falcon is sensitive to disturbance during the breeding season, but reaction to human disturbance is highly variable among individuals. Peregrines seem to be more sensitive to disturbances occurring above or at the same level as cliffside eyries, than to disturbances occurring below eyries.

Methodology
Surveys were conducted on the Forest in the 1990's. Nest sites were confirmed on the Zigzag and Clackamas Districts. There are records of sightings of peregrines in the Permit Area however, it's expected that sightings are primarily of transient birds. There is suitable nesting habitat within one mile of the Permit Area, but occupancy of this habitat is currently unknown. The home range of a falcon occupying this nest site would overlap with the Permit Area and would use the Permit Area as foraging habitat.

Survey and Manage

Great Gray Owl

Habitat
The great gray owl is one of the largest of the North American owls. It is the only member of the Strix genus found both in North America and Eurasia. It is essentially a bird of the boreal forests, occupying a latitudinal band from Scandinavia through much of the former Soviet Union (Mikkola 1983) and from Alaska through Ontario (Bull and Duncan 1993). The owl's northern limits generally coincide with the tree line; trees are critical for nesting, for cover and for hunting perches. The great gray owl is unevenly distributed throughout its range. It is known to occur in the following physiographic provinces within the Northwest Forest Plan area: WA Western Cascades, WA Eastern Cascades, OR Western Cascades, OR Eastern Cascades, OR Coast Range, OR Willamette Valley, OR Klamath, CA Klamath, and CA Cascades where suitable nesting, roosting and foraging habitat is present (Interagency Species Management System (ISMS) data 2003, Winters et al, 1986, Fetz, et al.).

The great gray owl's breeding range includes areas outside the boreal forests in the western United States. In Montana, Wyoming, Idaho, Washington, Oregon, Nevada and California, it is found in montane and subalpine forests (Winter 1986, Bull and Henjum 1987, Forsman and Bryan 1987, Bull and Duncan 1993). The most westerly and southerly portions of this breeding range include areas covered under the Northwest Forest Plan (Huff et al. 1996). Their home range size may change depending on food supply, but averages 2.8 square miles.

Great gray owls are long-lived (approximately 11 years), capable of high reproduction (nesting annually and producing clutches of as many as nine eggs; Mikkola 1993, Bull and Duncan 1993), and capable of traveling great distances (Nero 1980, Duncan 1992). Radio-tracking shows that individuals can travel up to 25 miles in 24 hours and 400 miles in 3 months. They tolerate other owls and other birds of prey within their home range (Mikkola 1983) and defend only a small area around their nests (Bull and Duncan 1993). Competition for nest sites with other owls and raptors is likely greater than competition for prey. The highest reported nesting density in North America is 0.73 pairs per square mile in Manitoba and northern Minnesota (Duncan 1987). Bull and Henjum (1990) calculated densities of 0.66 pairs per square mile on their two eastern Oregon study areas.

Courtship generally begins in late February or early March. Breeding and egg-laying may take place as early as late March or as late as early June (Platt and Goggans 1991). Egg-laying may be delayed in areas with heavier snows or lows in the prey cycle. Clutch size varies from one to four eggs and females incubate the eggs while the male brings her prey (Bull and Henjum 1990). Incubation takes about 28 to 29 days.

Great gray owls hunt primarily from perches, listening and watching the ground intently. When prey is detected, the owl usually flies only a short distance averaging 35 feet (Bull and Henjum 1990), but may fly up to 328 feet to catch prey (Bull and Duncan 1993). Great gray owls can detect and capture prey by sound alone, which allows them to capture prey beneath snow. Hunting usually occurs nocturnally, but they may hunt in the morning and evening daylight hours when numerous young are being fed. Despite their large size, great gray owls utilize relatively small

prey. In the western U.S., the primary prey are pocket gopher and voles (Mikkola 1983 and Bull and Duncan 1993). Great gray owls tend to forage in meadows or other openings, though males in Northeastern Oregon were noted foraging in forest stands with 11 to 59 percent canopy closure (Bull and Henjum 1990). Within the Western Cascades Physiographic Province of Oregon, the preliminary data reviewed suggests that some great gray owls are foraging within the nest stands.

Similar to most owls, great gray owls do not construct nests or carry nesting materials (though females may scratch a depression in the bottom of a nest such as a snag). Great gray owls are, therefore, dependent on existing nests. Potential substrates include stick nests built by common raven and hawks, squirrel nests, broken-top snags, the platforms caused by infections of dwarf-mistletoe, and artificial platforms. Availability of nest sites and suitable foraging habitat are considered the most important factors determining habitat use by breeding great gray owls (Collins 1980, Nero 1980, Mikkola 1983). Since foraging and nesting habitat can be quite different, proximity of these two habitat types is important as well.

Great gray owls preferred to nest in mature or older stands, with a fairly open understory and dense overstory of 60 percent or greater canopy closure (Bull and Henjum 1990). In Eastern Oregon, nest tree size ranged from 23 to 31 inches in diameter. The birds tend to select nest sites in forests near meadows or other openings that have sufficient prey numbers. However, they would nest in a wide variety of habitat types as long as the required habitat characteristics exist.

Methodology
Surveys for great gray owls were conducted on the Forest in 1997 and 1998. They have not been documented in the Permit Area, but are defined as "suspected" to occur on the Forest. An owl was detected on the Warm Springs Reservation approximately 20 miles south of the Permit Area in 2004. The Permit Area contains habitat that is considered suitable for nesting which includes nesting structure (broken top trees or other nesting platforms) and adjacent meadows for foraging. Given the home range size of the great gray owl, the Permit Area would only support one nesting pair's territories.

Surveys for great gray owls are required when an activity has a likely substantial negative impact on the species habitat, its life cycle, microclimate, or life support requirements (Survey & Manage ROD 2001). While some trees would be removed, the impact from this activity is insignificant when analyzed in the context of the owls' habitat requirements and the size of its home range. Surveys were not conducted because the impacts from the proposed project do not pose a substantial negative impact to the species. See the Direct, Indirect and Cumulative Effects Section for more details on the impacts to great gray owls.

Management Indicator Species
The National Forest Management Act requires the Forest Service to manage wildlife habitat to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." The National Forest Management Act requires the Forest Service to identify Management Indicator Species through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. The primary assumption of this process is that indicator species represent the habitat needs of other species because they have similar habitat requirements. Spotted owls, for example, indicate the needs of a variety of animals that use old growth forest. This analysis focuses on certain key species and does not specifically address

common species except to the extent that they are represented by these management indicator species.

Management Indicator Species as defined by the Mt. Hood Land and Resource Management Plan (Forest Plan) for this portion of the Forest include northern spotted owl, pileated woodpecker, American marten, deer and elk, gray squirrel, and wild turkey (Table 3-21).

Table 3-21: Management Indicator Species for the Project Area.

Management Indicator Species	Habitat Description	Habitat Present in Analysis Area	Species Present in Analysis Area
Northern Spotted Owl	Old Growth	Yes	Documented
Deer	Early Forest Succession Mature/Old Growth	Yes	Documented
Elk	Early Forest Succession Mature/Old Growth	Yes	Documented
Pileated Woodpecker	Mature/Over Mature	Yes	Documented
American Marten	Mature/Over Mature	Yes	Documented
Gray Squirrel	Old Growth Ponderosa Pine Pine/Oak	No	Not Present
Wild Turkey	Old Growth Ponderosa Pine Pine/Oak	No	Not Present

With the selection of some of these species there was a special emphasis on mature, over mature, and old growth habitat. The selection was done at a time when timber harvest was planned to replace many older stands with younger more rapidly growing stands: it was suspected that the mature and over mature stands would decline and the species associated with this habitat could be lost. Several species were selected to represent all of the species that required this type of habitat. A Forest-wide analysis for Management Indicator Species has been conducted: the report is incorporated by reference and is available in the project record located in Hood River, Oregon.

Mule Deer and Elk

Habitat
Deer and Elk were selected as Management Indicator Species (MIS) in the Forest Plan because they are economically important game animals. Based on State and global rankings, deer and elk are common, widespread and abundant. The Oregon Department of Fish and Wildlife (ODFW) consider deer and elk game species. Deer and elk utilize early-successional habitat for foraging and were originally thought to require mature and old growth forest for thermal cover.

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 deer and elk survival and production. Over time, wildlife managers have questioned if elk required thermal cover. Currently, there is not much support from the elk research community for the necessity of thermal cover for elk. John Cook indicated at the Elk Modeling Workshop (April 2010) that telemetry data indicated elk were

negatively associated with cover. Cook indicated that openings are far more valuable for elk than cover. With the reduction in regeneration timber harvest, the Forest now has abundant optimal and thermal cover, but openings for forage are becoming scarce. There are approximately 69,226 acres of early-seral habitat on the Forest. This level is declining over time since plantations have grown dense with trees that shade out forage.

Deer and elk populations on the Forest are stable with a future anticipated trend of declines from a reduced amount of early-successional habitat due to reductions in harvest, differences in harvest methods, and low levels of wildfires. This is general consensus among biologist on the Forest and ODFW. There is limited data to support this because dense cover makes surveys too difficult to be reliable. At this time, there is no concern for viability of the species by ODFW. If viability becomes a concern, ODFW would close or limit the hunting season.

High road densities lead to harassment of elk herds. Harassed elk move more often than elk left alone and use of habitat decreases as road density increases (Witmer 1985). It is also recognized that elk within or moving through areas of high open-road densities move longer distances; often several miles per day. There are limited open roads in the Permit Area and vehicle displacement is likely due to Highway 35. This has a greater impact than the access associated with Elk Meadows Trail and summer workers for Meadows.

The Permit Area supports elk and deer for most of the summer and fall months by providing rearing habitat and summer range. Deer and elk move to lower elevations during the winter months and would not utilize the Permit Area during this time. Optimum habitat for elk consists of approximately 40 percent cover habitat and 60 percent forage habitat. Within the Permit Area hiding cover is abundant and forage habitat is limited. MHM has a Permit Area of 3,554 acres. Of this total, 178.1 acres of natural openings and 235.8 acres of created openings have been utilized.

Forage is widely available on the District, but is generally of low quality. The low quality forage, and the lack of wetlands and permanent low-gradient streams on the District are considered one of the limiting factors for elk and possibly deer. The shapes and sizes of forage areas influence the level of use, deer and elk prefer to feed near forested cover. The eastern half of the Permit Area remains sufficiently forested so that elk and deer use of natural meadows and existing ski trails is probably near optimal, considering the effect of nearby roads. Areas around the main lodge have fragmented forested patches next to forage areas that do not provide for sufficient cover for use to be consistent or measurable. This is exacerbated by the amount of human disturbance that occurs year round located in and around forage areas.

The most heavily used forage areas observed in the past were in the stringer meadows. The few wetlands areas existing on cleared ski runs are also fairly heavily used. Areas of huckleberry and other shrubs (such as willows) are occasionally heavily used in old-growth forest areas. However, cleared runs, natural subalpine and alpine meadows, and other natural openings were barely used (FEIS 1990). Evidence of forage utilization by big game is lowest in cleared runs. Ongoing ski area development has caused declines and seasonal changes in use of historical forage areas by elk and deer. Much of the use of forage areas appears to be nocturnal, as a result of human activity associated with existing ski area development.

Thermal cover for elk is defined as a stand of coniferous trees at least 40-feet tall with an average crown closure of 70 percent or more. Optimal cover is found mainly in multi-storied mature and old-growth stands. Within the Permit Area the lower half is optimal habitat for deer and elk, and within the Permit Area the habitat is primarily optimal thermal cover. The old growth forests provide fair to good summer thermal and hiding cover adjacent to open areas, where the forest is in fairly large contiguous blocks. Areas cleared for runs, however, are too narrow and open to provide adequate hiding or summer thermal cover.

Elk herds in the East Fork Hood River Watershed likely exhibit a close association with riparian habitat in areas of gentle terrain and low road density. Research on elk in this type of habitat generally shows that elk spend most of their time in close proximity to streams or wetlands. This kind of habitat is in and adjacent to the Permit Area. Due to past timber sales there are openings that allow for foraging opportunities with cover close by. Huckleberry and other key forage habitat like meadows are inside the Permit Area. Keeping contiguous forested routes to and from the area is important for deer and elk migration to other key areas like the white river, teacup and pocket creek areas.

Methodology
Deer and elk were observed within the Permit Area; however, site-specific surveys were not completed for the analysis. Assumptions for deer and elk include that the Permit Area and adjacent habitat is at or near carrying capacity. It is also assumed that habitat use is not evenly distributed throughout, specifically that deer and elk tend to use the eastern portion of the Permit Area and ski runs in higher elevations where there is little human use during the summer.

American Marten

Habitat
The American marten is referred to as the pine marten in the Forest Plan. The American marten is an indicator species of mature or older forests with dead and defective standing and down woody material. It has a feeding area that utilizes several stand conditions that range from poles to old growth. American martens often utilize higher elevation sub-alpine stands and prefer older habitat with a highly complex component of dead trees and down wood with cavities (Buskirk 1994). They prefer mature forests with closed canopies, but sometimes use openings in forests if there are sufficient downed logs to provide cover (Csuti 1997).

The Forest has approximately 21,553 acres of habitat that have a 30 percent or higher probability of supporting American marten. A home range of 173 acres was used in determining the number of home ranges on the Forest. There are approximately 63 to125 home ranges for martens on the Forest. The original Forest Plan analysis for marten overestimated habitat at 231 home ranges. The current model is closer to predicting the actual population because it is supported by tracking information provided by Cascadia Wild (winter tracking data and camera stations). Home ranges may contain two adults and up to three young. The estimated population on the Forest is 310-625 martens.

In the western United States, the American marten's distribution is fragmented. Summaries of track plate and camera surveys (Kucera et al. 1995) show that marten continue to be distributed throughout the Sierra Nevada and Cascades but are absent from the historic range in northwest

California. Home ranges vary from 1 to 4.5 square miles for males and from 0.4 to 3.6 square miles for females (Simon 1980, Zielinski et al. 1997).

Martens prey on vertebrates smaller and larger than themselves, eat carrion, and forage for bird eggs, insects, and fruits (Marten 1994). Their diets in summer include a wide range of food types, while berries are important in the fall. As snow cover increases, martens utilize mostly mammalian prey, the most important of which are ground squirrels, mice, and rabbits. Martens forage by walking along the ground or snow surface, with forays up trees, investigating possible feeding sites by sight and smell. They can easily become habituated to human foods and would inhabit areas with relatively high levels of human use in order to take advantage of discarded food items.

American martens are closely associated with forested habitats with complex physical structure near the ground. Structure can include the lower branches of living trees, tree boles in various stages of decomposition, coarse woody debris, shrubs, and rock fields. Use of non-forested habitats by martens increases in summer and includes meadows and small harvest units near forest edges, as well as areas above the tree line in western mountains (Buskirk and Ruggiero 1994). While martens may utilize meadows and small harvest units, marten populations markedly decline in areas with clear cut logging (Thompson and Harestad 1994).

Suitable habitat for marten is most commonly created by ecological succession. However, in some instances, disturbances such as disease, fire, and timber cutting that leave coarse woody debris can increase structure near the ground over the short term.

Methodology
The Permit Area contains habitat that is suitable for denning and foraging and marten were documented in the Permit Area in August of 2010 and in January 2012. Habitat is assumed to be throughout most of the Permit Area.

Snag and Down Log Associated Species
Many wildlife species in the Pacific Northwest evolved to use large snags and logs that were historically abundant on the landscape and the loss of these forest components reduces the ability of these species to persist in these habitat types. Approximately 236 acres within the Permit Area has had trees, snags, and logs removed in the past to construct ski runs, chair lifts, maintenance buildings, road construction, and parking lots.

Methodology
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 et al. 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.

A critical consideration in the use and interpretation of the DecAID tool is that of scales of space and time. DecAID is best applied at scales of subwatersheds, watersheds, subbasins, physiographic provinces, or large administrative units, such as Ranger Districts or National Forests. DecAID is not intended to predict occurrence of wildlife at the scale of individual forest stands or specific locations. It is intended to be a broader planning aid not a species or stand specific prediction tool.

Modeling biological potential of wildlife species has been used in the past. DecAID was developed to avoid some pitfalls associated with that approach. There is not a direct relationship between the statistical summaries presented in DecAID and past calculations or models of biological potential.

Refer to the DecAID web site listed in the References section for more detail and for definition of terms (Mellen et al. 2003). This advisory tool focuses on several key themes prevalent in recent literature:

- Decayed wood elements consist of more than just snags and down wood, such as live trees with dead tops or stem decay.
- Decayed wood provides habitat and resources for a wider array of organisms and their ecological functions than previously thought.
- Wood decay is an ecological process important to far more organisms than just terrestrial vertebrates.

The Permit Area is located within the habitat type identified in DecAID as the Montane Mixed Conifer in the vegetation condition of "large trees." For this forest type, the DecAID advisor identifies the 30 percent tolerance level for snags as 11 snags per acre greater than 10 inches and 3.7 per acre greater than 20 inches in diameter. It identifies the 30 percent tolerance level for down wood as 3.3 percent cover of down wood (including all decay classes) with sizes of logs averaging 10 to 21 inches in diameter. Most of the forested portions of the Permit Area contain snag and down wood numbers above the 30 percent tolerance level.

Neotropical Migratory Birds

Habitat
In 1990, there were approximately 40 species of birds recorded within the MHM Permit Area. Some of the species observed included the mountain chickadee, red crossbill, golden-crowned kinglet, yellow-rumped warbler, pine siskin, red-breasted nuthatch, American robin, rufous hummingbird, and evening grosbeak. Species specific to MHM area are Nashville warbler, yellow warbler, hermit warbler, hermit thrush, Lincoln's sparrow, and purple finch. Eight of the birds were cavity nesters including hairy woodpecker, northern flicker, pileated woodpecker, American Kestrel, violet green swallow, mountain bluebird, mountain chickadee, and redbreasted nuthatch. Other likely species include the black-backed woodpecker and the three-toed woodpecker because suitable habitat exists. The pileated woodpecker, a MIS of mature and old growth forests, appears to be distributed throughout the Permit Area. An abundance of snags and mature timber in the area indicates that habitat is optimal. A Lewis woodpecker was observed in the area. Another focal species, the blue grouse, inhabits the subalpine fir portions of the Permit Area.

Methodology
Bird surveys were not conducted. Species that were seen while on field trips or during other work were noted. Species present from previous surveys and information from past planning efforts at MHM are assumed present in the Permit Area.

Conservation strategies for land birds of the east slope of the Cascade Mountains in Oregon and Washington and a conservation strategy for land birds in coniferous forests in western Oregon and Washington were prepared in June 2000 and March 1999 respectively by Bob Altman of American

Bird Conservancy for the Oregon-Washington Partners in Flight. The strategies are designed to achieve functioning ecosystems for land birds by addressing the habitat requirements of "focal species." By managing for a group of species representative of important components of a functioning ecosystem, it is assumed that many other species and elements of biodiversity would be maintained.

Table 3-22 displays the focal species potentially positively or negatively affected by changes in habitat in the eastern slope of the Cascade Mountains region, and the forest conditions and habitat attributes they represent.

Table 3-22: Focal Migratory Bird Species

Forest Conditions	Habitat Attribute	Focal Species
Ponderosa Pine	Old forest, large patches	White-headed woodpecker
Ponderosa Pine	Large trees	Pygmy nuthatch
Ponderosa Pine	Open understory, regeneration	Chipping sparrow
Ponderosa Pine	Burned old-forest	Lewis' woodpecker
Mixed Conifer	Large trees	Brown Creeper*
Mixed Conifer	Open understory, regeneration	Williamson's sapsucker
Mixed Conifer	Grassy openings, dense thickets	Flammulated owl
Mixed Conifer	Multi-layered, structural diverse	Hermit thrush
Mixed Conifer	Fire edges and openings	Olive-sided flycatcher*
Oak-Pine Woodland	Early-seral, dense understory	Nashville warbler
Oak-Pine Woodland	Large oaks with cavities	Ash-throated flycatcher
Oak-Pine Woodland	Large pine trees/snags	Lewis' woodpecker
Lodgepole Pine	Mature/old-growth	Black-backed woodpecker
Whitebark Pine	Mature/old-growth	Clark's nutcracker
Montane Meadows	Wet and dry	Sandhill crane
Aspen	Large trees/snags, regeneration	Red-naped sapsucker
Subalpine fir	Patchy presence	Blue grouse*

*Significantly declining population trends in the Cascade Mountains Physiographic Region.

This methodology is consistent with the white paper "Incorporating Migratory& Resident Bird Concerns into the National Environmental Policy Act Process Region Six Forest Service & OR/WA Bureau of Land Management" (Bresson 2013).

3.7.2 Effects Analysis/Environmental Consequences

The direct wildlife effects common to all alternatives include habitat loss, increased fragmentation, alterations or loss of special features such as snags and down logs and harassment by increased human presence during construction. These direct impacts are discussed in the species-specific discussions below as appropriate.

R6 Sensitive Species

Wolverine

No Action Alternative (Alternative 1) - Direct and Indirect Effects
Human disturbance would continue from recreational and administrative uses. There would be no habitat impacted and no change in the use patterns of wolverines with this alternative. Therefore, this alternative would have **no impact** to wolverines

Action Alternatives (Alternatives 2 & 3) - Direct and Indirect Effects
All action alternatives are being analyzed the same way because wolverines have large home ranges (62 to 560 square miles). Foraging and denning opportunities would still be available in the portion of the home range outside of the Permit Area. Because wolverines are highly sensitive to human presence, the disturbance associated with the alternatives could temporarily displace foraging wolverines. Because the proposed projects are near areas of high human influence the alternatives would likely not reduce the available denning habitat. Due to the large home ranges of the wolverine, it is unlikely that the Permit Area would impact more than one male or one female with kits. The proposed projects **may impact individuals, but are not likely to impact populations, nor contribute to a potential loss of viability of this species**.

Cumulative Effects
The spatial scale for wolverines is the Permit Area, consideration was given to past, current and reasonable foreseeable projects in relation to the current conditions. Habitat removal within the Permit Area is not likely to have a measurable impact on habitat available for wolverines due to human presence. Projects that were analyzed include: Highway 35 Betterment, teacup grooming, Mt. Hood Meadows Parking Improvements EIS (Twilight Parking Lot and Sunrise Maintenance Shop), Blue Grass Ridge fire, Stadium Lift realignment, and avalanche control techniques, including the Howitzer and hand charges which can be heard throughout the Upper Hood River Valley.

The immediate short-term cumulative effects from these projects are the increased human presence in summer from construction activities and thus disturbance to foraging behavior of prey species. When considering cumulative effects to wolverines, consideration was given to habitat that is most likely to be occupied. This habitat is higher in the Permit Area and more likely farther away from user services like the Buttercup Ski Lift. The direct effect this noise can have on wolverines is unknown, but with noise from heavy equipment and a helicopter with the increase in construction activities as well as recreational opportunities, there is less opportunity for future re-colonization of the area to historical levels.

Peregrine Falcon

No Action Alternative (Alternative 1) - Direct and Indirect Effects
Human disturbance would continue from recreational and administrative uses and these levels would not change. There would be no habitat impacted with this alternative. Therefore, this alternative would have **no impact** to peregrine falcon.

All Action alternatives (Alternatives 2 & 3) - Direct and Indirect Effects
The action alternatives are being analyzed together because the Peregrine nest site is over two miles away and the effect of all alternatives is assumed to be the same. Peregrine falcons are sensitive to human presence, so the disturbance associated using the helicopter could temporarily disturb nesting birds. Potential disruption would only take place during construction activities and potentially impact no more than one breeding pair for one breeding season. No nesting habitat would be directly impacted by the action alternatives and there would continue to be sufficient foraging habitat adjacent to the Permit Area within the territory of a nesting pair. Foraging habitat is not being removed due to the feeding techniques of peregrines. The proposed project **may impact individuals, but is not likely to impact populations, nor contribute to a potential loss of viability of this species**.

Cumulative Effects
The spatial scale for peregrines is the Permit Area and within close vicinity to the presumed nest site, temporally consideration was given to past, current and reasonably foreseeable future projects and possible impacts. These projects could contribute to disturbance to peregrine falcons: Highway 35 betterment (including White River bridge replacement, Clark Creek wetland enhancement and snow park decommissioning), Meadows Creek Highway 35 and Teacup Road culvert replacements, Teacup grooming activities, Blue Grass Ridge fire, Stadium Lift realignment (including Blue Wetland restoration and trash rack culvert replacement), Mt. Hood Meadows Parking Improvements EIS (Twilight Parking Lot and Sunrise Maintenance Shop), Annex Wetland restoration, paving on Sunrise Parking Lot, general on-going road maintenance including winter road treatments, general on-going ski area activities (e.g., ski run maintenance, hazard tree removal, and sign replacement), Sahalie Falls bridge stabilization, precommercial thinning, and avalanche control. The primary impacts would be disturbance from human presence associated with the implementation of the projects and noise from helicopter use; however, due to the vicinity of the projects and nesting habitat the cumulative effect is minimal. No nesting habitat would be impacted by any of these projects.

Survey and Manage – Great Gray Owl

No Action Alternative (Alternative 1) - Direct and Indirect Effects
There would be no noise disturbance or habitat impacted with this alternative. The number of snags that provide habitat would remain unaltered while allowing for larger trees and snags to be recruited as perch habitat. With the No Action Alternative, there would be no sound related disturbances associated with construction activities. Therefore, this alternative would have **no impact** to great gray owls. Due to maintenance of ski runs, openings would remain available for foraging.

All Action Alternatives (Alternatives 2 & 3) - Direct and Indirect Effects
The proposed project **may impact individuals, but is not likely to impact populations, nor contribute to a potential loss of viability of this species**. Because great gray owls are sensitive to human presence, the disturbance associated with action activities could temporarily displace nesting birds. The disruption would only take place during construction activities and potentially impact no more than one breeding pair. Tree removal for this project is limited to only a few hazard trees located at the top terminal. Since great gray owls hunt by perching in trees or snags, tree removal would reduce the number of trees available for hunting. Because the home range of a

great gray owl is approximately three square miles, this impact to potential nest and perch trees is extremely small. It is also more likely that great gray owls would be nesting in the lower elevations of the Permit Area, where higher quality nesting habitat is located and where trees are not currently proposed for removal.

Surveys for great gray owls are required when an activity has a likely substantial negative impact on the species habitat, its life cycle, microclimate, or life support requirements according to the 2001 *Record of Decision and Standards and Guidelines for Amendments to Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (Survey & Manage ROD). While some trees would be removed, the impact from this activity is insignificant when analyzed in the context of the owls' habitat requirements and the size of its home range. Surveys were not conducted because the impacts from the proposed project do not pose a substantial negative impact to the species. As such, the project is consistent with the survey requirements in the 2001 Survey and Manage ROD for this species.

Cumulative Effects
The Permit Area is the spatial boundary for analyzing cumulative effects. Projects that were done in the past, current and reasonably foreseeable future were analyzed for great gray owls. Potential impacts to great gray owls include hazard tree removal within the Permit Area because this reduces available nesting trees. Hazard tree removal has the potential to remove large snags; however, due to management practices trees should only be removed when they pose a threat to human life or safety. These would be in areas of used by humans where great grays are less likely to be located. Other direct effects include disturbance by noise from construction work, maintenance, avalanche control, and fire management techniques. Habitat within the Permit Area is available and in general good condition for great gray owl use. The proposed projects and those that have the potential to occur in the near future are not proposed in the meadow systems upon which great grays rely heavily.

Management Indicator Species

Mule Deer and Elk

No Action Alternative (Alternative 1) - Direct and Indirect Effects
No cover would be lost and no forage would be gained with this alternative. No additional disturbance would take place with this alternative.

Action Alternatives (Alternatives 2 & 3) - Direct and Indirect Effects
Construction activities could potentially disturb animals that are in the area at the time of implementation. The potential disturbance is predicted to be small in scale. The Permit Area is in inventoried summer range and disturbance that occurs during this season could potentially displace animals, and has the potential to affect the health of individuals if the disturbance occurs near active calving sites. The project is not predicted to cause a measurable reduction in the current local population size for either deer or elk. No additional main roads would be created; therefore, road densities would remain unchanged and would be below the Forest Plan Standard of 2.5 miles per square mile for inventoried summer range. Because the Permit Area is so close to the base and active summer use by maintenance personnel, elk and deer usage likely occurs at night and animals move away from known high human use during the day. A total of 1.5 acres would be impacted for

creation of the new ski lifts. This small amount does not pose any major losses and makes the project impacts limited to deer and elk. The proposed alternatives **may impact individuals, but is not likely to impact populations, nor contribute to a potential loss of viability of this species.**

Cumulative Effects
Cumulative effects were bound spatially by the district boundary to the West and East, south to Highway 26, and North to Little John Sno-Park. Temporal bound was within the last 10 years, current and reasonably foreseeable future projects and management activities. Recreational activities, timber harvest, parking lot construction, and Highway reconstruction all have the potential to impact deer and elk through disturbance and/or habitat changes. There have been several large fires recently that wrap around the Northwestern portion of the Mt. Hood: all are excellent forage habitat for deer and elk. Due to current timber practices and management and road decommissioning, habitat is increasing in value. Because of the vast tracks of habitat that are available to deer and elk, this project and the relatively small amount of habitat removal would not push deer and elk into a declining state. As such, there are no cumulative effects that would result from this project.

American Marten

No Action Alternative (Alternative 1) - Direct and Indirect Effects
No habitat would be impacted with this alternative. Snag and tree densities which the marten depends on would remain unchanged in the short-term. In the long-term, additional snags would be recruited from the live trees in the Permit Area.

Action Alternatives (Alternatives 2 & 3) - Direct and Indirect Effects
The alternatives are being analyzed the same because the effects to the species are presumed similar. There is documentation of marten use in close proximity to the Permit Area. Since denning and foraging activities are unknown, the assumption is they are using the Permit Area. Because of the relatively small home range of this species (0.4 to 4 square miles), the tree removal may have an impact on an individual's ability to forage and locate denning sites. It is not anticipated that this would impact more than one individual's home ranges. Tree removal would be small in scale and not anticipated to be a major impact to martens.

Since martens may inhabit areas with high levels of human use, the disturbance caused by construction activities may not have a significant impact on martens unless the disturbance is directly adjacent to a denning or foraging area. Because of the small home range size, disturbance may prevent an individual from foraging or denning in the area for the duration of construction activities. This impact would be short-term and last only one season. The action alternatives **may impact individuals, but is not likely to impact populations, nor contribute to a potential loss of viability of this species**.

Cumulative Effects
Cumulative effects were analyzed at the Permit Area level, and consist of past, present and reasonably foreseeable future projects and management activities. Past ski run clearance and maintenance and chair lift construction have reduced the amount of suitable habitat for marten in the Permit Area. Other projects also include those that remove trees, such as parking lot construction and hazard tree removal. These projects also have the potential to reduce snags and

down wood on the landscape which are used by marten for denning and foraging. Management practices help to keep snags that are within the Permit Area that do not pose a human safety risk. Those that are fell stay in the Permit Area as down wood which helps to create important habitat for marten. Old ski run clearance may act as foraging habitat for marten during the summer. The lower portion of the Permit Area is mature forest habitat that is relatively intact. Overall, the cumulative effects are not expected to have a long term impact on the species.

Snag and Down Log Associated Species

No Action Alternative (Alternative 1) - Direct and Indirect Effects
Snags and down logs would remain unchanged in the short-term. In the long-term, additional snags and down logs would be recruited from the live trees in the Permit Area.

All Action Alternatives (Alternatives 2 & 3) - Direct and Indirect Effects
Snag and down logs would be reduced in the Permit Area. In the long-term, the removal of trees would prevent further recruitment of snags and down wood. The current condition for large snags in the watershed is comparable to historic conditions for 2 to 10 and 12 to 14 snags per acre, but is lacking in 10 to12 snags per acre, more than 14 snags per acre, and high density patches of large snags (Figure 1). Twice as much of the watershed now has zero snags per acre compared to historic conditions. Implementation of this project would result in the loss of snags greater than 12 inches in dbh (diameter at breast height). This number of snags in not measurable at the watershed scale, therefore, there would be no substantive reduction in the percentage of biological potential being provided for species dependent on snags and down wood.

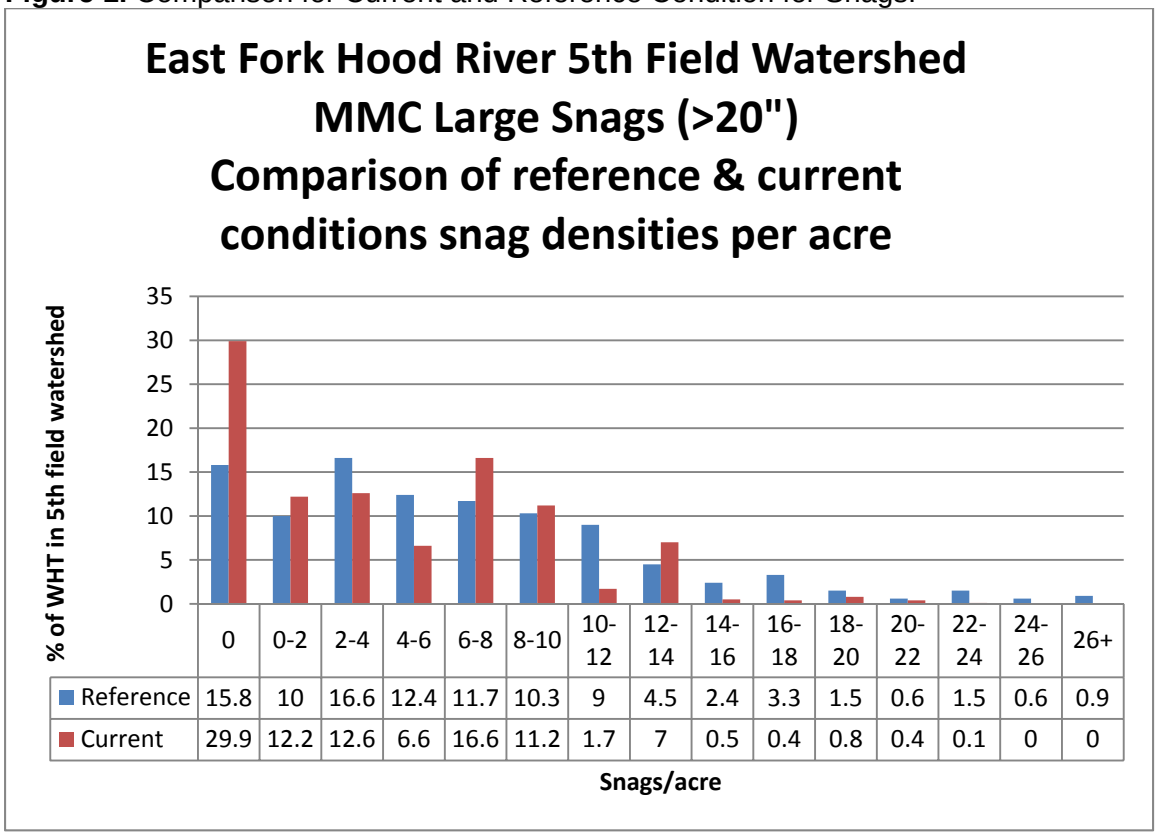
The current condition for this habitat type was taken from the estimates in DecAID advisor. These estimates included all disturbances through 2006. The Gnarl Ridge Fire within this watershed was in 2008 after the analysis was completed for this habitat type. Therefore, the current condition for the category of 26+ snags per acre may be underestimated if a portion of the fire was within the mountain mixed conifer habitat type in this watershed.

There is only a few snags proposed for removal for human safety reasons. Down logs are pushed out of ski runs, but remain in the watershed. Analyzing these reductions at the watershed scale make the effects for the projects un-measurable for snag and down wood. Also, FW-240 allows for an exception to the snag and down log Standards and Guidelines in A11 Winter Recreation Areas (i.e., downhill ski slopes). As such, this project is fully consistent with the snags and down log Standards and Guidelines within the Forest Plan.

Cumulative Effects
Cumulative effects were analyzed at the watershed scale to coincide with the DecAID analysis. Past timber harvest, ski run clearance and maintenance, and chair lift construction have reduced the amount of snags and down wood in the Permit Area and nearby vicinity. Other projects in the watershed that remove trees, such as timber harvest, parking lot construction, Highway reconstruction, and hazard tree removal, also have the potential to reduce snags and down wood on the landscape. The watershed is currently deficient in high density patches of large snags, and removal of trees and snags would further reduce the ability of the landscape to provide for this habitat type. Due to the Gnarl Ridge Fire, the amount of large snags on the landscape is likely more than what was predicted by DecAID. The amount of large snags that are going to be removed in

the Permit Area is predicted currently less than 5, this amount at the watershed scale is very small. The ability for this amount to be recruited in the future is likely due to management practices that leave snags standing when not near ski runs or other structures that could pose a threat to human health or safety. The reduction of snags in the past, current and reasonably foreseeable projects is not likely to limit snag availability for snag dependent species. Fire has played a major role in the creation of snags and management practices are not likely to cause depletion of habitat available for snag dependent species.

Figure 1. Comparison for Current and Reference Condition for Snags.



	0	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-26	26+
Reference	15.8	10	16.6	12.4	11.7	10.3	9	4.5	2.4	3.3	1.5	0.6	1.5	0.6	0.9
Current	29.9	12.2	12.6	6.6	16.6	11.2	1.7	7	0.5	0.4	0.8	0.4	0.1	0	0

Neotropical Migratory Birds

No Action Alternative (Alternative 1) - Direct and Indirect Effects
There would be no alteration of habitat, therefore, no migratory bird species would be impacted by this alternative.

All Action Alternatives (Alternatives 2 & 3) - Direct and Indirect Effects
All alternatives are lumped because habitat that is lost is similar. There is no data demonstrating the impacts of downhill skiing on blue grouse populations in North America (typically the species impacted would be limited to forest species such as blue grouse). However, substantial mortality has been documented in other European grouse species associated with bird collisions and ski-lift cables (Editors 2004). The ski lift expansion would increase the length of the ski lift cables, which could increase the potential for collisions. The linear trails created by ski runs also provide a potential for increasing predator corridors in the forest (Editors 2004). The noise and disturbance

of ski resorts may deter grouse from using habitats adjacent to ski trails and facilities in the winter. Trails for skiing may also serve as alpine meadows and brood habitat for grouse during early summer.

The amount of tree removal would be small when compared to the range of the species and seasonal restrictions for cutting the trees would reduce the chance of direct impacts to nesting birds. Neotropical migratory birds in the Permit Area are likely to be directly affected for one season from noise and habitat disturbance. Also, there would also be a long-term impact from collisions with ski cables.

Cumulative Effects
The spatial scale for effects is the watershed level, and temporally bound by less than 10 years ago, current and reasonably foreseeable projects. Other projects in the watershed that have the potential to impact migratory birds by tree removal include: Highway reconstruction, hazard tree removal, pre-commercial thinning, and Blue Grass Ridge Fire. In some cases, thinning may enhance habitat for a number of migratory species and provides habitat for some species that are rare or absent in un-thinned stands. However, some species of migratory birds have been shown to decline following thinning. The effects of thinning in mid-successional stands would most likely have a combination of positive, neutral. The watershed has habitat available that includes all seral stages, the projects listed and analyzed do not limit habitat available for neotropical migrants. There are 11 ski lifts in the MHM Permit Area; all could potentially cause mortality from ski lift cable collisions. The amount of ski lift line when compared to habitat available in the watershed or throughout the Permit Area is substantial, and since the use is unknown especially due to the amount of human disturbance the impact is likely very small.

3.7.3 Consistency Determination

This project is consistent with all applicable components of the Mt. Hood Land and Resource Management Plan (Forest Plan) as amended, including Standards and Guidelines, Northwest Forest Plan, and Survey and Manage 2001 Record of Decision. PDC are consistent with the MHM Master Plan. The Master Plan PDC and mitigation measures are to be implemented in conjunction with the ones created under this planning process.

3.7.4 Summary of Effects By Action Alternative

The Proposed Action and alternative impacts wolverines, peregrine falcons, great gray owls, mule deer and elk, American marten, and neotropical migratory birds dominantly in the form of human presence and disturbance. Noise from helicopter and other heavy equipment with the added human presence for all these species **may impact individuals, but is not likely to impact populations, nor contribute to a potential loss of viability of this species**. Little to no habitat removal is occurring for these species. Snag and down log associates are impacted with the three hazard trees that would be felled for human safety. The falling of the trees **may impact individuals, but is not likely to impact populations, nor contribute to a potential loss of viability of this species.** Trees would be left on site and would be recruited as down log habitat.

3.8 Botany

More information is available in the project record including the full botany analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.8.1 Methodology

Analysis Assumptions

It is assumed that the final project footprints would be the same as the proposed areas of disturbance described in Chapter 2 of the Environmental Assessment. For example, acres of proposed disturbance (regardless of alternative) include all areas of excavation, grading, powerline installation, etc. and are accurate representations of actual area of disturbance.

Methodology – Forest Service Direction

R6 Sensitive Species - The Five Step Biological Evaluation Process

Forest Service policy requires a 5-step biological evaluation process 1) Pre-field review of all existing information; 2) Field reconnaissance if sensitive species or habitats are determined to be present and may be affected by proposed project activities; 3) Evaluation of project effects on sensitive species and habitats; 4) Analysis of the significance of the project's effects on species locally and throughout their range; and 5) A biological investigation if needed (due to lack of information). Management of known sites can be addressed during the project planning phase to avoid sites by project design if needed to maintain viability of a species in the project area and throughout the species' range. 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.

Survey and Manage Species – 2001 ROD Standards and Guidelines

Methodology for Survey and Manage botanical species is essentially the same as the five step biological evaluation process. In addition, a species and its habitat must be protected if the species is listed under a Survey and Manage category that requires management of known sites; Survey and Manage Categories are: Category A = Pre- disturbance surveys are practical and must be conducted if suitable habitat is present, and manage all known sites; Category B = Equivalent Effort surveys required in old growth habitat unless Strategic Surveys have been completed, and manage all known sites; Category C = Pre- disturbance surveys are practical and must be conducted if suitable habitat is present, and manage high-priority sites; Category D = Pre-disturbance surveys not practical or not necessary, manage all known sites until high-priority sites can be determined; Category E = Pre-disturbance surveys are not required, status undetermined, manage all known sites until a determination is made whether the species meets the basic criteria for Survey and Manage (ROD SG pages 7-14).

3.8.2 Existing Conditions

The proposed project area was previously disturbed by ski area development during installation of the existing Buttercup Ski Lift and ski-runs. Vegetation in the area is primarily comprised of early seral forbs and sedges in open meadow habitat. There are no rock outcrops, talus slopes, krummholtz /parkland forests, creeks, seeps, springs, or perennially moist microhabitats in the

proposed project impact area. There is an unnamed stream and seasonal wet area behind the Mountain Shop; the area would be avoided.

The following R6 Sensitive botanical species were identified during prefield review as having marginal-suitable habitat in the proposed area: *Calamagrostis breweri, Carex vernacula, Diphasiastrum complanatum, Bryum calobryoides, Encalypta brevicollis* (also Survey and Manage Category B), *Rhytidium rugosum* (also Survey and Manage Category B), and *Tholurna dissimilis* (also Survey and Manage Category B). Forest Service Region 6 sensitive species (December 2011) list was used for this project. Surveys were completed during August and September 2012 and species were not found. *Calamagrostis breweri* is the only Region 6 Sensitive species that has been found in the MHM Permit Area during previous surveys, known sites are outside the project area and would not be impacted by proposed project activities. Suitable habitat for Survey and Manage botanical species (other than species listed above that are also R6 Sensitive) is not present in the proposed project area; therefore, additional surveys are not required. The survey requirements established by *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001) were followed.

3.8.3 Effects Analysis / Environmental Consequences

R6 Sensitive Species Effects Determination

There are no known sites of R6 Sensitive botanical species in the proposed project area so there would be no direct, indirect or cumulative effects as a result of proposed project activities. The proposed projects would have *No Impact* on R6 Sensitive botanical species or their habitat.

Survey & Manage Botanical Species

There are no known sites of Survey and Manage botanical species in the proposed project area and there are no known sites that require management. There would be no direct, indirect or cumulative effects as a result of proposed project activities.

3.8.4 Consistency Determination

Activities proposed under Alternatives 2 and 3 are consistent with the following Forest Service policy, direction, standards and guidelines:

- The proposed project is consistent with Forest Service Policy FSM 2670.3 that requires a 5-step biological evaluation process to "assure that management activities do not jeopardize the continued existence of sensitive species or result in an adverse modification of their essential habitat". The proposed project also meets the intention of FSM 2672.1: "Sensitive species of native plant and animal species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing. *There must be no impacts to sensitive species* without an analysis of the significance of adverse effects on the populations, its habitat, and on the viability of the species as a whole. It is essential to establish population viability objectives when making decisions that would significantly reduce sensitive species numbers."

- Mt. Hood National Forest Land and Resource Management Plan FW-149, FW-150, FW-151, FW-162, FW-299, FW-300, FW-301 regarding preservation of native plant communities; and FW-174, FW-175 regarding protection of threatened, endangered, and sensitive plants.

- Mt. Hood Meadows Master Plan 1997 ROD & Forest Plan Amendment (No. 10ROD A-7.6: Impacts to R6 Sensitive Plant populations and habitats would be avoided by project design and machine activity.

- Northwest Forest Plan 2001 Record of Decision Standards and Guidelines SG 6-11, and SG 41-50 "Conduct pre-disturbance surveys for species in Rare & Uncommon Categories A and C" and SG 23-24 "Conduct surveys according to protocol" do not apply to this project because habitat is not present in the proposed project area.

3.8.5 Summary of Effects by Alternative

Surveys for R6 Sensitive and Survey and Manage botanical species have been completed as required, listed species were not found in the project area, and there are no known sites in the area that would be impacted by proposed project activities.

3.9 Noxious Weeds

More information is available in the project record including the full noxious weed analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.9.1 Methodology

Introduction

Invasive plants are any plant species not native to a particular ecosystem and are likely to cause environmental harm or harm to human health. They include, but are not limited to, species on the Oregon Department of Agriculture (ODA) Noxious Weed list. Invasive plants may disrupt natural ecosystems by displacing native species and reducing natural diversity through the replacement of native communities with invasive monotypic weed stands. Invasive plants and noxious weeds reduce productivity of forest ecosystems by outcompeting and displacing desirable native species and monopolizing valuable resources (Oregon Weed Control Program 2002). Please refer to the current list of ODA Noxious Weeds at http://www.oregon.gov/ODA/PLANT/WEEDS/pages/statelist2.aspx.

Noxious weeds are designated A, B, and/or T according to the Oregon Department of Agriculture (ODA):

1. "A" Designated weed – A weed of known economic importance that occurs in the state in small enough infestations to make eradication /containment possible; or is not known to occur, but its presence in neighboring states make future occurrence

in Oregon seem imminent. Recommended action: Infestations are subject to intensive control when and where found.

2. "B" designated weed – A weed of economic importance that is regionally abundant but may have limited distribution in some counties. Where implementation of a fully integrated statewide management plan is infeasible, biological control shall be the main control approach.

3. "T" designated weed – A priority noxious weed designated by the State Weed Board as a target weed species for which ODA will implement a statewide management plan.

Analysis Assumptions

It is assumed that the final project footprints would be the same as the proposed areas of disturbance described in Chapter 2 of the Environmental Assessment. For example, acres of proposed disturbance (regardless of alternative) include all areas of excavation, grading, powerline installation, etc. are accurate representations of actual disturbance.

Methodology – Effects Analysis

The analysis area includes the entire Mt. Hood Meadows Permit Area (i.e., planning area). The analysis area is defined as the project area because potential for the spread and/or introduction of noxious weeds would be directly and indirectly related to activities proposed under Alternatives 2 and 3. Only the proposed project and proposed project activities that might have direct or indirect effects are included in the cumulative effects analysis. Short-term direct and indirect effects, if any, are estimated to occur in 1-5 years after project activity. Long-term effects, if any, are estimated to occur 5 years after project activity.

Criteria Used to Determine Effects includes: 1) Presence of noxious weed species in or around the proposed project area; 2) Presence of vectors; 3) Potential for project to spread or introduce noxious weeds; and, 4) Potential for project to contribute to a cumulative increase of noxious weeds in the planning area.

The spatial context for the effects analysis is the affected environment as described under Existing Conditions. The discussion of cumulative effects and the final determination of effects also consider the fact that the only two known populations of noxious weeds (e.g., spotted knapweed) in the analysis area have been and continue to be treated annually and are currently considered to be under control. The temporal context depends on the existing or future project/activity; if there is an overlap in time from an effects perspective then it is included.

Methodology - Noxious Weed Risk Assessment Process and Risk Ranking

The Factors and Vectors considered in determining the risk level for the introduction or spread of noxious weeds are as follows:

Factors

A. Known noxious weeds in close proximity to project area that may foreseeably invade project
B. Project operation within noxious weed population

C. Any of vectors 1-8 in project area

Vectors

1. Heavy equipment (implied ground disturbance including compaction or loss of soil)
2. Importing soil/cinders/gravel/straw or hay mulch.
3. ORVs (off-road vehicles) or ATVs (all-terrain vehicles)
4. Grazing
5. Pack animals (short-term disturbance)
6. Plant restoration
7. Recreationists (hikers, mountain bikers, etc.)
8. Forest Service or other project vehicles

High-, moderate-, or low-risk rankings are possible. For the high ranking, the project must contain a combination of either factor A+C or B+C above. The moderate ranking contains any of vectors #1-5 in the project area. The low ranking contains any of vectors #6-8 in the project area or known weeds within or adjacent to the project area, without vector presence.

3.9.2 Existing Conditions

There is a sparse population of spotted knapweed (<10 plants) in the flowerbeds on the south side of the Mt. Hood Meadows Day Lodge. Spotted knapweed is listed by the Oregon Department of Agriculture as a Category B and T designated weed. The plants have been hand-pulled annually by Mt. Hood Meadows personnel and Forest Service employees. The number of knapweed plants in the Day Lodge flower beds has decreased over the years. In 2012, only four knapweed rosettes were found and were hand-pulled. The site has also been approved for herbicide treatment (if needed) under the 2008 Record of Decision for Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area.

No other noxious weeds have been found during surveys conducted during the past ten years in the Buttercup Ski Lift area or throughout the Mt. Hood Meadows Permit Area.

A small population of spotted knapweed (<20 plants) has also been documented in the Oregon Department of Transportation (ODOT) sand storage facility at the junction of Highway 35 and the Hood River Meadows access road. The site has been reported to ODOT and has been approved for treatment under the 2008 Record of Decision for Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area. The plants have been hand-pulled in the past and currently the population of knapweed appears to be controlled.

3.9.3 Effects Analysis / Environmental Consequences

Alternative 1 – No Action

Under the No Action alternative, there would be no direct or indirect effect as a result of not implementing the proposed project. The potential for introducing or spreading noxious weeds directly or indirectly via project machinery would not exist because the project would not be implemented. New weed populations might be introduced and/or spread by other vectors already present in the planning area, such as regular vehicular traffic, recreationists, or wildlife. Known sites of spotted knapweed in the flower beds on the south side of the Day Lodge, and in the ODOT

sand storage area, would continue to be controlled annually regardless of whether or not the proposed project is implemented.

Effects Common to Alternatives 2 and 3

Direct and Indirect Effects
Direct and indirect effects are common to Alternatives 2 and 3 because the potential vectors for spread/introduction of noxious weeds are essentially the same. The nearest known noxious weed population (spotted knapweed) is located in the flowerbeds on the south side of the Mt. Hood Meadows Day Lodge. Project activities are not expected to cause direct or indirect spread of spotted knapweed from the flowerbeds because the plants (if still present in 2013) would be hand-pulled prior to project activity, and before the plants bloom, as required by Project Design Criteria (N-3). In addition, the Mt. Hood Meadows Annual Operating Plan (AOP) requires MHM to mitigate and monitor invasive plant species (AOP Vegetation Management Item #23). Mt. Hood Meadows should continue to monitor the presence of knapweed in the flower beds around the Mt. Hood Meadows Day Lodge with the help of the Forest Service, and pull or dig plants before they bloom July thru September, to ensure the species does not spread. The Forest Service personnel are available to assist MHM personnel with the identification for knapweed and other species of concern.

Although project activities proposed under Alternatives 2 and 3 have a **Moderate Risk** of introducing noxious weeds from outside the Mt. Hood Meadows Permit Area via machinery/equipment, mulch material, and soil/gravel (potential vectors are shown in Table 3-23), implementation of PDC (i.e., wash machinery before entering the Mt. Hood National Forest and use only certified "weed-seed-free" gravel and mulch) and AOP Vegetation Management Item #23, would reduce the risk. Annual monitoring for early detection would allow for application of appropriate control measures to ensure the project area remains clear of noxious weeds and invasive plant species.

Table 3-23: Noxious Weed Risk Ranking Results

Project	Factor	Vectors	Risk	Species
Buttercup Lift Replacement	A	1, 2, 3, 6, 8	Moderate	Spotted knapweed (*Centaurea stoebe, i.e. C. maculosa)*

Cumulative Effects
All projects presented in Chapter 3 were considered in this cumulative effects analysis. Activities anticipated to occur within the general analysis area over the next five years include construction on the Twilight Parking Lot and Sunrise Maintenance Shop, road and parking lot maintenance, brushing of ski trails to maintain openings, machine application of sand/gravel on roads for seasonal traction, and maintenance of underground utilities. All of these activities would present potential opportunities for noxious weeds/ invasive species to become established or spread. Past actions have proven it is unlikely that new infestations of noxious weeds would go undetected by the daily presence of Mt. Hood Meadows and/or Forest Service personnel in the analysis area. As a result of the early detection in conjunction with the PDC and AOP associated with this project and future projects, the cumulative effects are expected to be minimal.

3.9.4 Consistency Determination

Activities proposed under Alternatives 2 and 3 are consistent with the following Forest Service policy, direction, standards and guidelines:

- Weed prevention practices identified under "Invasive Plants" in the Project Design Criteria, and use of native plants species for restoration of disturbed soils, are supported by U.S. Forest Service noxious weed policy FSM 2670.22(2), FSM 2070.3, and FSM 2080., Forest Service policy is intended to prevent the introduction and establishment of noxious weed infestations, determine the factors that favor establishment and spread of noxious weeds, analyze weed risks in resource management projects, and design management practices to reduce these risks (FSM 2080.44).

- The use of native plants species for restoration of disturbed soils in the project area is also supported by Mt. Hood National Forest Land and Resource Management Plan (FW-149, FW-150, FW-151, FW-162, FW-299, FW-300, FW-301), and by the Mt. Hood Meadows Master Plan Record of Decision (A-6.3, A-6.9).

- The USDA Forest Service Guide to Noxious Weed Prevention Practices identifies development of practices for prevention and mitigation during ground-disturbing activities such as forest vegetation management and road management (V.1 2001, pages 12-13 and 17) which are included in the project design criteria for this project.

- Region 6 completed a Final Environmental Impact Statement (FEIS) for Preventing and Managing Invasive Plants in April 2005. In 2008, the Mt. Hood National Forest and Columbia River Gorge National Scenic Area completed a FEIS for Site- Specific Invasive Plant Treatments that would authorize herbicide use and an early detection/rapid response program. The knapweed site in the flower beds on the south side of the Day Lodge has been approved for herbicide treatment (if needed) under the 2008 Site-Specific Invasive Plant Treatment FEIS.

- Executive Order 13112 on Invasive Species (February 1999) requires federal agencies to use relevant programs and authorities to prevent the introduction of invasive species and not authorize or carry out actions that are likely to cause the introduction or spread of invasive species unless the agency has determined-- and made public--documentation that shows that the benefits of such actions clearly outweigh the potential harm. All feasible and prudent measures to minimize risk of harm would need to be taken in conjunction with the actions as required.

3.9.5 Summary of Effects by Alternative

The proposed Buttercup Lift Replacement Alternatives 2 and 3 are in compliance with Forest Service policy and direction regarding prevention and control of noxious weeds and invasive plant species. The Moderate risk of spreading or introducing noxious weeds during project activities would be reduced by implementation of Project Design Criteria/Mitigation Measures for Invasive Plants listed in the Buttercup Ski Lift Replacement Environmental Assessment.

3.10 Vegetation Resource

More information is available in the project record including the full vegetation resources analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.10.1 Methodology

The analysis area boundary for disclosing effects on the vegetation resources at this more site-specific level is the Upper East Fork Hood River subwatershed, where the proposed project was evaluated.

Forested Plant Associations of the Westside Central Cascades of Northwestern Oregon was used to analyze the effects of proposed activities. Plant association classification describes repeating patterns of plant communities that indicate different biophysical environments. The combinations of factors such as moisture and temperature regimes, light, and soil nutrients provide habitat for a group of plant species. There are few distinct boundaries along the environmental continua. However, categorizing discrete plant associations provides a means to track and predict vegetation composition, structure, and response to disturbance. Plant association classification of forested lands has been a forest management tool for many years. Ecosystem management and concerns with biodiversity also require understanding the plant and animal habitats that occur across our landscapes.

The baseline condition against which changes to the vegetation would be measured is the existing condition. Criteria used to determine effects on vegetation include: (1) total acres impacted and acres impacted within each affected forest; (2) changes in forest structure and composition; and (3) effects on residual trees. This section only analyzes the impacts of the vegetation management treatment.

3.10.2 Existing Condition

The project area for the Buttercup Ski Lift Replacements ranges from 5400 feet to 5600 feet in elevation on the south eastern region of Mt. Hood. The area is comprised predominantly of open area. The area is within mountain hemlock plant association.

3.10.3 Effects Analysis/Environmental Consequences

Under the all alternatives (Alternatives 1, 2 and 3) there would be no forested lands removed. This alternative would have no effect on vegetation resources. As such, there would be no measurable cumulative effects for the vegetation recourse.

3.10.4 Consistency Determination

All of the action alternatives proposed would meet the goals and objectives of the Mt. Hood National Forest Land and Resource Management Plan (Forest Plan) as defined by A-11 Winter Recreation Areas Management Area Direction as amended, including Standards and Guidelines,. A vegetation management plan would need to be prepared to be consistant with required mitiagtion

measures from the Mt. Hood Meadows Ski Area Master Plan (Forest Plan Amendment No. 10) page A-7. All action alternatives proposed are consistant with the required mitigation and monitoring found in the Mt. Hood Meadows Ski Area Master Plan (Forest Plan Amendment No. 10) A-6 through A7.

3.11 Cultural Resource

More information is available in the project record including the full cultural resources analysis file. This information is located in the project record which is incorporated by reference and located at the Hood River Ranger District.

3.11.1 Methodology

Heritage resources include structures, sites, and objects that reflect the prehistory, protohistory, and history of people. The analysis area for heritage resources in this EA is the area of ground disturbance as proposed for the Proposed Action and action alternatives. Ground disturbance includes treatments using heavy machinery associated with the construction of structures and roads, vegetation treatment, slope grading and stabilization, sewer line installation, and power line installation.

The National Historic Preservation Act and the National Environmental Policy Act both require consideration be given to the potential effect of federal undertakings on heritage resources. The guidelines for assessing effects and for consultation are provided in 36 CFR 800. To implement these guidelines, in 2004, Region 6 of the Forest Service entered into a Programmatic Agreement (PA) with the Oregon State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP).

The proposed activities of the Buttercup Ski Lift Replacement project include excavations for footings and other lift features, regrading, slope stabilization, the installation of a buried power line, the installation of a sewer line, and the construction of a graveled road. Three large hemlock trees may also require felling. All of these activities involve heavy machinery and ground disturbance. In accordance with the 2004 agreement, a survey for heritage resources surveys was conducted that included the project area. The project area was also inspected by East Zone Archaeologist Michael D. Dryden. The previous survey and the inspection of the project area by Dryden have been documented in Heritage Resource Appendix Report 2013/060606/0002 (Dryden 2013) for this project.

3.11.2 Existing Condition

The proposed project area has been previously surveyed, with no previously documented sites within the proposed project area (*Cultural Resource Inventory of the Mt. Hood Meadows 1992*, Report #92/06/17; Lehman Turck 1993). A re-inspection of the area on July 27, 2011 revealed only concrete footings from previous ski lift features.

The new lift, however, would be visible from the historic Timberline Trail (666EA0002), constructed by the Civilian Conservation Corps. The site has not been formally evaluated for its eligibility for the National Register of Historic Places, but should be treated as a potentially eligible property until an evaluation is completed.

3.11.3 Effects Analysis/Environmental Consequences

No Action (Alternative 1) – Direct and Indirect Effects
Under the No Action Alternative, heritage resources would only be affected by decay and other natural and physical forces that are already occurring. This alternative would have no effect on heritage resources.

Proposed Action (Alternative 2) – Direct and Indirect Effects
The project area has been surveyed previously to current standards with no heritage resources within the areas of proposed ground disturbance. The inspection of the project area revealed only non-historic concrete footings from a previous ski lift and no heritage resources. There are no heritage resources within the proposed activity areas; the proposed project would not directly affect heritage resources.

However, as previously mentioned, the proposed lift would be visible from the historic Timberline Trail (666EA0002). There are no established standards for the effects of visible improvements from the trail and their effects upon the National Register eligibility of the trail. However, the scenic quality of the view from the trail is listed as one of its significant features. This implies that the "setting" of the trail be protected, in addition to the protection of the actual trail tread. The visual qualities for viewers on the trail could be indirectly affected by the visibility of the proposed improvements.

Past projects have assessed effects to the trail when the visual corridor of the foreground is affected. The Mt. Hood Land and Resource Management Plan (Forest Plan) has established a visual corridor of 600 feet for the trail. Alterations to the viewshed within the MHM Permit Area are ongoing, continuous and historic. As a result, the Visual Quality Objectives (VQOs) for the Timberline Trail within the Permit Area have been amended to Modification in the foreground (600 feet on either side of the trail). A Modification classification allows activities to visually dominate the natural landscape, but must borrow form, line, color, and texture from the landscape. The relocation of the Buttercup Ski Lift would place it more than 1800 feet from the Timberline Trail, outside of the visual foreground for the trail. See the Visual Resources Specialist Report available in the project record for more information. The proposed project would have no effect on the historic Timberline Trail.

Alternative 3 – Direct and Indirect Effects
The expected impacts to Heritage Resources would be the same for Alternative 3 as for the Proposed Action. Alternative 3 would have no direct or indirect effects to Heritage Resources.

Cumulative Effects
For heritage resources, any effects are limited to site-specific locations. Any cumulative effects would also be limited to heritage resources situated within proposed areas of ground disturbance. It was determined that the Proposed Action and Alternative 3 would have no direct or indirect effects

to heritage resources. Also, heritage resources are generally avoided for all federal undertakings with no cumulative effects. As such, there are no cumulative effects for this project.

3.11.4 Consistency Determination

The project area has been surveyed previously to current standards with no heritage resources located within the area of affect. Consequently, this project has limited potential to affect historic properties (Stipulation III.A.2(19); *Proposed undertakings in areas that have been surveyed twice under an inventory strategy meeting current standards where no historic properties are affected;* and Stipulation III.A.2.(18); *Installation of buried utilities or power pole/tower placement when placed in previously disturbed ground*) and is exempt from case-by-case review in accordance with the 2004 Programmatic Agreement.

This action is consistent with the Forest Plan goals to protect important heritage resources. Heritage resource inventories were conducted in compliance with the 2004 PA during the project planning stage (FW-602 and FW-606), the field survey results were fully documented (FS-608), and the potential effects to heritage resources from the proposed projects were assessed (FW-609, FW-610). The proposed activities also meet the visual quality objective of modification for the middleground for the Timberline Trail (FW-585). All records and documents concerning heritage resources for the project are kept on file at the Hood River Ranger District, Mt. Hood National Forest (FW-626).

3.11.5 Summary of Effects by Alternative

Under Alternative 1 (No Action), heritage resources would only be affected by natural processes that are already occurring. Activities associated with Alternatives 2 (Proposed Action) and 3 would not directly affect heritage resources. Alternatives 2 and 3 also meet the Forest Plan standards for the visual quality objectives for the Timberline trail. Alternatives 2 and 3 would have **no effect** on heritage resources.

3.12 Other Required Disclosures

3.12.1 Conflicts with Plans, Policies or Other Jurisdictions

NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with . . . other environmental review lands and executive orders.”

Based on information received during scoping, informal consultation meetings, and analysis in the Environmental Assessment, none of the alternative under consideration would conflict with the plans or policies of other jurisdictions, including the Confederated Tribes of Warm Springs. This project would not conflict with any other policies and regulations or laws, including the Clean Water Act, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, or National Historic Preservation Act. Refer to the following sections for discussions regarding these laws:

- Section 3.4 Water Quality – Clean Water Acts;

- Section 3.5 Aquatics and 3.7 Wildlife – Endangered Species Act;
- Section 3.5 Aquatics – Magnuson-Stevens Fishery Conservation and Management Act;
- Section 3.11 Cultural Resources– National Historic Preservation Act.

3.12.2 Floodplains and Wetlands

There would be no impacts to floodplains due to the PDC and BMP that are required components on any action alternative (see Section 2.4 and Appendix A). This project proposes some level of entry into Riparian Reserves adjacent to a wetland. This is due to site limitations, and the incursions were avoided where possible.

The project does not enter the delineated wetland, and the PDC and BMP would minimize or eliminate all potential detrimental effects to the wetland and water quality (see Section 2.4 and Appendix A). As such, this project would comply with Federal Executive Order 11990 (1977), which ended the official policy of federal assistance for wetlands conversion and directed all agencies to minimize wetland impacts in their regulations. The Oregon Department of Lands and the US Army Corps of Engineers would be notified and provided necessary information about this project related to dredging and filling, as required (Section 404, Clean Water Act).

3.12.3 Air Quality

No burning is planned for this project, so there would be no impacts on visibility from smoke. Any dust from proposed construction activities would be short-term in duration and very site-specific to each project. There would be no effects past the implementation phase. No cumulative effects would be expected. As such, this project is consistent with the Clean Air Act.

3.12.4 Consumers, Civil Rights, Minority Groups, Women, and Environmental Justice

Executive Order No. 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, directs Federal agencies to address effects accruing in a disproportionate way to minority and low income populations. No disproportionate impacts to consumers, civil rights, minority groups, and women are expected from the action alternatives. Construction work associated with the Buttercup Ski Lift Replacement would be implemented by contracts with private businesses. Project contracting for the project's activities would use approved management direction to protect the rights of these private companies.

3.12.5 Treaty Resources and Reserved Indian Rights

No impacts on American Indian social, economic, or subsistence rights are anticipated. No impacts are anticipated related to the American Indian Religious Freedom Act. The Confederated Tribes of Warm Springs Oregon were consulted to the effects of this project on the tribes and ceded lands; no concerns were identified (see Section 4.1).

3.12.6 Inventoried Roadless Areas, Unroaded and Potential Wilderness Areas

There will be no impacts to Inventoried Roadless Areas (IRA) as none exist within or near the project area. The project area contains no unroaded or potential wilderness areas as the project area has a well-developed road system maintained for management activities by both the permittee and Forest Service. As such, there will be no impacts to inventoried roadless areas, unroaded or potential wilderness area because none of these lands exist within the project area.

3.12.7 Prime Farmlands, Rangelands, and Forestlands

None of the action alternatives have any adverse impact to the productivity of farmland, rangeland, or forestland since these lands are not present within the project area.

3.12.8 Congressionally Designated Lands

None of the action alternatives impact any congressionally designated lands, including Wilderness Areas, Wild and Scenic Rivers or National Recreation Areas since these lands are not present within the project area.

3.12.9 Potential or Unusual Expenditures of Energy

The No Action alternative would not require any expenditure of fuel or energy. The action alternatives would require expenditures of fuel for workers to access the project area expenditures of fuel for the construction equipment to implement the project. Jet fuel use for helicopter operations to place the towers would also occur. Overall, the action alternatives would not result in any unusual expenditure of fuel.

3.12.10 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that are forever lost and cannot be reversed. Irretrievable commitments of resources are considered to be those that are lost for a period of time and, in time, can be replaced. The action alternatives would not result in any irreversible or irretrievable commitments of resources.

4.0 COORDINATION AND CONSULTATION

4.1 Consultation

Consultation with the National Marine Fisheries Service (NMFS)
The Endangered Species Act requires that federal activities do not jeopardize the continued existence of any species federally listed or proposed as threatened or endangered, or result in adverse modification to such species designated critical habitat. A Biological Evaluation (BE) was prepared for sensitive, threatened or endangered fish species. This BE is available in the project record, located at the Hood River Ranger District in Mt. Hood/Parkdale, Oregon. No threatened or endangered fish species were present in the project area. As such, no consultation was necessary. See Section 3.5-Aquatics for more information.

Consultation with the US Fish and Wildlife Service (FWS)
Similarly, a BE was prepared for sensitive, threatened or endangered wildlife species. This BE is available in the project record, located at the Hood River Ranger District in Mt. Hood/Parkdale, Oregon. No threatened or endangered wildlife species are present within the planning area. As such, no consultation was necessary. See Section 3.7-Wildlife for more information.

Consultation with the Oregon State Historic Preservation Officer (SHPO)
The National Historic Preservation Act requires consideration be given to the potential effect of federal undertakings on historic resources. This includes historic and precontact cultural resource sites. The guidelines for assessing effects and for consultation are provided in 36 CFR 800. To implement these guidelines, Region 6 of the Forest Service entered an agreement in 2004 with the Oregon State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation. The project area has been surveyed previously to current standards with no heritage resources located within the area of affect. Consequently, this project has limited potential to affect historic properties (Stipulation III.A.2(19); *Proposed undertakings in areas that have been surveyed twice under an inventory strategy meeting current standards where no historic properties are affected;* and Stipulation III.A.2.(18); *Installation of buried utilities or power pole/tower placement when placed in previously disturbed ground*) and is exempt from case-by-case review in accordance with the 2004 Programmatic Agreement.

Tribal Government
Ethnographic studies and past consultation with concerned Native American tribes indicate that while Native peoples continue to use the existing permit area, some of the traditional activities have been displaced into the White River area and others have been totally lost. While there has been some coexistence between the traditional users of the area and the existence of the ski area, the evidence is that the traditional uses and resources have been and would continue to be compromised by the presence of ski area development. The proposed project, when considered with past similar improvements within the ski area, would not noticeably compromise the traditional use of the area more than has already occurred. Formal consultation with the Confederated Tribes of Warm Springs (CTWS) was completed in August 2013. The CTWS did not express any concerns related to this project.

4.2 List of Preparers

The following is a list of Interdisciplinary Team (IDT) members who assisted in the development of the Environmental Assessment.

Role	**Person**
IDT Leader / NEPA Specialists	Jennie O'Connor Card
Recreation / Visual Quality Specialist	McKenzie Jensen
Soil Scientist	John Dodd
Hydrologist	Mark Kreiter
Fish Biologist	Gary Asbridge
Wildlife Biologist	Stephanie Powers
Botanist / Noxious Weeds	Susan Nugent
Silviculturalist	Whitney Olsker
Cultural Resource Specialist	Mike Dryden
GIS Maps	Mt. Hood Meadows (Steve Warila)

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Appendix A: Best Management Practices for Water Quality Protection

BMP Title[1]	Objective	Explanation	Project Design Criteria (PDC)	Implementation and Responsibility	Ability to Implement	Effectiveness	Monitoring
Plan-2. Project Planning and Analysis	Use the project planning, environmental analysis, and decision making processes to incorporate water quality management BMPs into project design and implementation.	The project planning, environmental analysis, and decision making process is the framework for incorporating water quality management BMPs into project design and implementation. The process should identify likely direct, indirect, or cumulative impacts from the proposed project or management activities on soils, water quality, and riparian resources in the project area. Project documents (plans, contracts, permits, etc.) should include site-specific BMP prescriptions to meet water quality objectives as directed by the environmental analysis. Project planning should ensure that activities are consistent with land management plan direction; State BMPs, floodplain, wetland, coastal zone; and other requirements including Clean Water Act (CWA) 401 certification, CWA 402 permits, and CWA 404 permits; wilderness or wild and scenic river designations; and other Federal, State, and local rules and regulations.	Throughout the planning process	Hydrologists, fish biologists, geologists, and/or soil scientists evaluate watershed characteristics and estimate response to proposed activities. The project is designed to include site-specific prescriptions for each area of water quality concern. The subsequent contract would include provisions to meet water quality criteria and other resource protection requirements as provided by this Environmental Assessment (EA). The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on regular basis and would have the authority to provide direction and/or take action if construction or operations are not conducted according to the PDC	High	High based on local monitoring and experience	The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs, as described in implementation and responsibility. This project would go into a pool of similar projects to be selected for project level BMP implementation and effectiveness monitoring as per the National BMP Monitoring Protocol. If selected, watershed and recreation specialists would evaluate whether the site-specific BMPs were implemented and the effectiveness of the BMPs. This project would be part of annual, informal monitoring conducted by Forest Service hydrologist and soil scientist to observe BMP effectiveness and make adjustments to correct any observed deficiencies.
Plan-3. Aquatic Management Zone (AMZ) Planning	To maintain and improve or restore the condition of land around and adjacent to water bodies in the context of the environment in which	The land around and adjacent to water bodies plays an important ecologic role in maintaining the structure, function, and processes of the aquatic ecosystem. These areas provide	Throughout the planning process and PDC H-1, H-3, H-4,H-7, H-9, H-11	The AMZ requirements are identified by an interdisciplinary team during the environmental analysis. The project is designed to include site-specific BMP prescriptions for the prevention	High to Moderate	High to Moderate based on literature, local monitoring and experience	Same as previous BMP.

[1] Taken from 2012 National Core BMP Technical Guide

BMP Title[1]	Objective	Explanation	Project Design Criteria (PDC)	Implementation and Responsibility	Ability to Implement	Effectiveness	Monitoring
	they are located, recognizing their unique values and importance to water quality while implementing land and resource management activities.	shading, soil stabilization, sediment and water filtering, large woody debris recruitment, and habitat for a diversity of plants and animals. The quality and quantity of water resources and aquatic habitats may be adversely affected by ground-disturbing activities that occur on these areas. Protection and improvement of soil, water, and vegetation are to be emphasized while managing these areas under the principles of multiple use and sustained yield. Designation of a zone encompassing these areas around and adjacent to a waterbody is a common BMP to facilitate management emphasizing aquatic and riparian-dependent resources. These management zones are known by several common terms such as streamside management area or zone, riparian management area, stream environment zone, and water influence zone. For purposes of the National Core BMPs, these areas will be referred to as AMZs. Local regulation often stipulates the area and extent of AMZs and may be listed in land management plans; biological opinions, evaluations, or assessments; and other regional or State laws, regulations, and policies.		of sedimentation and other stream damage from construction and operations. The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on regular basis and would have the authority to provide direction and/or take action if construction or operations are not conducted according to the PDC.			
AqEco-2. Operations in Aquatic Ecosystems	Avoid, minimize, or mitigate adverse impacts to water quality when working in aquatic ecosystems.	Common construction or maintenance operations in water bodies often involve ground disturbance. The close proximity to, and contact with, the water	Throughout the planning process and PDC S-1 through S-5, H-1 through H-13	The project is designed to include site-specific prescriptions for each area of water quality concern. The subsequent contract would include provisions	High to Moderate	High to Moderate based on literature, local monitoring and experience	Same as previous BMP.

BMP Title[1]	Objective	Explanation	Project Design Criteria (PDC)	Implementation and Responsibility	Ability to Implement	Effectiveness	Monitoring
		body increases the potential for introducing sediment and other pollutants that can affect water quality. This BMP includes practices for minimizing direct and indirect water quality impacts when working in or adjacent to water bodies.		to meet water quality criteria and other resource protection requirements as provided by this EA. The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on regular basis and would have the authority to provide direction and/or take action if construction or operations are not conducted according to the PDC.			
Fac-2. Facility Construction and Stormwater Control	Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by controlling erosion and managing stormwater discharge originating from ground disturbance during construction of developed sites.	During construction and operation of facility sites, land may be cleared of existing vegetation and ground cover, exposing mineral soil that may be more easily eroded by water, wind, and gravity. Changes in land use and impervious surfaces can temporarily or permanently alter stormwater runoff that, if left uncontrolled, can affect morphology, stability, and quality of nearby streams and other waterbodies. Erosion and stormwater runoff control measures are implemented to retain soil in place and to control delivery of suspended sediment and other pollutants to nearby surface water. This practice is initiated during the planning phase and applied during project implementation and operation. This BMP contains practices for managing erosion and stormwater discharge that are generally applicable for any	Throughout the planning process and PDC S-2, S-3, H-5, H-6, H-8, H-10, H-12, H-13, N-1, VM-1, VM-2	The project is designed to include site-specific prescriptions for each area of water quality concern. The subsequent contract would include provisions to meet water quality criteria and other resource protection requirements as provided by this EA. The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on regular basis and would have the authority to provide direction and/or take action if construction or operations are not conducted according to the PDC.	High to Moderate	High to Moderate based on literature, local monitoring and experience	Same as previous BMP.

BMP Title[1]	Objective	Explanation	Project Design Criteria (PDC)	Implementation and Responsibility	Ability to Implement	Effectiveness	Monitoring
		project that involves ground disturbance, including developed recreation, mineral exploration and production sites, pipelines, water developments, etc., and should be used for all such projects.					
Rec-10. Ski Runs and Lifts	Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during the construction, operation, and maintenance of ski runs and lifts.	A ski area and its operation are complex and can result in a variety of adverse effects to soil, water quality, and riparian resources. These adverse effects can be particularly true for ski runs and lifts. Because good ski runs tend to be steep, extra precautions are needed to avoid or minimize accelerated erosion and resulting sedimentation. Ski run clearing, slope grading, and developing access routes, ski lift and towline facilities, and similar actions can expose and compact soils, resulting in accelerated runoff and erosion. Increased runoff can alter water yield and runoff regimes, augment peak flows, and increase instream sediment from channel erosion. Appropriate soil and water protection measures should be included in the ski area's operation and maintenance plan.	Throughout the planning process and PDC S-1 through S-6, H-1 through H-13	Hydrologists, geologists, and soil scientists evaluate watershed characteristics and estimate response to proposed activities. These professionals would assist in layout of trails in complex areas. The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on a regular basis and would have the authority to provide direction and/or take action if construction or operations are not conducted according to the PDC.	High	High based on local monitoring and experience	Same as previous BMP.

BMP Title[1]	Objective	Explanation	Project Design Criteria (PDC)	Implementation and Responsibility	Ability to Implement	Effectiveness	Monitoring
Rec-12. Ski Area Facilities	Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources originating from design, construction, operation, and maintenance of ski area facilities.	Ski area facilities include buildings, sanitary facilities, parking lots, and other infrastructure. During construction and operation of facility sites, land may be cleared of existing vegetation and ground cover, exposing mineral soil that may be more easily eroded by water, wind, and gravity. Changes in land use and impervious surfaces can alter temporarily or permanently storm water runoff that, if left uncontrolled, can affect morphology, stability, and quality of nearby streams and other water bodies. Receiving waters can be contaminated by oil, grease, anti-freeze, sewage, trash, sediment, and salt. Construction and operation of these facilities should include measures that will avoid, minimize, or mitigate effects to water quality.	Throughout the planning process	The project is designed to include site-specific prescriptions for each area of water quality concern. The subsequent contract and/or annual operating plan would include provisions to meet water quality criteria and other resource protection requirements as provided by this EA. The Forest Service Permit Administrator or his/her designee would monitor the implementation of the PDCs during construction and operations on regular basis and would have the authority to provide direction and/or take action if construction or operations are not conducted according to the PDC.	High	High to Moderate based on literature, local monitoring and experience	Same as previous BMP.

Mt. Hood Land and Resource Management Plan (Forest Plan) Direction

Appendix H of the Forest Plan defines the criteria for Rating "Ability to Implement" and BMPs "Effectiveness" on page H-6. These estimates are general, given the range of conditions throughout the Forest. More specific estimates are made at the project level when the specific BMPs are developed.

Ability to implement

Provides a qualitative estimate of the ability of the Forest Service to implement the BMPs. The following index is used to rate the ability to implement as High, Moderate or Low:

- **High:** Almost certain the BMPs can be implemented as planned.
- **Moderate:** Greater than 75% certainty the BMPs can be implemented as planned.
- **Low:** Less than 75% certainty the BMPs can be implemented as planned.

Effectiveness

Provides a qualitative assessment of the expected effectiveness that the applied measure would have on preventing or reducing impacts on water quality and beneficial uses. The effectiveness of each BMPs would be evaluated with an index that rates the effectiveness of each BMPs as either High, Moderate, or Low.

- **High:** Practice is highly effective (90%) and one or more of the following types of documentation are available:
    - Literature/Research - must be applicable to area.
    - Administrative studies-local or within similar ecosystem.
    - Experience- judgment of an expert by education and/or experience.
    - Fact-obvious by reasoned (logical) response.
- **Moderate:** Documentation shows that the practice is effective less than 90% of the time, but at least 75% of the time; or logic indicates that this practice is highly effective, but there is little or no documentation to back it up.
- **Low:** Effectiveness unknown or unverified, and there is little or no documentation; or applied logic is uncertain in this case, or the practice is estimated to be less than 75% effective.

In order to meet this management direction, the effectiveness of BMPs are based on guidance from the National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMPs Technical Guide (USDA, 2012), models, literature, research, 25 years of monitoring implementation of projects on National Forest Lands in the Northwest and professional experience.

Models:

- Water Erosion Prediction Project (WEPP) (USDA Forest Service, 1999).

Other Applicable BMPs Software:

- Erosion Draw 4.0 (Erosion Control Standards and Construction Drawings – Salix Applied Earthcare, 2002)

Relevant Research:

- 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)

Monitoring:

- Administrative BMPs Monitoring Studies, Mt. Hood National Forest: Various administrative monitoring studies were planned and implemented from 1997 through 2004. Monitoring for BMPs implementation and effectiveness was performed on a wide variety of BMPs, ranging from riparian reserve protection to temporary road construction. Monitoring results are summarized in the Forest Plan Monitoring and Evaluation Reports for Fiscal Years 1997 through 2004. BMPs monitoring completed during this period indicates that overall the BMPs monitored were prescribed and implemented as planned, resulting in adequate soil and water protection in most instances.

- Best Management Practices Evaluation Program (BMPEP), 1992-2002 Monitoring Results (Draft Report). USDA Forest Service, Pacific Southwest Region, Pacific Southwest Region This draft report summarizes the results of the USDA Forest Service, Pacific Southwest Region, Best Management Practices Evaluation Program (BMPEP), from 1992 to 2002. Past monitoring completed as part of the BMPEP program has validated the effectiveness of BMPs in mitigating the effects of forest management activities on water quality.

- Monitoring done during the Mount Hood National Forest administrative studies cited generally correlates well with the extensive monitoring done during the BMPEP monitoring program in the Pacific Southwest Region. .

Professional Experience:

- A small group of local professionals further refined assignments of “Ability to Implement” and “Effectiveness” ratings for Buttercup Ski Lift Replacement PDC and BMP based on experience. This group consisted of a Soil Scientist with over 25 years of professional experience in planning, monitoring and implementation of a variety of Forest Service projects in the Pacific Northwest, a Fisheries Biologist with over 23 years of professional experience in planning, monitoring and implementation of a variety of Forest Service projects in the Pacific Northwest and a Hydrologist with over 25 years of professional experience in planning, monitoring and implementation of a variety of Forest Service projects in the Pacific Northwest.

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USDA Forest Service Pacific Southwest Region. November 2004. Vallejo, CA. 76 p. plus Appendices.

Appendix B: Response to Comments

Comment No.	Comment	Response to Comment
1-1	. . . There was no consideration of the economic impacts of the alternatives. Alternative 1, no action, would have no implementation cost, but would not result in increased revenue. Alternative 2 would expand beginner/novice terrain, improve traffic flow, and provide additional capacity for uphill transportation; Mt Hood Meadows feels that these improvements would drive increased revenue from ticket sales and ski school lessons that would provide a reasonable return on the investment. Alternative 3 provides similar benefits as Alternative 2 with slightly lower capacity, however the cost of installation is roughly 2x that as Alternative 2.	A comparison of the installation costs for all three alternatives has been added to the Environmental Assessment (see Section 2.6, Comparison of Alternatives). Alternative 2 would cost between $2.0 to $3.0 million to install and alternative 3 would costs between $3.6 to $6.0 million to install based on personal communications with the Forest Service National Ropeway Services Team and Mt. Hood Meadows Ski Resort. The return on investment and increased revenue of the ski area permittee is outside the scope of this project. The overall purpose of this project is to expand beginner/novice terrain and to improve traffic flow at the Buttercup Ski Lift, rather than improving the revenue for the permittee.
1-2	Another point I would like to make is that the loading conveyor with loading gates would provide a superior progression for our beginner skiers and snowboarders; this would be their first lift ride coming from the beginner area where they learned to ride conveyors. The loading gates open to let them slide onto the loading conveyor at the right time so they are placed correctly for the chair to scoop them up. On the detachable lift in Alternative 3 the beginner needs to slide out at the right time and shuffle to the right place to be scooped up. The added complexity would likely lead to mishaps and reduce the experience and capacity.	The skier experience and safety associated with both lift types and loading systems was fully analyzed in Environmental Assessment (EA) Section 3.1.3, Recreation Effects Analysis/ Environmental Consequences. The new ski lift would provide safer uploading for beginner skiers under both action alternatives. For both alternatives, the new ski lifts would assist first time riders and small children uploading chairs; the number of times the chairlift is slowed or stopped per day would decrease; and most loading accidents would be eliminated increasing skier safety. The capacity (passengers per hour) for both alternatives is increased compared with the No Action Alternative; and Alternative 2 (2059 passengers/hour) has a higher capacity compared to Alternative 3 (1800 passengers/hour).
1-3	Our experience with fixed grip (alternative 2) and detachable chairlifts (alternative 3) is that detachable lifts are considerably more expensive to operate.	The maintenance and operation costs were not analyzed as part of this environmental analysis due to the variability of these costs. The variables influencing the maintenance and operation costs include: type of ski lift, age of ski lift, length of ski season, days of operation, speed of ski lift, average use in a day, and cost of electricity. These vary within and between ski seasons creating too many possibilities to provide an accurate estimate for each alternative. An economic comparison of the installation was added to the Environmental Assessment (see response to Comment #1-1).

Comment No.	Comment	Response to Comment
1-4	From a visual standpoint, Alternative 2 would have a lower impact than Alternative 3; fixed grip lifts do not need a large terminal structure at both ends. The bottom terminal would have a simple support structure with an exposed bullwheel while Alternative 3 would need a terminal building to protect the detachable mechanism from the weather.	Impacts to visual resources were fully analyzed in EA Section 3.2.3, Visual Resource Effects Analysis/Environmental Consequences. Under the modification visual quality objective (VQO) set by the Mt. Hood Land and Resource Management Plan (Forest Plan), management activities may visually dominate the original characteristic landscape. Both action alternatives to upgrade and realign Buttercup Ski Lift would be in the middle ground of the Timberline Trail. The earthtone terminals and towers would blend with the surrounding natural landscape as viewed from the Timberline trail and Umbrella Falls trail; meeting the Modification VQO. There would be no effects from the action alternatives on visual quality.
2-1	**Chair Interval Spacing** - By my calculation, spacing [in Alternative 3] increases over both Alternatives 1 and 2. Spacing=3600/(hourly capacity/# passengers). The increased spacing allows beginners more time to load and unload before the next group arrives.	See response to Comment #1-2.
2-2	**Speed at Unload** - Alternative 2 load conveyor helps mitigate the 400 fpm line speed. However the chairs still unload at 400 fpm. In theory the unload ramp would direct riders away. In practice, beginners are often spooked by the high speed. If a rider falls on the unload ramp, the next chair is approaching at 400 fpm.	The EA, Section 3.1.3, Recreation Effects Analysis/ Environmental Consequences discusses the differences in speed and unloading. The detached chair moves much slower through the terminals allowing riders to load and unload at a much safer speed. The chairlift reduces speed even slower than a typical fixed grip beginner chair. A typical detachable chair speed moving through terminal is 200 feet per minute. The detachable chairlift would assist first time riders and small children uploading and unloading chairs. See response to Comment #1-2 for more information.
2-3	Alternative 3 avoids both of these problems, allowing an extra second in chair spacing, and unloading at a slow 200 fpm.	See response to Comment #1-2 and Comment #2-2.
2-4	Comparison of “Safety, Experience” by Alternatives. • Alternative 1: Fixed lifts still unloads at speed of 310 FPM. • Alternative 2: Gates, Timing. Learning the process of stepping on conveyor. Beginnings must learn another new process. Fixed lift still unloads at full speed of 400 FPM River must get off the chair or risk a stoppage. Chari spacing of 7 seconds.	See response to Comment #1-2 and Comment #2-2.

Comment No.	Comment	Response to Comment
	• Alternative 3: Beginners learn the same process used to load the other detachable lifts. Unloads at half speed of 200 FPM, reducing anxiety of unloading skiers. Chair spacing of 8 second.	
2-5	Comparison of “Experience” by Alternatives. • Alternative 1: Ride time a slow 3.0 minutes. • Alternative 2: Ride time still a slow 2.5 minutes. • Alternative 3: Lower ride time of 1.4 minutes, significant increase in quality skiing experience. Avoids the cold windy ride mid-winter that makes beginners and children cold, numb, with possible muscle cramps.	The EA, Section 3.1.3, Recreation Effects Analysis/ Environmental Consequences discusses the differences in ride time and quality of rider experience. All action alternatives would increase quality of rider experience. Both action alternatives would improve rider experience by providing access to additional terrain and the ride times would not have a measurable impact on this experience.
2-6	Return to Base Lodge. Would be preferable if a return road would be created each winter using snow at an appropriate grade as a "catchline" to assist beginners in returning to the lodge. Estimate this would start at approx. tower 2 of new alignment.	The overall purpose of this project is to expand beginner/novice terrain and to improve traffic flow at the Buttercup Ski Lift. The underlying needs for the project are to: (1) Expand the beginner/novice terrain by providing access to existing beginner terrain that is currently inaccessible via the existing lift; and, (2) Provide skiers and snowboarders with a safer off-load location and improve the dispersion of skiers and snowboarders at the top of the lift by realigning the current Buttercup Ski Lift. As such, creating a return road is outside the scope of this project.
2-7	Unload Point should be extended/graded so to allow an access trail to the Speedwell trail at 7:00 skiers left. This would allow skiers to access both the Mt Hood Express and Stadium Express without crossing the busy base area and Ballroom Carpet area. This would reduce the safety hazard of high speed traffic trying to cross the base area. This would also improve the ability of skiers to transfer from the south side to north side of the resort.	See response to Comment #2-6. Extending the Buttercup Ski Lift and providing access to additional skier trail is outside the scope of this project.
2-8	Would like to see trees replanted, and use excavators to install large logs as standing snags until smaller trees grow. This would help create Natural Windbreak to help slow the South wind and improve the beginner skier experience. This would also naturally divert skier traffic coming from South Canyon under Daisy (SCUD) and eliminate the need for an orange safety fence.	See response to Comment #2-6. Creating a windbreak and establishing a diversion structure is outside the scope of this project based on the purpose and need for action.

Comment No.	Comment	Response to Comment
3-1	Positive Beginner Learning Progression: It is a well-established fact in the modern era of teaching individuals new to skiing/snowboarding that the safest and most successful way to begin learning skills and instill confidence is the use of a learning carpet for uphill transportation. To provide a comfortable, confidence building transition to riding a chairlift using a moving carpet is now preferred because the student is familiar with its use. Therefore, the moving carpet is a safer and more efficient method to put students in the best position for loading the chairlift. Additionally, a fixed grip quad chairlift is a better alternative to managing the number and flow of students on the beginner slope. This creates a safer and more comfortable learning experience because less people on the slope at one time means less potential for skier/rider to skier/rider collisions while optimizing the use of the existing terrain. Alternative 2 of the Buttercup proposal provides the ideal design to achieve these desired outcomes.	See response to Comment #1-2.
3-2	Financial Viability: The initial outlay of capital for a high-speed detachable quad is significantly more than the combination of a moving carpet and fixed grip quad. Further, the ongoing cost of maintenance of a high-speed detachable quad is substantial compared to a fixed grip quad, particularly given the short length of the Buttercup Chairlift . . . These two factors alone make Alternative 3 economically unfeasible to construct and maintain for the proposed use. Financial viability is fundamental to whether a project can actually be implemented.	See response to Comment #1-1 and Comment #1-3.
3-3	Operational Sustainability: One of MHM five Core Values is sustainability. MHM views this Core Value as a three legged stool: environmental, ecological and financial. All three legs must be balanced equally for the stool to successfully stand. As previously discussed the long-term operating costs of fixed grip quad as proposed in Alternative 2 are substantially less for replacement parts, labor to maintain and repair and energy costs to operate.	See response to Comment #1-1 and Comment #1-3.

Comment No.	Comment	Response to Comment
3-4	. . . It appears the impact on the riparian reserve of Alternative 2 is slightly less in terms of acreage and no difference in impervious surface, water temperature, sediment and chemical contaminants compared to Alternative 3. Given this, Alternative 2 stands out as the best choice given the significant financial difference and little to low environmental impact to the riparian reserve of the Upper East Fork Hood River.	The impacts to riparian reserves, impervious surface, water temperature, sediment and chemical contaminants are fully analyzed in Section 3.4, Water Quality. Alternative 2 would disturb approximately 0.3 acres of riparian reserves while Alternative 3 would disturb approximately 0.5 acres of riparian reserves. The difference results in the installation of the lower terminal. Table 2-1 (EA, Section 2.6) compares all the water quality measures.
4-1	. . . The FOMH [Friends of Mount Hood] would very much like to see this hillside returned as much as possible to its original meadow condition. To accomplish this the native seed mix should specify buttercups; and, rather than the standard revegetation attempt there should be a specified meadow restoration plan on the order of the planning and extensive work that has been done on wetland restorations.	Subalpine native species that are commonly referred to as "buttercups" only grow in or around wet areas. There are no wet areas that would be impacted by the proposed project so buttercups would not be part of a native seed mix for restoration. Mt. Hood Meadows has prepared a draft Vegetation Management Plan. The following is an excerpt that addresses native seed mix used for general restoration of disturbed areas within MHM Permit Area: "MHM staff and/or contract workers collect seed from native plants such as pearly everlasting (*Anaphalis margaritacea*), alpine lupine (*Lupiuns alpinus*), broadleaf lupine (*Lupinus latifolius*), yarrow (*Achillea millefolium*), California Brome (*Bromus carinatus),* tea-leafed aster (*Aster ledophyllus*) and alpine aster *(Aster alpigenus*) for distribution throughout the developed areas within the mid- to lower [Permit Area] elevations. In addition, MHM has successfully used Canadian Goldenrod (*Solidago canadensis*) to revegetate the ski slopes in the vicinity of the base area. These seed collections and distributions will continue as standard operating procedures . . ." These management practices would be implemented as part of this project. A native seed mix would be used for restoration purposes as needed and as described in Project Design Criteria (PDC) VM-3. PDC VM-3 has been generalized in the final EA in order to allow all native species to be considered.