CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter presents the scientific and analytical basis for comparison of the alternatives displayed in Chapter 2. Probable effects of implementing each alternative are disclosed for the affected resources. The effects analysis area varies in size depending on which resource is being considered and generally exceeds the immediate project area, for some resources it encompasses the 5th field Dosewallips watershed[9].

The probable effects described include direct, indirect, and cumulative effects. The ONP proposed activities are approximately four air miles from the area where the ONF proposed activities would occur. Due to this geographic separation direct and indirect effects are discussed separately for effects of ONP and ONF activities. Since the park proposed action is common to all action alternatives for the proposed repair on FSR 2610, the direct/indirect effects discussions for all action alternatives for the park action are at the end of each issue discussion. Cumulative effects are combined in one discussion, covering both ONF and ONP actions. The chapter is organized according to the issues presented in Chapter 1 and concludes by addressing the disclosures specifically required by Federal statutes and Executive Orders.

As this EIS has been prepared by specialists from the ONF, WFLHD, and ONP; and each agency have unique regulation and policy requirements; some terminology and analysis needs are specific to each agency. These agency specific differences are noted throughout this chapter.

Information supporting the analysis in this chapter may be found in resource specialist reports contained in the project's analysis file. Individual specialist reports are referenced at the beginning of each resource discussion.

Cumulative Effects

According to the Council of Environmental Quality (CEQ) NEPA regulations, "cumulative impact" is the impact on the environment which results from the increased impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions (40 CFR 1508.7). This project's cumulative effects analysis was guided by the June 24, 2005 CEQ Memorandum "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis", which provides guidance on the extent Federal agencies are required to analyze the environmental effects of past actions (CEQ 2005).

Early in the analysis process the project IDT identified past, present, and reasonably foreseeable future actions that might result in cumulative impacts with the proposed action. Only those past actions that the IDT considered to still be having impacts on resources potentially affected by the

[9] The 5th field Dosewallips watershed includes encompasses the entire Dosewallips River drainage, from its headwaters in the park to the where it enter Hood Canal near Brinnon, Washington.

Dosewallips Road Washout project are included in this analysis. Each resource area considered different mixes of these actions, depending on the cumulative effects boundary for the resource area and the resource affected. Only those past, present, and reasonably foreseeable actions which overlap the geographic analysis boundary for each particular resource are considered, and only if those other actions have or are expected to have overlapping effects with the Dosewallips Road Washout project. Some past projects may still be having effects which result in cumulative effects associated with a particular resource, but not another.

Past

- Timber harvest (both Forest Service and private).
- Wildland fire (1919, 1926).
- Construction of a by-pass trail around the washout.
- Use and maintenance of Elkhorn Campground.
- Use and maintenance of Olympic National Park facilities.
- Use and maintenance of roads beyond the washout.
- Road decommissioning (10.1 miles in last 10 years)
- Jefferson County bank stabilization project involving placement of riprap along 170 feet of Dosewallips River bank at RM 1.9. Also included planting of native vegetation.
- Washington Trout – Project along lower Dosewallips River which removed 1,000 feet of dike and restored 40 acres of salt marsh. Also planted native trees and shrubs on 5 acres.
- Fall 2006/Winter & Spring 2007 closure of motorized access to ONP Staircase (FSR 24).
- Road repair on FSR 2610000 at MP 1.9 near Case Creek. This included installing a larger culvert and improving road drainage.

Present

- Current use of Elkhorn Campground.
- Current use of Olympic National Park facilities.
- Trail system accessed by FSR 2610.
- Use and maintenance of transportation system up to the washout.
- Dispersed camping along the Dosewallips River.
- Harvest of second growth timber and associated road construction on private land in the Mt. Jupiter and Dosewallips Road area (about 150 acres).
- Closure of FSR 24 to all public access since November 1, 2007. FSR 24 is the main access point for the Staircase area of the Olympic National Park.

Future

- Placement of large woody debris (LWD) in the Dosewallips River and riparian area.
- Road decommissioning on FSR 2610-012 from MP 0.7 to 2.7, about 2.0 miles.
- Jackson Thinning Project (about 1,000 acres of commercial thinning – primarily cable and helicopter logging, and 3 miles of temporary road construction in the Rocky Brook subwatershed).
- Future treatment of danger trees along the transportation system.
- Forest Service road maintenance of FSR 2610.
- Watershed restoration project involving rehabilitation of dispersed camping areas on National Forest System land adjacent to the Dosewallips River.
- Washington Trout – Project will install up to 6 log jams along the lower Dosewallips River.

- Dosewallips Floodplain acquisition project – Project plans the acquisition of about 93 acres (0.75 miles of river length) of riparian and floodplain habitat 1.5 miles above the river's mouth.
- Olympic National Park resumption of road and facility maintenance.
- Implementation of the ONP's new General Management Plan (GMP).
- Private land timber harvest and road construction (about 200 acres).
- Pleasant Harbor Marina and Golf Resort, a 250 acre development planned at Pleasant Harbor about three miles south of Brinnon.

ONP Methodology, Assumptions, and Definitions (applies only to ONP effects discussions)

Impacts are evaluated based on the most current and comprehensive scientific and social data available. Overall the ONP based these impact analyses and conclusions on the review of existing literature and ONP studies, information provided by experts at the park and other agencies, professional judgment and park staff insights, and input from interested public. Impacts can be beneficial or adverse. Beneficial impacts would improve resource conditions while adverse impacts would deplete or negatively alter resources.

There are several terms used within the park's environmental consequences sections to assess the impacts of each alternative on each impact topic. Unless otherwise stated the standard definitions for these terms are:

Negligible - the impact is at the lower level of detection; no measurable change would occur.

Minor - the impact is slight but detectable; a small change would occur over the life of the project.

Moderate - the impact is readily apparent; a measurable change would occur and could result in a small but permanent change.

Major - the impact is severe, resulting in a permanent measurable change.

Impairment - the impact would harm the entire integrity of the resource or value whose conservation is key to the cultural or natural integrity of the recreation area or is a resource or value needed to fulfill a specific purpose identified in the park's enabling legislation.

Localized Impact - the impact occurs in a specific site or area, to individual wildlife, or the wildlife group. When comparing changes to existing conditions, the impacts are only detectable in the localized area.

Short-term - the impact occurs only during or immediately after the actual management or project activity.

Long-term - the impact could occur for an extended period of time after the management or project activity has been completed. The impact could take several years or more.

Direct – an effect that is caused by an action that occurs at the same time and in the same place.

Indirect – an effect that is caused by an action that is later in time or farther removed in distance but is still reasonably foreseeable.

Impairment of Park Resources and Values (only applies to ONP resources)

In addition to determining the environmental consequences of the proposed action and alternatives, NPS *Management Policies* (2006) and *Director's Order-12* (2001) require analysis of potential effects to determine if actions would impair park resources. The fundamental purpose of the National Park System, established by the *Organic Act* and reaffirmed by the *General Authorities Act*, as amended, begins with a mandate to conserve park resources and values. NPS managers must seek ways to avoid or minimize to the greatest degree practicable, adversely impacting park resources and values. Congress has given NPS managers discretion, however, to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park so long as the impact does not constitute impairment of the affected resources and values.

The prohibited impairment is an impact that would, in the professional judgment of the responsible NPS manager, harm the integrity of park resources or values, including opportunities that would otherwise be present for the enjoyment of those resources or values. An impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific park purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or, is
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated of an action necessary to preserve or restore the integrity of park resources or values.

A determination on impairment is made in the "Conclusion" section of all natural resource impact topics of this document as they relate to Olympic National Park. Impairment statements are not required for recreational values/visitor experience or heath and safety topics or for those resources located outside Olympic National Park on U.S. Forest Service administered lands.

Environmental Impact Analysis

Road Management (Road Management Report, December 2005 with updates in 2008)

Introduction

Dosewallips River Road History

In the late 1880s settlers started locating up the Dosewallips River valley. Early transportation up the valley was by trail. The Dosewallips River Road was established by County order in January 1892 for a distance of about eight miles on the north side of the river (Bailey 1997). Early maps of the area indicate the road stopping just past Gamm Creek around 1893, with it being extended up past the current washout location sometime during the period 1910 -1926 (ibid). The road provided motorized access to the Elkhorn Campground location in about 1932 (Bailey pers comm). During the late 1930s and 1940s the Civilian Conservation Corps extended the road up into the park to the Dosewallips Campground location.

Affected Environment

Olympic National Forest

FSR 2610 extends approximately 3.3 miles beyond the washout and terminates at the entrance to Olympic National Park. There are two local roads that branch off from FRS 2610 upstream of the washout. The first, FSR 2610040, is about 0.5 mile in length and is located just downstream of Elkhorn Campground. It is drivable to about MP 0.25 where a culvert has been removed from an unnamed stream crossing. It was constructed for timber management purposes and includes a bridge across the Dosewallips River. The second local road is FSR 2610050, a short loop road accessing Elkhorn Campground. All roads are single lane, surfaced with aggregate.

None of these roads have received annual maintenance since the washout in January of 2002. In many places there is vegetation such as small red alder trees growing in the roadway and ditch. Ditches and culvert inlets have accumulated sediment and are in need of cleaning. In other places runoff has washed away sections of aggregate surfacing.

The current or operational maintenance level for FSR 2610 up to Elkhorn Campground is for passenger cars (maintenance level 3), changing to high clearance vehicles past the campground (maintenance level 2). The proposed long-term management (objective road management) is to provide access for passenger cars on the complete length of FSR 2610 as well as on FSR 2610050. The objective for FSR 2610040 is maintenance level 2, high clearance vehicles. The proposed long-term management of these roads has been determined through the Forest's roads analysis or road management strategy (RMS) and the Access and Travel Management Strategy (ATM).

Olympic National Park

The 1.7-mile Dosewallips River road begins at the end of FSR 2610 and ends at the Dosewallips Ranger Station, campground, and trailheads. The road is unpaved and very narrow in places, and is maintained at park primitive road standards. One portion of the road is very steep (18 percent slope) and is not recommended for large RV's and vehicles pulling trailers. Prior to the washout it was generally open year round and only closed due to weather conditions. Annual maintenance has not been possible since the 2002 washout on FSR 2610.

Environmental Consequences

Olympic National Forest - Introduction

The alternatives being considered occupy one of two basic locations, a hillslope location and a river margin location. While exact alignments will be subject to the final design, information from surveys and designs as well as additional site reconnaissance allows for reasonable comparative cost estimates.

This section includes costs of construction and maintenance of the alternatives and the implications for user safety. Costs primarily address four areas: 1) cost of construction, 2) cost of maintenance during construction of the three miles of FSR 2610 leading to the washout, 3) cost of annual maintenance along the new section of road, and 4) the cost of maintaining the approximate 3.3 miles of FSR 2610 beyond the washout.

All estimates are for comparative purposes only, actual costs would be developed with final alternative design. Because of the uncertainty of subsurface conditions costs would be expected to fluctuate as additional information is available. Uncertainty usually results in higher final costs and increases could be expected. Hazards, uncertainty, and potential changes would be most likely along portions of Segment 2 of the reroute alternatives, which is about 40 percent of the length of the reroute. However preliminary surveys and site reconnaissance allow for reasonable estimates of cost.

The most likely conditions to be encountered that could result in higher costs are: 1) encountering material of lower quality than expected which would require haul off-site to a disposal area, 2) encountering unsuitable foundation conditions requiring higher walls or changes in design during construction, 3) slope instability conditions such as high groundwater tables and weak soil or rock that require more complex stabilization designs including the possible need to shore excavations for worker safety, and 4) lower quality material, springs, and seepage areas in cut slopes requiring laying the slope back further than anticipated and constructing rock buttresses, installing horizontal drain systems, or combinations of slope stabilization methods which might result in additional excess material to be hauled to disposal sites.

If lower quality material is encountered either during excavation or cutslope construction it would likely be localized. The steepness of the ground and the presence of shallow groundwater suggest that the soil is shallow and relatively strong material (weathered bedrock or glacial till) is present in the subsurface.

Other potential costs are more speculative and associated with risk; for example the cost of major reconstruction due to the washout migrating upstream or downstream on the bridge alternative or the cost of repairing a slope failure (landslide, etc.) on one of the re-route alternatives. Estimating these costs is too speculative and dependant on the magnitude of the problem if one develops.

Alternative A - No Action

Direct/Indirect Effects

Olympic National Forest

This alternative does not meet the purpose and need of this analysis in that road access would not be provided to the recreational facilities beyond the washout. No provisions would be made for parking or turnaround locations near the washout beyond what is already available.

Costs
This alternative would likely cost less than $5,000 depending on the road closure device specified. No additional costs for road construction, reconstruction or annual road maintenance would be expected or planned with this alternative.

User Safety
A more permanent road closure device would be installed at the washout for user safety.

Olympic National Park

Costs
Conditions on the Dosewallips Road would not change. There would be no reconstruction or maintenance, and no costs incurred.

User Safety
Vehicle traffic would not be able to access the damaged road area and as such there would be no effects to user safety.

Cumulative Effects

In comparison to the action alternatives the cost of this alternative to ONF is minor which would allow Forest road funding resources to be used in other areas on the Forest. As there are no ONP road construction or maintenance costs associated with this alternative, park road funding resources would be available to be used in other areas of the park.

Alternative B - Reroute 1 Bench Emphasis

Direct/Indirect Effects

Olympic National Forest
The road would be constructed and managed to a standard consistent with the rest of FSR 2610; that is a 14-foot wide, single lane road designed for maintenance level 3, suitable for passenger vehicles. Compared to the original location and the bridge alternative, this alternative would involve a long section of new construction with wide clearing limits. It would be about 0.84 mile in length or more than 6 times as long as Alternative F.

Costs
This route traverses steep ground and would be constructed at a steep grade, as such it would be costly in terms of initial construction costs and annual maintenance costs. The anticipated earthwork is substantial with large cuts and fills and little opportunity to adjust alignment to reduce that earthwork.

The annual maintenance costs and frequency would be expected to be fairly high initially (short-term) because of the large cutslopes and steep grades. Big cuts on steep slopes suggest that some slope erosion should be anticipated at least initially, and keeping the drainage system (ditches and culvert inlets) open and functioning is expected to require frequent maintenance if failures of the drainage system are to be prevented. The sections with steep grades have a higher potential

for road surface and fillslope erosion and drainage diversion than flatter roadway sections should the drainage system plug. Over time this cost and impact tends to go down as vegetation is established and a more stable slope angle develops (repose) in the cutslope.

Table 2: Alternative B cost estimates

Item	Cost	Term	Estimated duration
Construction	$2,550,000	NA	NA
Annual Maintenance, New	$33,900/yr	short	First 2 years
Annual maintenance, Life	$2,000/yr	long	After 2-yrs – life of project
Annual maintenance beyond washout, Life	$10,800/yr	long	Life of project

NA = Not Applicable

User Safety
This alternative would provide for user safety equal to or exceeding existing conditions found along FSR 2610 before the washout in terms of road design and maintenance standards. Danger trees along the newly constructed road would be removed.

Alternative C – Reroute 2 Retaining Wall Emphasis

Direct/Indirect Effects

Olympic National Forest
This route would essentially be in the same location as Alternative B, with a similar length.

Costs
Adjustments would be made in the horizontal and vertical alignment in order to reduce the foot print or clearing limits of the route compared to Alternative B. Because of the steep sideslopes and grade limitations there would be limited ability to make these adjustments. Adjustments would be primarily with the use of retaining walls and slope reinforcements, which would increase construction and short-term maintenance costs. Construction maintenance costs would also be higher due to the increased haul of embankment material along FSR 2610.

Table 3: Alternative C cost estimates

Item	Cost	Term	Estimated duration
Construction	$3,760,000	NA	NA
Annual Maintenance, New	$34,200/yr	short	First 2 years
Annual maintenance, Life	$2,000/yr	long	After 2-yr – life of project
Annual maintenance beyond washout, Life	$10,800/yr	long	Life of project

NA = Not Applicable

User Safety
User safety would be the same as for Alternative B

Alternative F - Bridge

Direct/Indirect Effects

Olympic National Forest
The alignment would be essentially straight between the upstream and downstream ends of FSR 2610 at the washout. The height would be expected to be at or near the elevation of the upstream end of the road, well above the level of the predicted 100 year flood.

Costs
Construction and maintenance costs are estimated in Table 4. An additional expense is that bridges and major structures are subject to inspection by a certified bridge inspection team every 2 years, and bridge maintenance would be conducted to meet health and safety requirements of the Highway Safety Act. This is the only alternative that would affect additional inventory, tracking, and workload in this regard.

Table 4: Alternative F cost estimates

Item	Cost	Term	Estimated duration
Construction	$8,750,000	NA	Design life (50 yr)
Annual Maintenance, New & Life	$3,900/yr	Short, long (same)	Life of project
Bridge insp. maintenance	$1,200/yr	long	Life of project
Annual maintenance beyond washout, Life	$10,800/yr	long	Life of project

NA = Not Applicable

User Safety
There are no unusual concerns. Danger trees along the top of the slope would be removed.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

Olympic National Park
Costs
Construction costs would be the same for all action alternatives and are estimated to be $350,000. Deferred road maintenance costs are likewise the same for all action alternatives and are estimated to be $4,500.

User Safety
These alternatives would provide for user safety equal to or exceeding existing conditions in terms of road design and maintenance standards found along the Dosewallips Road before the road became damaged. Danger trees along the newly repaired road would be removed.

Cumulative Effects

Use of ONF road funds for any of the action alternatives would reduce the overall total road funds available to perform other road work on the Forest. The alternatives with higher expenses would have a greater impact in this regard. Use of ONP road funds on the Dosewallips Road

would reduce the overall total road funds available to perform other road work on the park.

Geotechnical and Geomorphic Processes (Geotechnical and Geomorphic Processes Reports, January 2006 with updates in 2008; and Soils Report, January 2006 with updates in 2008)

Introduction

Olympic National Forest
The alternatives being considered can be placed into two general road alignment categories: 1) approximating the original road location along the river, and 2) bypassing the river margin and routing up the hill and around the washout to the north. These are referred to as river margin and hillslope alignments respectively. While geomorphic processes are of a larger concern for the river margin alternative and geotechnical processes are more important for the hillslope alignments, they are combined in this section to give a more complete understanding of all geological processes occurring in the project area.

The Affected Environment discussion includes a basic description of geomorphic processes (processes which create or shape land forms). An understanding of these concepts is important in understanding the environmental consequences of the alternatives, particularly Alternative F. It is also important in understanding the analysis presented in Appendix B which describes the environmental consequences of former Alternatives D (Replace-in-kind) and E (Low-water Revetment), which were dropped from consideration.

Alternative F (bridge alternative), which approximates the original road location along the river is affected by river (fluvial) processes as well as the processes associated with the long-term evolution and stabilization of the high bank (eroded bluff) at the washout. For the purposes of this document the high bank at the washout refers to the bare slope at the washout that has enlarged over time as river erosion, undercutting, and slope instability has progressed. Other terms such as bluff slope or eroded face of the high terrace have been used in discussion of this site, all are intended to describe the same feature. The photographs used in this section were provided by Shelly Ament and Jay Moore of the Washington Department of Wildlife.

The Affected Environment section also provides the geotechnical basis for addressing issues raised by the public through comments and appeal points on the 2003 EA regarding the uncertainty of geologic or geotechnical conditions along the proposed hillslope alignment, particularly in the area of slope stability. Since the EA analysis additional geotechnical reconnaissance has been conducted along the proposed route and the hillslope alignment has been surveyed and staked. Additional site reconnaissance included further surface examination of deposits, topography, slope stability features, and seeps and springs. No subsurface investigation was conducted because drilling would be costly and would create environmental

impacts such as clearing large trees and creating temporary access roads. It was judged premature to incur these impacts prior to committing to one of these re-route alternatives as geophysical investigations were not expected to provide sufficient information in light of their associated environmental impacts.

Information used to develop preliminary designs for the reroute alternatives included making assumptions about subsurface conditions and geologic hazards (in this case slope stability). The available survey provided detailed information about topography and geometric design (horizontal and vertical alignment, size and geometry of cuts and fills, and volume of earthwork). This information along with the additional site reconnaissance allows for reasonable assessments of potential impacts.

Olympic National Park

The National Park Service portion of the project is located on the existing road near the Dosewallips Falls. The road grade near the site is approximately 18 percent, the side slope is extremely steep and rocky, and the toe of the existing crib/fill areas is approximately 30 feet below the road and directly adjacent to the river cascades. The falls have remained in their current channel since at least the 1930s and 40s, when the road was constructed. The roadway is not typically impacted by the falls, except during periods of extreme flooding. However heavy rains can erode the embankments above the walls causing the log cribbing to deteriorate over time.

Affected Environment

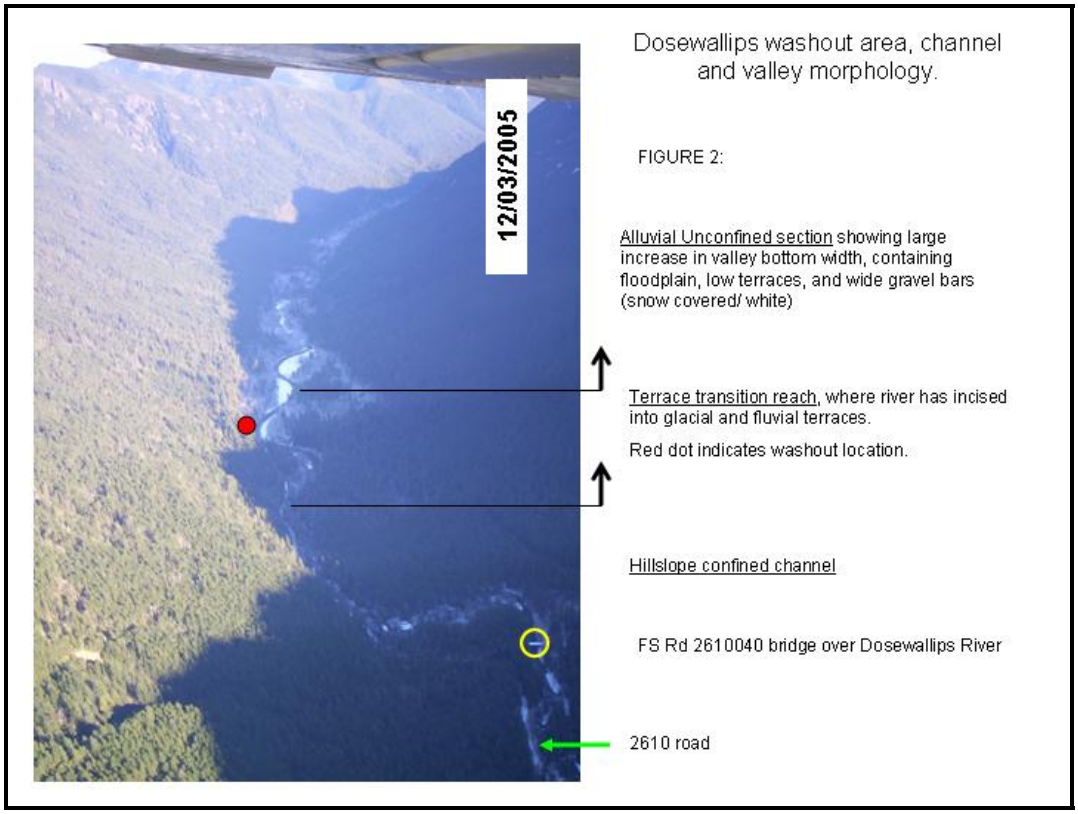
Olympic National Forest

The Reach Analysis

Much of the information regarding geomorphic conditions at and adjacent to the washout site was developed during investigations conducted in 2002 and 2003. This information is documented in Cenderelli, et al. (2003), *Geomorphic Processes and Habitat Conditions along the Dosewallips River in the Vicinity of the Washout on US Forest Service Road 2610.* This constitutes the documentation of what is most frequently referred to as the reach analysis or reach assessment. The primary objectives of that assessment were to: 1) develop appropriate mitigation for the preferred alternative proposed in the 2002 EA that replaced the road in the original location, 2) refine the assessment of long-term and off-site impacts for documentation in the 2002 EA, and 3) provide more detailed information for the aquatic biological assessment (BA).

Key findings included: 1) the trend in channel migration, 2) the recognition of the unique geomorphic setting at the washout location, and 3) the link between sediment supply at and adjacent to the washout and the important salmonid habitat just downstream. The washout occurs in a transition zone between a fairly steep bedrock controlled canyon reach extending upstream at least to the National Park boundary and the unconfined alluvial reach just downstream of the washout. (Figure 15 shows an aerial view.)

Figure 15: Washout location aerial view



The upstream reach, referred to as the hillslope confined channel or section, is characterized as being a high energy environment with comparatively low sediment supply. This means that the sediment supply is limited relative to sediment transport capacity. Fluvial (stream) and glacial terraces and associated bank erosion were not observed in this section (air photo examination only).

The terrace transition reach is a short section, extending from 1300 feet upstream of the washout to 850 feet downstream of the washout. Glacial and fluvial terraces confine the channel along the outside of bends. There is a high degree of interaction between the bank and the channel, and sediment supply is high and is dominated by gravel sizes in the range preferred by spawning salmonids. The entire reach is contained within two meander bends and the washout is located near the apex of the downstream bend. The largest (discrete) sources of sediment supply within the terrace transition reach are from erosion of the high banks at the outside of the two meander bends located at and upstream of the washout. These sites also contain the deposits with a large percentage of gravel of preferred spawning size. The large gravel bars downstream in the alluvial unconfined reach are storage sites for these deposits. They are snow covered and show up as bright white in Figure 15.

The alluvial unconfined section or reach is immediately downstream. Here the valley bottom is wide, confinement is reduced, the high terrace structures disappear, and the stream gradient decreases. The combination of high sediment supply upstream and decreased gradient

downstream favors deposition of sediment. At this point in the channel network sediment supply exceeds transport capacity (the reach becomes transport limited). This is the area where in-channel habitat conditions are complex and habitat is considered excellent. This combination of factors and conditions is unique in the upper watershed.

Trends in channel migration

The historic air photo assessment conducted during the Reach Analysis indicates that the trend since 1939 has been toward increasing sinuosity at the washout location. At the washout the river meander bend has progressed toward and then into the bank, resulting in road washout and erosion of the high bank. It is assumed that this trend, which has been consistent in the past but at a variable rate, will continue. Observations in the winter of 2007 indicate that the area of erosion and the amount of exposed (unvegetated) high bank has increased since the initial road washout in January of 2002.

It is typically expected that meanders migrate downstream over time (TRB, National Cooperative Highway Research Program, Report 533, Handbook for Predicting Stream Meander Migration, 2004). As this occurs, at some point in time the high bank will no longer be at the outside of the meander bend and the high bank will be abandoned as a source of gravel. When this will occur is unknown, but it is expected to be longer than 50 years, the commonly assumed design life of many transportation structures on similar forest roads in the area.

Figure 16 shows the washout site in 2005 with the 1939 channel position approximately located. Note that from 1939 to 2005, the trend of channel migration and meander development includes both extension (lateral shifting) and translation (downstream migration).

Figure 16: Historic migration zone

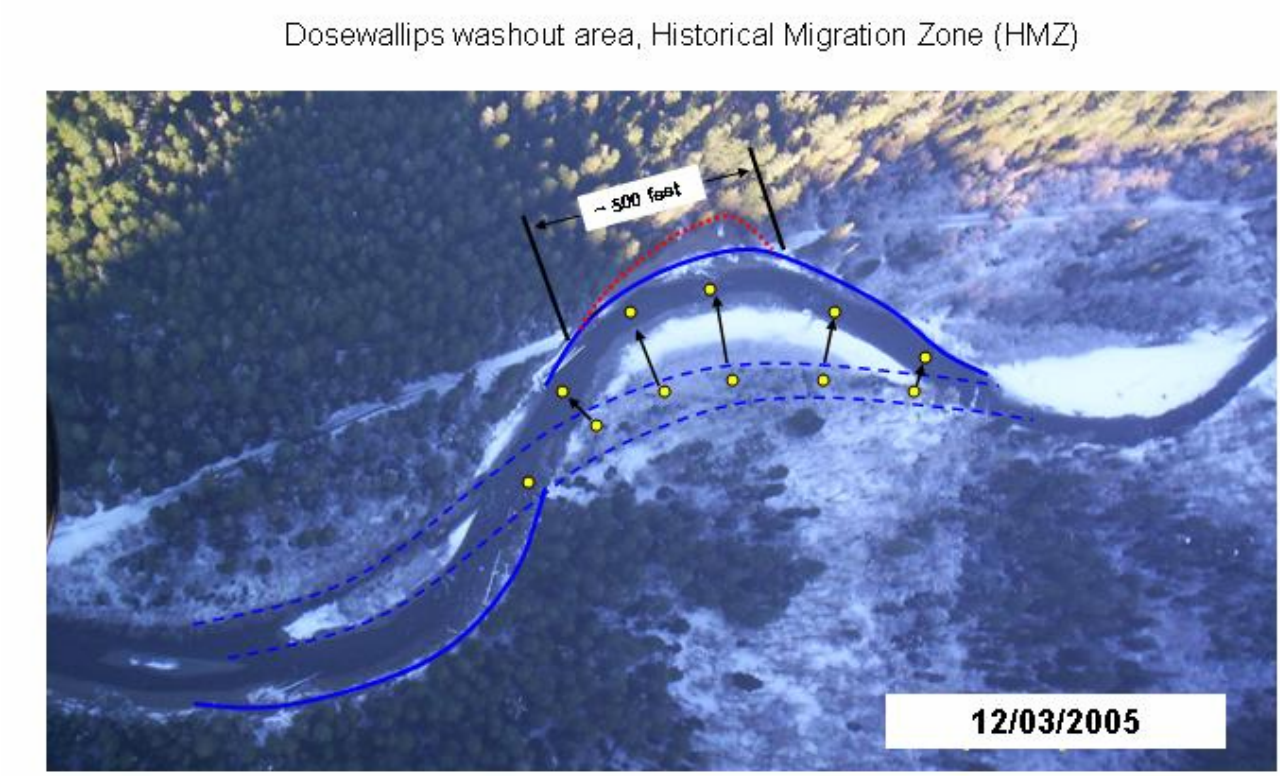


FIGURE 14: Air photo of washout site taken 12/03/2005. Dashed blue line shows the approximate location of the 1939 channel. Yellow dots and black arrows indicate direction of movement. Movement is pronounced extension (lateral or outward) with associated (downstream) translation. Movement near the apex of the bend appears to be about 280 feet. Washout area and high bank erosion is outlined in red.

Note that photo was not taken vertically and measurements are only rough approximations. Washout length was measured in the field, 10/18/2005, distance measurements are relative to this dimension.

Sediment supply and variability over time

Sediment supply from the terrace areas and delivery (response) to the low gradient segments downstream was judged from aerial photography from 1939 through 2002. The position of the channel relative to the banks (terrace faces), the appearance or amount of raw bank, and the size of gravel bars (un-vegetated channel margin) were primary indicators. Not surprisingly the trend in active bank erosion, channel response (wider gravel bars), and flood history are related and they varied over time throughout the period of photo record.

The pattern of erosion and downstream response or deposition (increases in gravel bar size) is episodic. This suggests that in some years, when banks are active, sediment deposition (and bar size) is at a maximum. Such conditions are present now and appear to have also been prevalent in 1962. Channel narrowing and vegetated bars prevailed in the late 1960's through the 1970's, and again in the 1990's. (Cenderelli et al. 2003, Table C3-1, and Figure C3-1) In 1982 the channel had shifted to the road at the washout site, and road maintenance engineers recalled having placed riprap at this location to avoid and prevent further washout. It seems reasonable to expect that in years when sediment supply is low (or limited), transport capacity is sufficient to move the smaller sediment sizes in the bed, and the bed becomes coarser (becoming cobble

dominated).

This cyclic or episodic nature of sediment supply and downstream response suggests in-stream habitat conditions downstream also vary through time. It is assumed that they are at their best during and following periods when sediment supply (of gravel) is high. Presumably the volume of gravel stored on bars and in the channel is high and channel splitting and potential wood delivery is also at the high end of the natural range at these times. During extreme flood periods, there is likely sufficient sediment supply from upstream and habitat conditions are also good at this time. However when the channel is armored sediment supply is reduced. Under these conditions a large supply of sediment just upstream is cut-off (as it had been from 1982 until the washout in 2002), and it is expected that in-channel habitat has reduced complexity and coarser substrate.

The assumption is that when the washout area is armored, habitat quality downstream is more likely to be at the lower end of the spectrum and will be in that condition more often. However armoring at the washout may not have a significant effect on the total range of habitat conditions exhibited in the channel downstream (in periods of low sediment supply or long intervals between floods the channel downstream is probably also at the low end of the range). There is also an expected lag between sediment supply and the response in habitat conditions downstream; large inputs in sediment may result in several years of changed (improved) habitat conditions downstream. Long-term or persistent change downstream is expected to be much more important than the absolute magnitude of change. The magnitude of change is expected to remain within the historic range of channel conditions. The frequency, or period of time when habitat quality is high, is expected to change and will be reduced if sediment supply from the high bank is eliminated.

Our interpretation is that when either of the two existing high banks are not actively supplying sediment to the channel (either by armoring, abandonment or any other process), the habitat conditions in the channel downstream are in a lower quality state. There is likely an exception to this in years immediately following large floods, when sediment is supplied from multiple alternative sources in the watershed. Furthermore, with the armor in place from at least the 1980's until the 2002 washout it is likely that habitat conditions were lower (quality) than they otherwise would have been. Conditions since the washout (2002) have included continuous bank activity with the river running against the accumulated deposits at the base of the slope. In other words there has been a period of high sediment supply since the washout. Current conditions reflect high sediment supply and high quality in-stream habitat.

Slope evolution at the washout

Stability of shoreline slopes such as the one along the washout area is actively changing or evolving through processes of erosion at the toe, followed by adjustments of the slope as it strives to achieve a stable angle or slope configuration. Evaluating hazard and stability in the long-term involves recognizing both the rate of change of bluff slope recession and predicting the long-term stable slope angle (Edil and Vallejo, 1980).

The rate of river erosion at the toe of the slope at the washout currently exceeds the rate of slope adjustment that tends to produce a stable angle. This has maintained a steep and active (eroding) high bank at the washout. Even if river erosion ceases the slope will continue to adjust. So far, shallow slides and falls have been the primary mechanisms of slope adjustment, and no large or

deep-seated slumps or slides have been observed.

Established vegetation has been used as an indicator of stable slope conditions. Slope angles on vegetated slopes near the washout were measured in the range of 100 percent (45 degrees; geotechnical cross section C) to 80 percent (39 degrees; FHWA survey). This suggests that slopes in this material that have established woody vegetation are stable up to the range of 80 to 100 percent (39 to 45 degrees). However bare slopes in this range are not expected to be stable, and a substantial amount of adjustment should be expected for slopes exceeding these angles. The un-vegetated and active slopes that currently exist at the washout have been measured in the range of 60 to 77 degrees indicating that this slope will continue to be unstable until stable slope angles are achieved.

Once recession or river migration has (been) halted, projecting a slope angle of 100 percent or less from the base of the slope provides an estimate of the long-term slope profile. Slopes steeper than this are expected to erode and remain active until the stable slope configuration is reached.

Slope recession and erosion since the washout has been measured in one location at geotechnical Cross Section A (Shelmerdine, 2/4/2002; 9/7/04; 10/18/05; and 12/11/2007). During this time the river has shifted into the hill, eroding the toe of the slope into the hill about 55 feet over 5 years. During this same period the apex of the high bank has shifted about 65 feet downstream. Because this represents the change associated with adjustments of the river planform (the shape of the river as seen in map or air photo view), the loss of the hardened bank associated with the former road, and includes three major flood events it may not reflect future long-term rates of bank recession. Hardening the toe by placing riprap would prevent further recession at the toe, and sediment supply would be limited to slope adjustments that tend toward a stable angle in the long-term. Most observed slope movements have been rather small in scale and result from collapse, falls, and topples rather than larger scale slides or slumps.

Slope Stability

Slope stability of the project area can be differentiated based upon landforms. The outwash plain occurs along the existing road prism between the Dosewallips River and the steeper toeslopes north of the existing road location. In general it is a stable landscape with no recent evidence of landslides or other mass failure activity. The edges of these landforms however form terraces and high streambanks which are susceptible to failures from the river undercutting the base of these slopes. This is evidenced by the existing large bank failure area at the washout (approximately 500 feet wide by slope distance of 150 feet high). This site has expanded in size since 2002, most notably after an October 2003 large storm event.

The glacial valley landform (steep toeslope and footslope) occurs in the vicinity above the existing road in the area of the proposed reroutes. It has been rated as medium for natural landslide potential and high for management response to road construction. This landform contains numerous small streams that are pocketed with springs. There are several indicators of historic deep seated and shallow rapid land movements in this area, notably Segment 2 of the proposed reroute upslope and east of the washout. Evidence of dormant deep seated landsliding and historic shallow rapid landsliding was observed along this segment in several areas. This landsliding was observed on steep slopes near convergent drainages, major slope breaks, and seep areas.

The terrace bench portion of the glacial valley landform has been rated as low for natural and management landslide potential. Slopes range from 5 to 10 percent and soils are well drained. No evidence of slope instability was observed. However areas of debris fans exist at the upslope margin of this landform, deposited from landsliding and debris or snow avalanches originating in the glacial troughwall landform.

The glacial troughwall landforms are located above the glacial valley and are found in the mid to upper mountain slopes and ridgetop area. They have a high potential for natural and management-related landsliding, especially in areas of dissected mountain headwalls and convergent zones. Slopes range from 35 to greater than 90 percent. Avalanche and debris chutes are common on this landscape. No management activities are being considered in this landform, but it does influence the glacial valley landform due to the inherent instability and contribution of materials downslope and downstream.

River erosion and flow around bends
Erosion at the toe of the slope by the river is particularly effective along the outside of bends. Several components are at work that would affect or would be affected by construction of a riprap bank along the channel edge.

The velocity (energy) and resultant shear stress initiating erosion is typically highest near the channel bottom where the flow is deep and along the outside of bends where the flow is spiraling and very effective in eroding the bank and the toe of the slope. This spiral flow or secondary circulation around bends is effective in selectively eroding along the outside of the bend, while depositing material along the inside of the bend. This is a process by which point bars are constructed and would be a primary mechanism for supply of gravels along the inside of the meander bend and at the pool tail at the washout (both are identified salmonid spawning areas).

Assumptions used in identifying downstream effects
Two primary assumptions were used in estimating influences, effects, and consequences of alternatives:

1. The recent trend (since 1939) toward lateral channel shifting into the hillside will continue.
2. Large and obvious sources of sediment close to response reaches play a more significant role in the character of the river bed (and spawning habitat) immediately downstream than sites that are not large and obvious and much further away. The identified response reach just downstream of the washout is a storage site for in-channel sediment (spawning gravel) that is linked to high quality aquatic habitat and is an important spawning site. A high supply of gravels from the terrace transition reach (including the washout area), combined with decrease in channel gradient, suggests that sediment transport capacity is limited relative to sediment supply and consequently sediment is stored here.

Olympic National Park
The Dosewallips River Reach analysis did not include the NPS portion of the project. Therefore detailed information is not available for the geomorphic processes affecting the NPS road.

The area is generally a stable landscape under natural conditions. The fill slope for the Dosewallips Road in the immediate vicinity of the road failure has been unstable since the 2003

failure of the retaining wall structure. There are a series of three log crib walls supporting an approximately 300-foot section of roadway above Dosewallips Falls. The log cribbing deteriorated on one portion of the roadway in 1993, primarily due to heavy rains eroding the embankment. Geotech exploration occurred at the falls site in 1994 to determine the options for reconstruction. The results showed that there was not bedrock at the project site, just large boulders. Reconstruction of the one of the log crib walls occurred in 1994. The other two walls had no problems at that time. However during the 2003 storm event the two lower retaining walls failed, creating road instability and slumping.

Environmental Consequences

Alternative A - No Action

Direct/Indirect Effects

Olympic National Forest
The area is generally a stable landscape under natural conditions. No direct or indirect effects are likely associated with no action. The likelihood of increased mass wasting within the area is low. Site reconnaissance did not identify any major mass wasting concerns that would impact the road beyond the washout. Much of the road is full bench constructed in stable rock and glacial till. The potential exists for isolated, natural shallow landsliding in the areas of glacial deposits in the valley bottom or valley side slope, particularly within dissected areas with significant groundwater in the soil profiles. These would likely occur in the mid to upper slopes above FSR 2610. Slope instability would continue on the high bank at the washout, especially through streambank undercutting by the river. This failure would likely remain unstable for 10 to 50 years, with rock topple and raveling continuing to occur. Additional small streambank failures may also occur in the vicinity, most notably Elkhorn campsites located directly adjacent to the Dosewallips River.

Geomorphic processes at the washout site, including river and slope processes, would function naturally. As in the current situation, the washout would continue to expand and increase the sediment supply (spawning gravels) as has occurred at this site in recent years.

Olympic National Park
At the road failure site there is little chance of catastrophic failure, however the road surface could potentially erode and deteriorate fairly rapidly due to frequent storms, both from upslope and downslope erosion. Geomorphic processes at the failure site, including slope processes, would function naturally. The road surface could potentially further erode and deteriorate.

Cumulative Effects

No cumulative effects associated with slope stability are anticipated with this alternative. Effects to slope stability of this alternative would be negligible and would not interact with impacts to slope stability associated with any past, present, or reasonably foreseeable future activity in the watershed. There would be beneficial cumulative effects to the supply of spawning gravel sized sediment as the sediment continuing to be supplied at the washout would add to the sediment supply associated with future in-river restoration projects.

Alternatives B and C – Reroute Alternatives

Direct/Indirect Effects

Olympic National Forest

Effects to slope stability along the reroute can be placed into one of two categories: 1) slope movements associated with steep ground construction (cut and fill slopes) and 2) historic or pre-existing slope movements. For the purposes of this discussion, the term slope movement includes the range of mass wasting or unstable slope features (slumps, slides, flows, etc.) without suggesting that the mechanism of failure is known.

Slope movements associated with steep ground construction are often associated with undercutting or removing the lateral support at the base of a slope, placing fill on a slope that is too steep, loading a slope by placing too much weight on it, or by diverting drainage onto susceptible locations. Effects to slope stability are most prominent on two sections of the reroutes due to steep sideslopes along segment 2, a 1750-foot long section on the east portion of the reroute; and segment 5, the 750-foot long section on the west portion of the reroute. Topography and materials are relatively uniform along Segment 5 and the issues along this segment are primarily with construction on steep ground rather than encountering pre-existing slope movements.

Alternative B would have the second highest risk of slope instability (Alternative C would be slightly higher) of the action alternatives. Along Segment 2 historic shallow landsliding and dormant deep-seated mass movement are evident. Steep slope angles, unstable soils, and considerable surface and subsurface water flows are factors that make this location susceptible to instability. Slope failures within the cutslopes would likely compromise the road drainage system. Such blockages, culvert plugging, or diversion are a common cause of road-related instability and resulting watershed impacts. The potential for the cutslopes to expand in size upslope somewhat beyond the designed top of cut is high, at least in some localized areas in segments 2 and 5.

Most effects to slope stability associated with construction should be addressed and mitigated through design. A range of techniques including controlled compaction, slope reinforcement or retaining wall construction, and modifying cutslope angles to stable configurations would likely be implemented. The extent that these techniques would be used would be an element of the final design. Some small scale (less than 1,000 sq. ft) shallow slides would likely occur in cutslope locations. They would be expected to occur during or in the first few years following construction and would likely be confined to the road prism. This would be an added cost for road maintenance of this route, and cleanup would be important for keeping the road drainage system functioning.

Effects to pre-historic or pre-existing slope movements are limited to Segment 2 on the east portion of the route. The additional field reconnaissance since the earlier EA was prepared found no active ground breaks (cracks, etc.) that would indicate recently active slope movement. Small

deep-seated mass movement would be a possibility, although unlikely due to mitigations recommended in Chapter 2. This movement could result from undercutting unstable slopes, altering surface water, or placement of large amounts of soil material. In several places along this segment the terrain suggests pre-historic debris flow and slope movement activity. It is likely slope instability would be encountered that would require some special design considerations in a 1300 foot long segment (primarily in Segment 2). Potential effects in this section would be expected to be mitigated with relatively standard design and construction practices. The potential for this kind of movement is unknown at this time and is considered less likely than shallow instability.

Slope processes at the high bank would continue in a natural condition as in Alternative A.

In terms of fluvial processes and sediment supply (spawning gravel) the primary advantage of these alternatives is that the location would be disconnected from the Dosewallips River. The terrain between the alignment and the river would provide a buffer that is well vegetated. With regards to the geomorphic processes discussed above, there are no predicted effects to sediment supply (spawning gravels) and fluvial processes in the Dosewallips River under these alternatives.

Alternative F - Bridge

Direct/Indirect Effects

Olympic National Forest

This alternative spans the washout area with a bridge and would allow river and slope processes to operate without the influences of extensive bank hardening and rock armor. Slope stability processes would continue under near natural conditions. The risk of slope instability under Alternative F would be lower than other action alternatives. The road would be located on a stable landform, with the exception of the existing streambank failure. There would be limited riprap armor at the upstream and downstream bridge abutments (estimated to cover 50 to 75 feet on each end) and this would eliminate the river's lateral erosive process on the bank at these locations. In the upstream area construction of riprap to armor the abutments would limit the amount of river induced erosion at the base of the slope and slow recession. This would allow the natural shallow slope movements of ravel, collapse of blocks, and erosion of individual particles to lead to eventual stabilization of the slope in this location in the long-term. Deep-seated, large-scale, or particularly active slope instability has not been observed in the area. Locating the downstream abutment about 100 feet from the current downstream end of the washout would not eliminate the river's lateral erosive process on the downstream portion of the high bank.

This alternative would allow the river to flow along the bank and allow erosion at the toe of the slope with the associated sediment (spawning gravels) supply. The majority of the high bank would be subject to natural slope stability processes as described under Alternative A, as modified by the intermediate bridge piers which would deflect some of the river's flow into the bank and some away. The presence of piers in the channel would split flow locally, deflecting some flow into the bank and some away with some scour around piers. This would result in a more irregular bank line and more complexity along the channel margin. It is not clear how it would affect sediment supply, but it is expected to be similar to Alternative A. Flow around the piers would result in local scour and deposition on the channel bed. The bridge location at the

outside of the bend would put it into a relatively high energy environment and in a location where mobile large wood in the channel would likely be swept along the bank and against the piers. Wood would be expected to catch and rack up onto the piers in this location. Wood would be removed from the piers if it became an impediment to the production of spawning gravels from the high bank. This alternative results in the greatest channel complexity and the highest in-channel variability of any alternative (including the no action). As discussed in more detail in the aquatics species and habitat conditions section of this document this would be a benefit by creating high quality, complex fish habitat.

Local and downstream sediment supply would be expected to approximate the no action alternative: erosion, sediment supply, and high bank recession would continue at the site. The migration of the meander bend downstream would be accommodated because the downstream abutment would be located about 100 feet downstream of the current downstream end of the washout. This would allow the natural downstream regression of the high bank to continue.

No wood would be removed from the channel. Wood would be allowed to accumulate on and around the bridge piers. However, when and if this wood is determined to be a hazard to the bridge structure or is interfering with the natural sediment production from the high bank to an extent that aquatic objectives are not being achieved, it would be removed from the bridge piers and redistributed in the adjacent river channel. Large pieces of wood would be kept intact as much as possible.

Alternatives B, C, and F - All Action Alternatives

Direct/Indirect Effects

Olympic National Park

The planning team based the impact analysis and the conclusions for possible impacts to geological resources on the on-site inspection of known and potential geological resources within the park (project area), review of existing literature, studies and information provided by experts in the National Park Service and other agencies, and park staff insights and professional judgment. Where possible map locations of geological resources were compared with locations of proposed developments and modifications of existing facilities. Predictions about short- and long-term site impacts were based on previous studies of impacts to geological resources from similar projects and recent scientific data; there are no short term impacts to geological resources, all impacts are long term. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Impact Description
Negligible	The action would result in a change to a natural physical resource, but the change would be so small that it would not be of any measurable or perceptible consequence.
Minor	The action would result in a change to a natural physical resource, but the change would be small and localized and of little consequence.
Moderate	The action could result in a change to a natural physical resource; the change would be measurable and of consequence.
Major	An action that would result in a noticeable change to a natural physical resource; the change would be measurable and result in a severely adverse or major beneficial

	impact.
Duration: **Short-term –** There are no short-term impacts to geological resources. **Long-term –** All impacts to geological resources would be long-term.	

The project would result in improved slope stability along the road at the Dosewallips Falls site, and reduced erosion in the long-term. Best management practices during project work would reduce the potential for runoff and erosion. However natural processes would not be allowed to occur, resulting in long-term adverse impacts to the geomorphological processes at the project site. Since the site is small and localized, it would result in minor adverse effects.

Cumulative Effects

In terms of slope stability there is no overlap in space or time with any of the proposed activities and past, present, and reasonably foreseeable future activities identified for this area. Project effects are minor and in terms of slope stability are localized to the project area where there are no effects due to past, present, and reasonably foreseeable activities. Consequently there are no cumulative effects associated with slope stability for any of the action alternatives. Project effects to sediment supply (spawning gravels) are minor and would result in a beneficial cumulative effect to the supply of spawning gravel sized sediment as the sediment continuing to be supplied at the washout would add to the sediment supply associated with future in-river restoration projects.

Soil Productivity (Soils Report, January 2006 with updates in 2008)

Affected Environment

Olympic National Forest
Soil Productivity
Soil productivity (long-term) is the inherent potential of the ecosystem to produce a certain level of vegetation and associated processes such as water, wildlife, and clean air indefinitely into the future. Fixed components influencing soil productivity include local climate, topographic features, and soil type. Components affecting productivity that can be changed include: soil volume, porosity, water availability, chemistry, and biology.

Processes known to cause the greatest adverse effects on soil physical, chemical, and biological properties associated with the types of proposed management activities include the following: soil compaction, displacement, surface erosion, mass wasting, alterations to surface and subsurface water flows, and sedimentation. Direct effects to the soils include compaction (new road construction) and displacement. Surface erosion, mass wasting, sedimentation, changes in hillslope hydrology, and soil biology usually occur as indirect effects.

The majority of the soils in the analysis area are susceptible to compaction due to the properties of the surface and subsurface horizons (0 to 15 inches deep). Specific properties include an inherently low bulk density, low percentage of rock fragments, and high available water holding

capacity.

The soils of the Dosewallips Road Washout Draft EIS project area have been studied, mapped and described (USDA 2000b). A soils map for the planning area is available in the Dosewallips Road Washout Draft EIS analysis file. This inventory, which meets the standards of the National Cooperative Soil Survey, describes soil map units, their individual components, and provides interpretive information on soil use and management.

The Dosewallips Road project area includes three main soil types:

- Soils that are moderately deep (20 to 40 inches) to a cemented till layer. These are moderately well drained soils that formed in colluvium over dense glacial till. These soils are located in the glacial valley landform along the potential re-reroute location above the existing washout.

- Soils that are moderately deep to basalt. These soils are well drained that formed in colluvium from marine basalt. These soils are located in the glacial troughwall landform, primarily located in the Buckhorn Wilderness area, upslope of the existing road and possible re-route locations.

- Soils that are very deep (greater than 60 inches). These can be somewhat excessively drained soils that formed in glacial outwash and fluvial deposits in glacial valleys. These soils are found mostly in the vicinity of the existing road location.

Overall the forest soils in the project area have a low potential for natural surface erosion. This is because they tend to have generally high natural porosity, high infiltration rates, high water storage potential, and are usually fully occupied with vegetation and surface litter. When disturbed the floodplain and lower terrace landforms remain low for surface erosion potential, primarily due to the gentle slopes and the properties described above. Soils found on glacial valleys and troughwall landforms, located on steeper, dissected slopes (40 to 100 percent) have a high potential for surface erosion because of the slopes, finer soil textures, and subsurface water.

Existing surface erosion within the project area is mainly confined to the steep streambanks adjacent to the Dosewallips River including the washout, where unstable soils are continuing to be undercut by stream processes. Since 2003 the washout area has widened in size about 200 feet. The erosion and sedimentation associated with the road fill on FSR 2610 is considered management-related, while the streambank erosion and sedimentation is considered natural.

The unpaved road surfaces, trails, and dispersed recreation sites in the activity area are also existing surface erosion sites but are small in size and not considered to be significant. Sedimentation does occur, although considered minor due to relatively flat terrain and vegetative buffers which act as filters to coarse and fine sediment.

Overall soil productivity is high in the Dosewallips project and planning area. Regional and Forest Plan Standards and Guidelines state that "…detrimental soil conditions should not exceed 20 percent of the total acreage within the activity area." The majority of the area surrounding the washout, re-reroute location, and the upper watershed is in a pristine condition as much of the land is undeveloped, being designated as wilderness or within the Olympic National Park.

Consequently the soils have not been impacted and are well within the standards and detrimental soil conditions are estimated to be less than 5 percent.

Hillslope Hydrology
Hillslope hydrology has a significant influence in the planning area because of the long slope lengths extending from the northern ridgetop (5,000 feet elevation) of this major glacial valley, extending to the floodplain (500 feet elevation). This sizable drainage area conveys a significant amount of surface and subsurface water throughout these landforms before entering the Dosewallips River system. The glacial troughwall area comprising approximately 85 percent of the planning area has a rapid runoff rate and low groundwater storage capacity, due to the steepness of slope and shallow soils.

The glacial valley landform, especially the terrace bench located above the washout, receives and stores large volumes of water transmitted from both surface and subsurface flows from the troughwall landform above. These glacial soils have a high water holding capacity, storing and releasing groundwater to the wetlands, streams, and river below. Some soils located on this landform have a dense glacial till layer, which transmit water laterally due to the slow permeability of this layer. These soils are unable to store as much water as evidenced by frequent seeps, springs, and small streams. This condition exists primarily in the area along Segment 2 of the proposed re-route alternatives.

There are 14 streamcourses that are potentially affected in the project area. These include eight Order 1 and two Order 2 streams which intersect the glacial valley sideslope landform, originating in the glacial troughwall. These streams are high gradient (greater than 20 percent) above the terrace bench. Streams become low gradient (2 to 5 percent) on the terrace, and then are greater than 20 percent until they enter the unnamed low gradient perennial tributary to Gamm Creek north of FSR 2610. This unnamed tributary supports cutthroat trout and coho salmon juveniles (lower reach). Refer to the Aquatic Species and Habitat Conditions section for further discussion of this streamcourse.

A series of small wetlands exist at the base of the glacial valley on the outwash plain and are adjacent to FSR 2610. These wetlands were likely created or enlarged with the construction of FSR 2610 which affected the surface and subsurface hydrology of this depressional area. These wetlands do support hydrophitic vegetation and hydric soils. Soils appear to be wet through most of the year as indicated by mottling in the upper 12 inches of the soil profile.

Environmental Consequences

Alternative A – No Action

Direct/Indirect Effects

Olympic National Forest
Soil Productivity
There would be no direct increase in detrimental soil conditions that would negatively affect soil productivity if this alternative were implemented. The reduction of motorized vehicles and the change in the type and amount of recreation use would improve soil productivity within the planning area beyond the washout, although very slowly (up to 50 years into the future).

The soil impacts from past activities (i.e. roads, campgrounds) beyond the washout would continue to slowly lessen and conditions would improve as compacted soils continue to develop and recover through natural physical and biological processes. The establishment of alder and other pioneer species would ameliorate soil compaction through root mass expansion, and development of ground cover, organic matter, and litter layer. Soil fauna and microbe activity would also gradually improve. These processes would occur very slowly over a period of up to 50 years.

Hillslope Hydrology
Under Alternative A there would be no direct effects on hillslope hydrology since no road construction or reconstruction would occur. Indirect effects of no action would primarily be related to the slow deterioration of FSR 2610 and the Dosewallips Road beyond the washout, approximately 5 miles in total, due to the lack of road maintenance. Culverts located at stream crossings may eventually become plugged or fail due to metal fatigue. This may result in fill washouts and stream diversions. This road has numerous relatively small stream crossing fills, less than 300 cubic yards each. Streamcourse diversions would cause surface and gully erosion. Large pulses of coarse and fine sediment, followed by minor chronic sedimentation into the Dosewallips River, would be expected until these erosion sites become stabilized. Most notably the Bull Elk Creek bridge crossing is vulnerable to a diversion due to its location at the base of a debris fan. A diversion here could possibly result in re-routing of the channel and significant gullying before it reaches the Dosewallips River, approximately 800 feet away. Overall, at the watershed scale, the potential erosion and sediment inputs described above would not be distinguishable.

Cumulative Effects

The cumulative effects area includes the entire Dosewallips watershed. The positive and negative effects include a combination of the management actions that occur on private, National Forest System (NFS) lands, and Olympic National Park lands.

The Dosewallips Watershed Analysis identified and described the negative effects of erosion and sedimentation and the impacts from past management activities on aquatic habitat conditions. These resources are currently recovering from those past effects.

Existing and foreseeable management activities on private lands that have adverse impacts to soil productivity would continue. On-going activities include but are not limited to the following: timber harvesting and road construction, agricultural uses, infrastructure development, dispersed recreation and other off-road vehicle use.

Road decommissioning activities on the Forest (approximately 10.1 miles of road in the last 10 years and 2.0 miles planned) have reduced the amount of soil in a detrimental condition.

Activities planned on the Forest include approximately 1,000 acres being planned for commercial thinning along with construction of 3 miles of temporary road associated with the Jackson Timber Sale, lower in the watershed (Rocky Brook subwatershed). These activities would result in the temporary increase in detrimental soil conditions, erosion, and alteration of hillslope hydrology. Short-term sedimentation into Rocky Brook and the Dosewallips River is expected to be minor due to riparian protection buffers and numerous mitigation measures

designed to keep soil impacts and erosion low.

Overall the activity area is estimated to have less than 5 percent in a detrimental soil condition, well within the standard of 20 percent. This includes the following areas that are currently in a detrimental condition and total about 39 acres in size:

- 17 acres - Dosewallips road beyond washout (5.0 miles of road)
- 6 acres - Elkhorn Campground
- 8 acres – Dosewallips campground
- 8 acres - trails, skid trails, unauthorized trails, dispersed recreation sites

Because the magnitude of effects of the No Action alternative are anticipated to be minor and not discernable at a watershed scale, and the effects of any past, present, or reasonably foreseeable activities are located well downriver from the project's activity area there would not be any cumulative effects.

Alternative B - Reroute 1 Bench Emphasis

Direct/Indirect Effects

Olympic National Forest
Soil Productivity
Under Alternative B soil productivity would be reduced more than the other action alternatives. Detrimental soil conditions expected from this action would include long-term compaction, displacement, and surface erosion. The physical soil conditions such as water infiltration, porosity, organic matter, and biological factors would be affected.

Associated with this action approximately 7.1 acres would be removed from the productive land base as a result of the new road construction. This is a long-term, irreversible detrimental condition. However approximately 1.4 acres (0.7 mile) of the existing FSR 2610 within the immediate riparian zone adjacent to the Dosewallips River would be decommissioned. This would result in the long-term improvement (10 to 20 years) of soil productivity as a result of the soil decompaction and revegetation treatments. Overall there would be a net increase in long-term detrimental soil conditions of 5.7 acres.

Indirect effects of Alternative B would result in additional soil erosion and loss of productivity of cutslopes and fillslopes until ground cover vegetation is well established. Surface erosion (sheet, rill) would increase in the short-term (1 to 2 years) due to the area of new disturbances, but slopes should be stabilized after 2 years. This erosion would likely be highest on cutslopes, fillslopes, and road surfaces on Segments 2 and 5 where cutslope angles would be steep and high, and road grades are estimated at 10 percent. In addition, erosion on other new disturbances (other new road segments, road decommissioning segments, and road maintenance beyond the washout) would be likely until vegetation becomes established on these bare soil areas. Numerous watershed mitigations are included in project design to reduce the amount and extent of soil erosion and sedimentation, especially those specifically designed to minimize surface erosion including sediment prevention structures. Erosion control seeding and fertilization would be required where appropriate on all areas of exposed mineral soils as soon as possible. No fertilization would occur within 50 feet of a live stream and wetlands. Hydromulching would

occur on bare soil areas that are determined to be a concern for erosion and sedimentation. Other watershed mitigations that would minimize surface erosion are listed in the watershed section of the mitigation measures and management requirements section of Chapter 2 of this document. Gully erosion may also occur at culvert outlets of new culvert installations along segments 2 and 5, but would be expected to be minor due to mitigations measures identified in Chapter 2 of this document.

Road construction may result in formation of gullies and deposition of shallow-rapid mass wasting. This would potentially impact vegetation and soils on the slope, the unnamed tributary streamcourses along Segments 1 and 2, and the wetlands in the area. Most material would likely be deposited and held in storage on the floodplain or wetlands and low terrace below. Toward the east end of the reroute such movements of materials would likely reach the unnamed tributary to Gamm Creek. Most of the coarse material would likely remain in storage where deposited while sand and fine sediment could be transported to the Dosewallips River via the unnamed tributary.

Hillslope Hydrology
New road construction under Alternative B would intersect 14 streamcourses, including one unnamed tributary to Gamm Creek that supports resident and anadromous fish. Alterations of surface and interception of subsurface water flows, seeps, and springs are also likely as a result of road construction, especially on Segments 2 and 3. In addition, affects to shallow groundwater flow and seasonal saturation, and its impacts to riparian function are also likely, but the extent and magnitude are unknown. There is the potential to affect low flow conditions in the unnamed tributary to Gamm Creek if groundwater pathways from water storage within the riparian zone are intercepted. Mitigations that are incorporated into the design would aid in minimizing disruption and re-routing of surface and subsurface water flows.

The un-named tributary stream to Gamm Creek located in Segment 1 would be crossed by the road reroute. Mitigations designed to pass 100-year flows and limiting earthwork activities for road construction to the dry season would help to minimize disruption of flows and material, and impacts to aquatic resources. Other mitigations are also designed for this concern and include putting erosion control measures in place prior to the normal heavy rainfall period.

Two of the small wetlands that are located near the beginning of the proposed reroute may also be affected under Alternative B, mainly along Segment 1 and the beginning of Segment 2 at the toeslope location. The road location would directly impact about 0.019 acre of wetland. An indirect effect would be it could potentially alter shallow groundwater flows to the wetlands by interception of the road ditchline and culverts. This could potentially result in altering wetland function by reducing the late season water supply and reducing soil moisture. Frequent ditch relief culvert spacing and outsloping mitigations would help to reduce the negative effects of this action. There are other mitigations that would reduce the affects to this wetland, including use of straw bales and filter fences. It is expected that the majority of these wetlands would not be substantially altered hydrologically. Additionally the decommissioning of 0.5 mile of FSR 2610 as it passes through the wetlands area would compensate for any loss of wetlands due the proposed reroute. This decommissioning would likely have a neutral to beneficial effect on the existing wetlands.

Alternative C – Reroute 2 Retaining Wall Emphasis

Direct/Indirect Effects

Olympic National Forest
Soil Productivity
Under Alternative C soil productivity impacts would be 0.6 acre less than Alternative B. As a result of this new construction, approximately 6.5 acres would be removed from the productive land base, currently designated as late-successional reserve. This reduction would be approximately 8 percent less than Alternative B, achieved by the narrowing of cutslope heights and constructing retaining walls. Detrimental soil conditions expected from this action would include compaction, displacement, and surface erosion. The physical soil conditions such as water infiltration, porosity, organic matter, and biological factors would also be adversely affected. These conditions are considered to be long-term and irreversible.

In addition to this action, approximately 1.4 acres (0.7 mile) of the existing FSR 2610 would be decommissioned that is within the immediate riparian zone adjacent to the Dosewallips River. This would result in the long-term improvement (10 to 20 years) of soil productivity, through decompaction and revegetation treatments. Overall there would be a net increase in long-term detrimental soil condition of 5.1 acres.

The indirect effects of Alternative C would result in additional surface erosion and loss of productivity of cutslopes and fillslopes until ground cover vegetation is well established, primarily along Segments 2 and 5. The cutslope angles are much steeper than the design in Alternative B and would tend to ravel and erode more and over a longer time period. This would result in an increase in the potential of road water diversions due to plugging of culverts and road ditchline. This would last until cut and fillslopes stabilize with vegetation in about 2 to 3 years. In addition to cutslopes and fillslopes along Segment 2 and 5, erosion on other new disturbances and decommissioning segments would be likely until vegetation becomes established on bare soil areas. Surface erosion (sheet, rill) would increase in the short-term (1 to 2 years) due to the area of new disturbances, but slopes should be stabilized after 2 years. This erosion would likely be highest on cutslopes, fillslopes, and road surfaces on Segments 2 and 5 where cutslope angles would be steep and high, and road grades estimated at 10 percent. In addition, erosion on other new disturbances (road reroute segments, road decommissioning, and road maintenance beyond the washout) are likely until vegetation becomes established on these bare soil areas. Numerous watershed mitigations are included in the project design to reduce the amount and extent of soil erosion and sedimentation, especially those specifically designed to minimize surface erosion including sediment prevention structures. Erosion control seeding and fertilization would be required where appropriate on all areas of exposed mineral soils as soon as possible. Hydromulching would occur on bare soil areas that are determined to be a concern for erosion and sedimentation. Other watershed mitigations that will minimize surface erosion are listed in the watershed section of the mitigation measures and management requirements section of Chapter 2 of this document. Gully erosion may also occur at culvert outlets of new culvert installations along segments 2 and 5, but is expected to be minor due to mitigations measures identified in Chapter 2 of this document.

Consequences of the road construction may include the formation of gullies and deposition of shallow-rapid mass wasting. This would potentially impact vegetation and soils on the slope, the streamcourses along Segments 1 and 2, and the wetlands in the area. Most material would likely

be deposited and held in storage on the floodplain or wetlands and low terrace below. Toward the east end such movements of materials would likely reach the unnamed tributary to Gamm Creek. Most of the coarse material would likely remain in storage where deposited, while sand and fine sediment could be transported to the Dosewallips River via the unnamed tributary.

Hillslope Hydrology
New road construction under Alternative C would intersect ten streamcourses, including one unnamed tributary to Gamm Creek that supports resident and anadromous fish. Alterations of surface and interception of subsurface water flows, seeps, and springs would also be likely as a result of road construction, especially on Segments 2 and 3. In addition, affects to shallow groundwater flow and seasonal saturation, and its impacts to riparian function would also be likely, but the extent and magnitude are unknown. There is the potential to affect low flow conditions in the unnamed tributary to Gamm Creek if groundwater pathways from water storage within the riparian zone are intercepted. Mitigations that are incorporated into the design would aid in minimizing disruption and re-routing of surface and subsurface water flows.

The un-named tributary stream to Gamm Creek located in Segment 1 would be crossed by the road reroute. Mitigations designed to pass 100-year flows and earthwork activities for road construction limited to the dry season would help to minimize disruption of flows and material, and impacts to aquatic resources. Other mitigations are also designed for this concern and include putting erosion control measures in place prior to the normal heavy rainfall period.

Two of the small wetlands that are located near the beginning of the proposed reroute may also be affected under Alternative C, mainly along Segment 1 and the beginning of Segment 2 at the toeslope location. The road location would directly impact about 0.020 acre of wetland. An indirect effect would be that it could potentially alter shallow groundwater flows to the wetlands by interception of the road ditchline and culverts. This could potentially result in altering wetland function by reducing the late season water supply and reducing soil moisture. Frequent ditch relief culvert spacing and outsloping would help to reduce the negative effects of this action. There are other mitigations that would reduce the affects to this wetland, including use of straw bales and filter fences. It is expected that the majority of these wetlands would not be substantially altered hydrologically. Additionally the decommissioning of 0.5 mile of FSR 2610 as it passes through the wetlands area would compensate for any loss of wetlands due the proposed reroute. This decommissioning would likely have a neutral to beneficial effect on the existing wetlands.

Alternative F - Bridge

Direct/Indirect Effects

Olympic National Forest
Soil Productivity
Under Alternative F soil productivity and other watershed impacts would be lower than the other action alternatives (B and C). As a result of the bridge construction across the washout area there would no new acreage removed from the productive land base. There would be construction for the bridge approaches but this activity would occur in the already disturbed area within the existing road prism. Detrimental soil conditions expected from this action would mainly result from short-term surface erosion and soil displacement associated with the

construction of the temporary road needed to construct the bridge and piers.

The indirect effects with soil productivity under Alternative F would be minor. Construction of a bridge across the washout area would only minimally disturb the streambank failure, for the most part allowing natural erosion processes to continue to occur, depositing gravels into the Dosewallips River.

Mitigation measures identified in Chapter 2 for this alternative are designed so that surface erosion and sedimentation would be minimized.

Hillslope Hydrology
Road reconstruction under Alternative F would result in no effects to the existing hillslope hydrology. Surface runoff and subsurface flows would remain the same. Some surface water interception would likely be associated with re-establishing the ditchlines on both sides of the washout

A wetland located near the bridge approach on the downstream side would be affected under Alternative F. The bridge location would directly impact about 0.016 acre of wetland. It is expected that the majority of this wetland would not be substantially altered hydrologically. Proposed mitigations would reduce temporary impacts to the wetland and mitigate unavoidable permanent impacts.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

Olympic National Park
Predictions about short- and long-term site impacts were based on previous projects with similar soils and recent studies. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	**Impact Description**
Negligible	Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soils would be slight.
Minor	The effects to soils would be detectable. Effects to soil area would be small. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.
Moderate	The effect on soil would be readily apparent and result in a change to the soil character over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and likely be successful.
Major	The effect on soil would be readily apparent and substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.
Duration: **Short-term –** Recovers in less than 3 years.	

Long-term – Takes more than 3 years to recover.

Since the project work occurs on a road and adjacent rock bank, there is low soil productivity currently in the area and there would be only negligible effects to soil productivity from project work.

Also due to the location of proposed activities on the slope and the limited scale there would only be only negligible effects to hillslope hydrology from project work.

Cumulative Effects

The cumulative watershed effects area includes the entire Dosewallips watershed. The positive and negative effects include a combination of the management actions that occur on private, Olympic National Park, and National Forest System (NFS) lands, along with natural occurrences. The Dosewallips Watershed Analysis identified and described the negative effects of erosion and sedimentation and the impacts from past management activities on aquatic habitat conditions. These resources are currently recovering from the past effects. Other detrimental conditions would remain in the watershed, comprised mainly of compacted surfaces (roading, developed and dispersed recreation sites).

Foreseeable management activities on National Forest lands include the Jackson Timber Sale and two miles of road decommissioning (FSR 2610-012). The timber sale would commercially thin approximately 1,000 acres and construct 3 miles of temporary road in the Rocky Brook subwatershed. Temporary roads would be decommissioned after use. These foreseeable actions would result in short-term sediment impacts associated with temporary road building and log haul, however they are anticipated to be relatively minor.

Other on-going and foreseeable activities on private lands include, but are not limited to the following: timber harvesting and road construction; agricultural uses; infrastructure development; dispersed recreation and off-road vehicle use. Implementation of all of these on-going and foreseeable off-site activities would occur several miles below the FSR 2610 washout.

All of the activities described above would result in additional detrimental soil conditions (both short and long-term), that would reduce soil productivity. Overall acres in a detrimental condition would be within Regional and Forest standards for soil quality. Within the upper watershed this is not considered to be significant and would remain well below the Regional and Forest Standards for soil quality, with a cumulative total of 44.7 acres for Alternative B, 44.1 acres for Alternative C, and 39.0 acres for Alternative F in a detrimental condition. This includes the additional areas that are currently in a long-term detrimental condition:

- 17 acres of Dosewallips road beyond washout (5.0 miles of road)
- 6 acres - Elkhorn Campground
- 8 acres – Dosewallips campground
- 8 acres trails, skid trails, unauthorized trails, dispersed recreation sites

Effects to soil productivity of past, present, and reasonably foreseeable activities in the Dosewallips watershed are described under the previous Olympic National Forest effects discussion. Since these effects are negligible or occur a substantial distance below the proposed work site near the Dosewallips Falls, cumulative effects to soil productivity would be negligible, and would not result in substantial cumulative impacts to the resource or affect the ability of the resource to sustain itself.

Aquatic Species and Habitat Conditions (Aquatic Specialist Report, February 2006; including edits made in 2007 and 2008)

Introduction

The Dosewallips River is one of the largest watersheds draining the east side of the Olympic Peninsula into Hood Canal. It contains abundant high quality habitat for a variety of anadromous salmonids, including three stocks that are listed as threatened under the Endangered Species Act.

Anadromous fish habitat extends from the estuary upstream to an impassible falls at approximately River Mile 15.4 (Figure 17). Because of the trellis-type drainage pattern within the watershed almost all the anadromous fish habitat is within the mainstem of the Dosewallips River. There is very little tributary habitat for anadromous fish.

Above River Mile 14.5 the entire watershed lies within Olympic National Park and is largely undisturbed. From River Mile 14.5 to River Mile 6 the Dosewallips River flows predominately through National Forest System lands. Aquatic conditions within this reach are also relatively good. The washout on FSR 2610 is approximately at River Mile 10.75. There is little evidence of past timber sale activity along the mainstem on National Forest System lands. FSR 2610 parallels the river along the north bank throughout the entire length of National Forest ownership, but there is a substantial riparian buffer between the road and the river except for a couple of places where the road impinges on the stream channel. Two Forest Service campgrounds were constructed along the mainstem of the Dosewallips River at approximately River Mile 10 (Steelhead Campground) and River Mile 12 (Elkhorn Campground). Both of these sites utilized riprap and/or gabions to stabilize streambanks adjacent to the campground areas. The Steelhead Campground was permanently closed in the early 1990's. It and Elkhorn Campground (since the washout) are used for dispersed camping.

Below River Mile 6 the Dosewallips River is predominately bounded by private lands. Bank stabilization, diking, removal of riparian vegetation, and other developments have substantially impacted aquatic habitat conditions within this reach.

The Dosewallips River is designated as a Key Watershed in the Forest Plan. There is an emphasis on protection and restoration of aquatic habitat on federal lands within the watershed. The Dosewallips is also designated as a Tier I watershed in the Hood Canal Coordinating Council's Salmon Habitat Recovery Strategy for Hood Canal. Tier I watersheds are considered to be the most important areas based on regional importance (Forest Service Region 6), significance to ESA listed fish stocks, and Salmonid Stock Inventory (SaSI) stocks listed as critical and depressed (Hood Canal Coordinating Council, 2001).

A reach scale analysis was conducted by the Olympic National Forest in 2003 to gain more information on the potential effects of rebuilding the road in place (Cenderelli et al. 2003). The primary area evaluated in that analysis included a 0.5-mile section of river extending approximately ¼ mile above the washout site to ¼ mile below the washout site. This is referred to as the project reach. A detailed assessment of the flow conditions, stream channel, bed and bank materials, and sediment supply was conducted through this section. A less detailed

reconnaissance-level assessment that extended a few miles upstream and downstream of the washout site was also done as part of the analysis. For a detailed discussion of analysis methods, results, and interpretations, refer to the Reach Analysis document.

Figure 17: Dosewallips Falls at RM 15.4

Three main geomorphic stream types are present within the project area. They are: 1) a hillslope-confined section upstream of the washout, 2) a terrace transition section throughout the project reach, and 3) an alluvial unconfined section immediately downstream. Each is described previously in the Geotechnical and Geomorphologic Processes section of this chapter.

The terrace transition section is unique, both in the characteristics of sediment supplied and the erosion processes involved. The series of high and intermediate terraces are not found anywhere else between Olympic National Park boundary upstream and the bedrock controlled channel approximately 3 miles downstream of the project area. The terraces are composed of sorted mixtures of sand, gravels, cobbles, and boulders with very little fine (silt and clay) materials. Gravel is the dominant size class contained in all of the high and intermediate height terraces, although several areas have significant boulder, cobble, or sand lenses. Much of the coarse sediment supplied to the channel from the large glacial terraces in this area is readily transported

to the alluvial unconfined segment immediately downstream.

Aerial photos from 1939 through 1998 show how dynamic the river channel is within the terrace transition section. The channel has shifted locations, changed sinuosity, and undergone multiple cycles of widening and narrowing over the years. The distance between FSR 2610 and the Dosewallips River in the vicinity of the washout has decreased over the years indicating that the stream is actively migrating to the north, toward the road. In the 1982 aerial photograph the low, vegetated terrace between FSR 2610 and the Dosewallips River is no longer present, and the apex of the meander is located immediately adjacent to the road. As the channel location shifted and the river began to encroach upon the road corridor, riprap was placed to stabilize the streambank and protect the road. The riprap prevented the stream meander from extending to the north and into the high bank at the washout site as it likely would have done under natural conditions. The storm of 2002 that washed out FSR 2610 removed the riprap stabilizing the bank and extended the stream meander into the large glacial terrace at the current washout. Channel changes associated with the 2002 storm have increased the area of eroding glacial terrace streambank and the estimated sediment supply from within the terrace transition segment by about 20 percent over pre-storm conditions.

Affected Environment

Fish Habitat

In the immediate vicinity of the washout the Dosewallips River consists of alternating pools and riffles with an occasional small rapid present in riffles where boulders have accumulated. Overflow channels and/or side channels are present along the inner bend of the meander bends adjacent to point bars. Channel-bed sediments consist primarily of cobble-sized particles and secondarily of pebble- and boulder-sized particles. The channel gradient ranges between 1 and 4 percent. While the high terrace and bank provide an excellent source for spawning size gravel the high energy of this reach limits the amount of spawning gravel retained. Some spawning habitat is present, especially in the pool tailouts, in side channels and behind boulders and obstructions. Chinook salmon, coho salmon, pink salmon, and steelhead trout have all been observed spawning within the immediate project area.

The low gradient response reaches within the unconfined alluvial segment immediately downstream of the project area contain numerous split channels, log jams, spawning areas, and deep pools. These areas provide extremely high quality fish habitat. The Steelhead Campground reach, which begins shortly below the washout appears to be one of three alluvial valley segments that are disproportionately important as salmon spawning and rearing areas in the Dosewallips watershed (Labbe et al. 2005). The Steelhead Campground reach is also considered to be one of the most healthy, dynamic river-floodplain systems in the watershed.

Washington Department of Fish and Wildlife spawning surveys have identified three primary spawning areas for Chinook within the Dosewallips River. The two reaches downstream of the washout, which are within and downstream of the Steelhead Campground reach from River Mile 10.75 to 9.75 and from River Mile 9.0 to river Mile 8.0, typically have by far the greatest number of redds each year for Chinook. These same two reaches are also important to steelhead and in some years contain the majority of spawning within the river. (Figures 18, 19, and 20; Chinook and steelhead redd maps) (personal communication Thom Johnson, 2005).

Habitat functions are described and analyzed in this document using indicators from the "Matrix of Pathway and Indicators" taken from the 1996 NMFS document, "Making Endangered Species Act Determinations of Effects for Individual or Grouped Actions at the Watershed Scale". The baseline conditions described here were identified at the watershed scale in the Dosewallips Watershed Analysis (USDA 1999) as being in one of three condition levels. These levels are: properly functioning (indicator maintains strong and significant populations that are interconnected and promote recovery of proposed or listed species or critical habitat), functioning at risk (indicator provides for persistence of species but in more isolated populations and may not promote recovery), and not properly functioning (indicator provides for maintenance of species at low persistence levels and active restoration is needed). Indicators used in this analysis are as follows.

Sediment – The term sediment is used in two contexts in this document. Sediment can be "good" as in a source for spawning gravels as from geomorphic processes, and it can be "bad" as in fine sediment resulting from road related activities. While sediment is not considered a significant factor in the upper reaches as they are subject to more natural conditions the lower portions of the watershed would be more subject to sediment generated from bank erosion due to the Dosewallips road, stream side development, and lowland harvesting. The baseline condition is functioning at risk.

Large Woody Debris – The concentration of large woody debris (LWD) may have been sporadic over the last two centuries. Today's LWD loading is likely affected by stream side logging and in recent decades logs were routinely taken out of the river for water diversion concerns or financial opportunities. The baseline condition is functioning at risk.

Pool Frequency and Quality – While pool creation is dominated by boulders above the six mile bridge, LWD is the major structure below this point. Due to the lack of LWD in the lower river the baseline condition is functioning at risk.

Off-channel Habitat – The glacial nature of the Dosewallips valley provides few low gradient tributaries which offer off-channel overwintering habitat, consequently there is a lack of this type of habitat. The baseline condition is functioning at risk.

Width/Depth Ratio – Information on this indicator is unknown at the watershed scale and it was not evaluated.

Streambank Condition – Due to the riprapped bank at the Elkhorn Campground and bank protection projects along private lands the baseline condition is functioning at risk.

Drainage Network Increase – Primarily due to the extensive roading in the Rocky Brook subwatershed the baseline condition is functioning at risk.

Road Density & Location – The Dosewallips River Road runs along the river and in places constricts the river. Additionally the extensive roading in the Rocky Brook drainage also affects the aquatic system. The baseline condition is functioning at risk.

Temperature – The Dosewallips is known for its cold water and water temperature

measurements have been within standards throughout most of the river. The baseline condition is properly functioning.

Function of Riparian Reserve – Given that the Dosewallips River Road is entirely within the riparian reserve and little protection is afforded in the lowlands the baseline condition is functioning at risk.

Figure 18: Chinook spawning sites

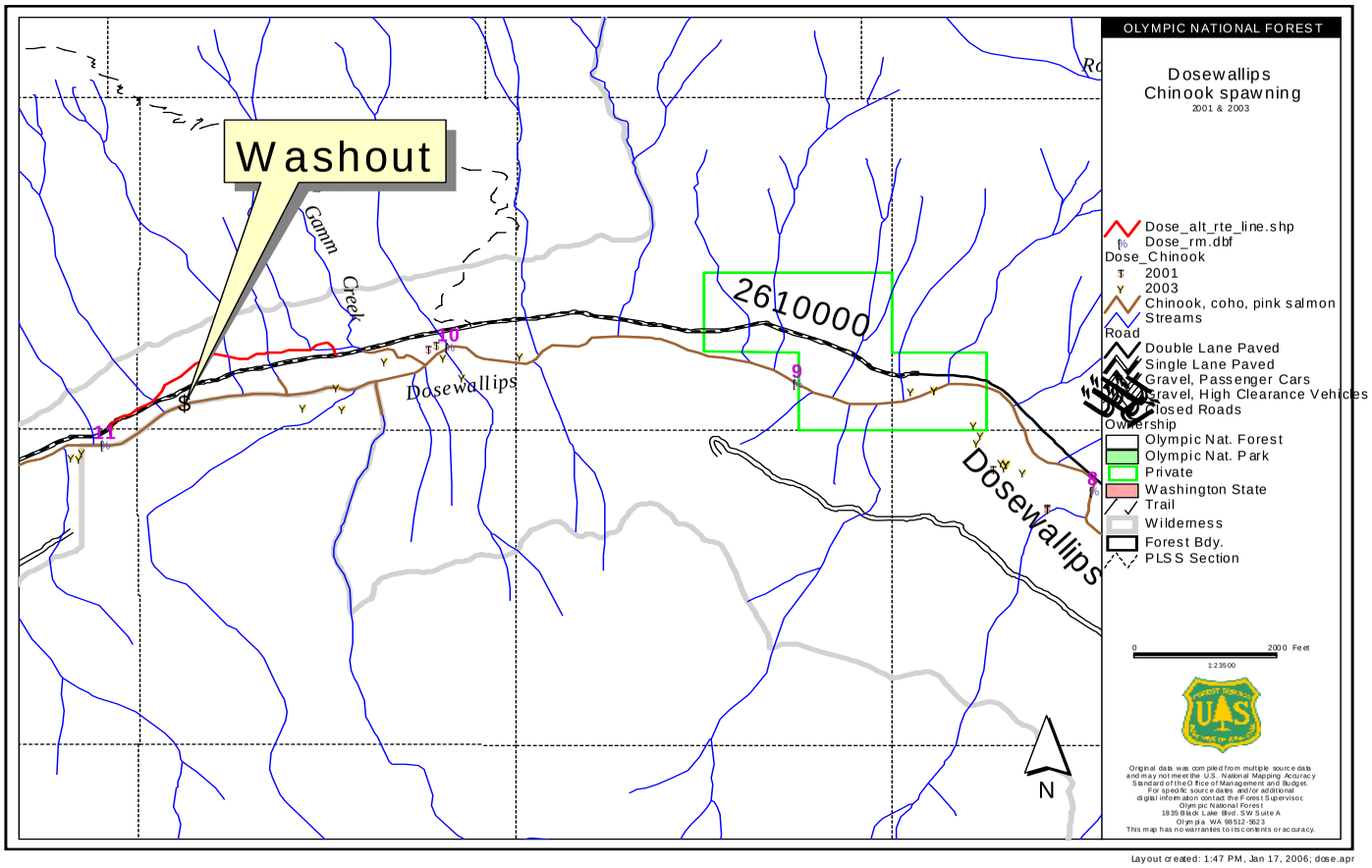


Figure 19: Steelhead spawning sites

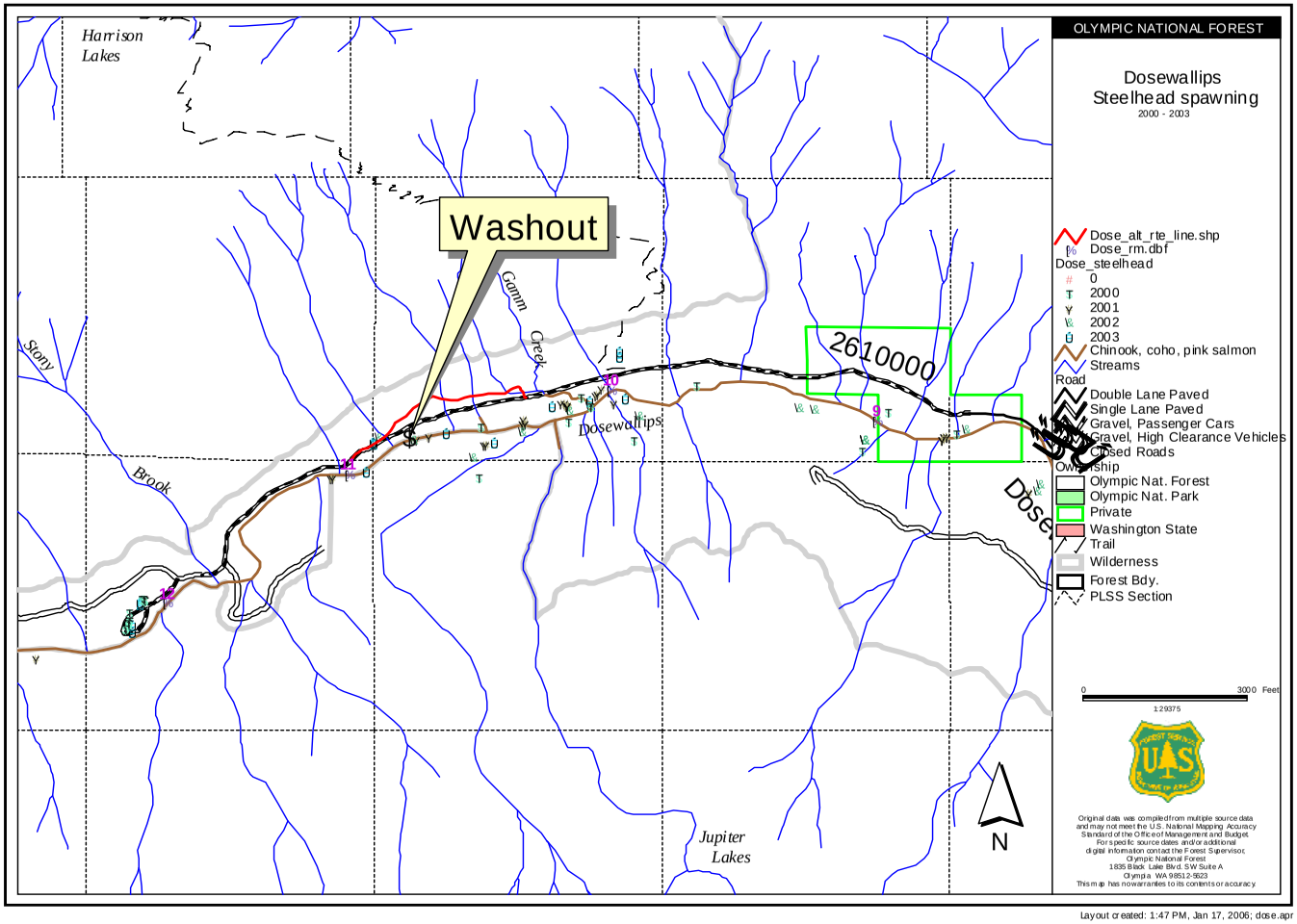
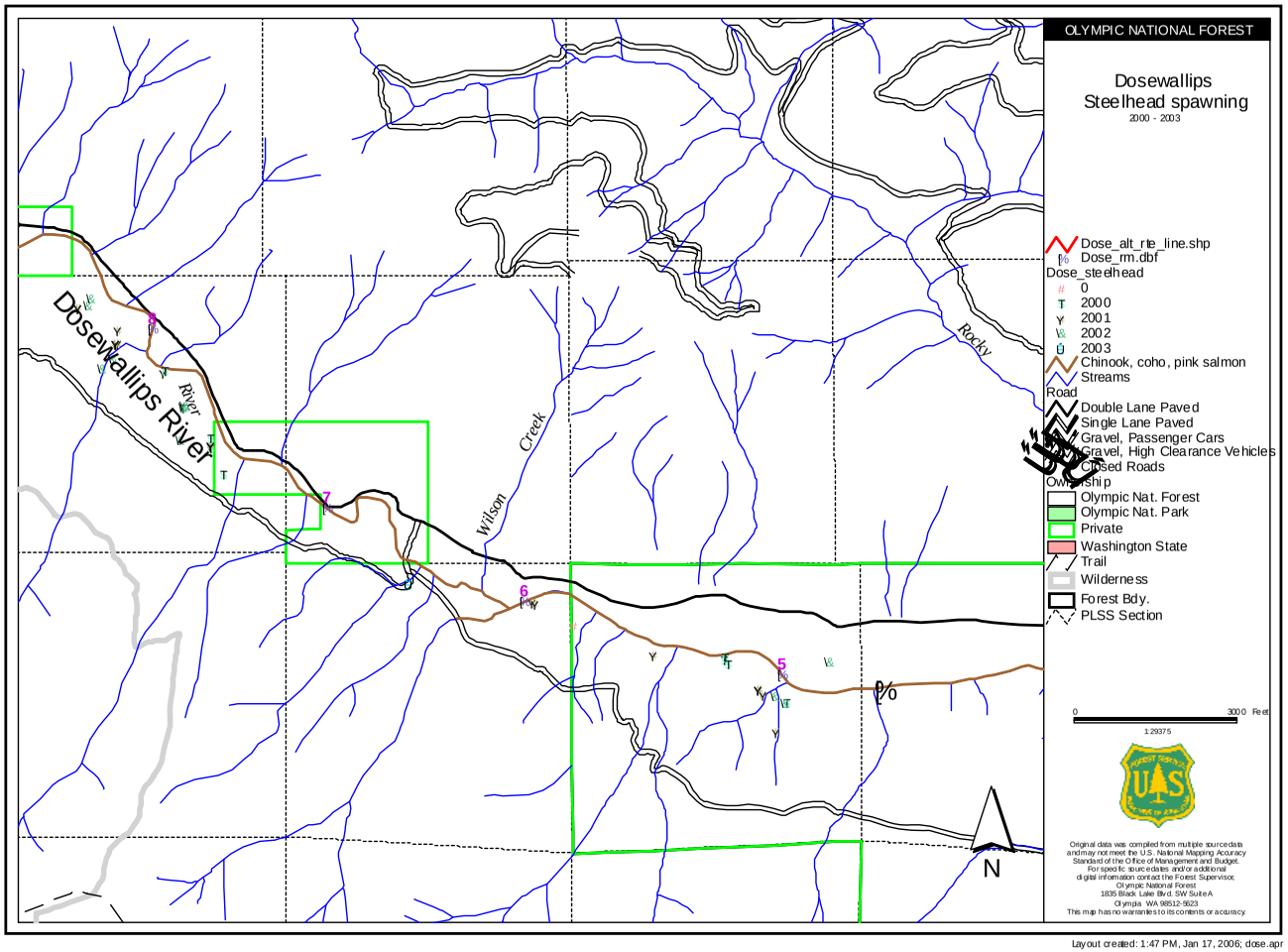


Figure 20: Steelhead spawning sites (below washout)



Fish Populations

Anadromous fish distribution extends up to Dosewallips Falls, just upstream of the Olympic National Park boundary at approximately River Mile (RM) 15.4 just below the falls.

Anadromous fish species present in the Dosewallips Watershed include Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), summer and fall chum salmon (*O. keta*), pink salmon (*O. gorbuscha*), winter and summer steelhead trout (*O. mykiss*), sea-run cutthroat trout (*O. clarkii*), and bull trout (*Salvelinus confluentus*). Chinook salmon, coho salmon, pink salmon, steelhead trout, and cutthroat trout spawn and rear within the project area. Coho spawn mostly downstream of the project area in side and braided channel areas. Summer and fall chum are present within the lower reaches of the Dosewallips Watershed well outside the project area. Bull trout have been documented in the lower river but have never been observed in the vicinity of the project area. Salmonids present in the Dosewallips River, their stock status, and their potential presence within the project area are listed within Table 5.

Table 5: Dosewallips salmonids

Species	Stock Status	Spawning Migration	Spawning	Rearing	FS Sensitive Species	Within Project Area
Chinook summer/fall	Threatened[1]	mid-July thru Oct	Sept thru Oct	Jan thru July	No	Yes
Coho	Unknown[2]	mid-Aug thru Dec	Oct thru mid-Jan	Year round	Yes	Yes
Pink	Depressed[2]	mid-July thru mid Oct	Sept thru Oct	Out migration after emergence	No	Yes
Steelhead trout winter	Threatened[5], Depressed[2]	Nov-May	mid-Dec thru June	Year round	No	Yes
Steelhead trout summer	Threatened[5], Unknown[2]	Apr thru Oct	Jan thru Feb	Year round	No	Yes
Coastal cutthroat trout	Unknown[4]	July thru Mar	Jan thru Mar	Year round	Yes	Yes
Chum summer	Threatened[1]	Aug thru mid-Oct	mid-Sept thru mid-Oct	Out migration after emergence	No	No
Chum late fall	Healthy[2]	mid-Nov thru early Jan	late Nov thru early Jan	Out migration after emergence	Yes	No
Bull trout	Threatened[3]	Sept thru Oct	late-Sept. thru Nov	Year round	No	No

[1]NMFS, 1999
[2]SaSI, 2002
[3]USFWS, 1999
[4]SaSI, 2000

[5]NOAA NMFS, 2007
Healthy – A stock of fish experiencing production levels consistent with its available habitat and within the natural variations in survival for the stock.
Depressed – A stock of fish whose production is below expected levels based on available habitat and natural variations in survival rates, but above the level where permanent damage to the stock is likely.
Unknown – Stocks where there is insufficient information to identify stock status with confidence.

Chinook Salmon

The Dosewallips Chinook salmon population was listed as Threatened under the Endangered Species Act (ESA) in 1999 (NMFS 1999a). The Dosewallips population is part of the Puget Sound Chinook Evolutionarily Significant Unit (ESU). The ESU encompasses all naturally spawned runs of Chinook salmon that occur below impassable natural barriers in the Puget Sound region from the North Fork Nooksack River in northeastern Puget Sound to the Elwha River on the Olympic Peninsula, including the Dosewallips River basin in the park.

The Dosewallips summer/fall Chinook population is grouped into the Mid-Hood Canal Management Unit by Washington State Department of Fish and Wildlife. The Mid-Hood Canal stock also includes the Hamma Hamma and Duckabush River Chinook populations. In 2002 the Washington State Salmonid Stock Inventory (SaSI) rated the stock status as "Critical" because of chronically low escapement (low number of returning fish that spawned) (SaSI 2002).

The mid-Hood Canal Chinook population is considered to be a mixed stock, meaning individuals originated from a mix of native and introduced non-native stocks. Production is categorized as composite which means the stock is sustained by both wild and artificial production. It is assumed that many of the naturally-spawning Chinook in the Dosewallips River in recent years have been strays from local hatcheries and/or were adults returning from hatchery fry released into the Hamma Hamma, Duckabush, and Dosewallips Rivers (SaSI 2002).

The Puget Sound Technical Recovery Team (TRT) has identified the Dosewallips as one of 22 individual Chinook populations within the Puget Sound ESU. They consider the Dosewallips to be the core population of the mid-Hood Canal area which includes the Duckabush, Hamma Hamma, and Dosewallips Rivers. At an average of only about 40 returning spawners per year over the past five years the Dosewallips Chinook population is the smallest of all 22 populations within the Puget Sound ESU (Shared Strategy for Puget Sound 2005).

Annual Chinook natural spawner escapements in the Dosewallips River have ranged from 0 to 87 fish (Table 6). Chinook escapement in the Dosewallips River for the year 2005 was 10 fish (personal communication T. Johnson). In 2002 a Chinook redd was observed just downstream of the road washout site.

Table 6: Chinook spawning escapement

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total	76	0	0	58	54	29	45	43	87	80	10

An Ecosystem Diagnosis Treatment (EDT) model was run in 2005 to estimate the number of adult Chinook spawners that the current habitat in the Dosewallips could support. Based on the model potential abundance for the Dosewallips River without harvest is approximately 1240 (personal communication T. Johnson). Annual escapements have been well below that, indicating that spawning habitat in the river may be underutilized.

Chinook distribution in the Dosewallips River extends to the Dosewallips Falls at river mile (RM) 15.4, just upstream of Olympic National Park boundary. Summer/fall-run Chinook in this system spawn from late August through October (PNPTC 1995). Inter-gravel development of the fry is normally completed by the end of February and emergence from the gravel follows closely thereafter. The majority of fry rear in the river for about three months with the majority out-migration occurring in late March to late June during the high spring freshets (WDF 1975).

The vast majority of Chinook spawning in the Dosewallips watershed occurs in the upper anadromous reaches of the river on National Forest System lands (personal communication T. Johnson). Spawning in the lower watershed is difficult to record due to the presence of chum and pink (in odd years) that are in the river at the same time. There are three primary spawning areas: 1) from the washout upstream to Elkhorn Campground (RM 10.75 – 12); 2) from the washout downstream to the old Steelhead Campground (RM 9.75 – 10.75); and 3) below Steelhead Campground (RM 8.0-9.0). The two spawning reaches below the washout typically have by far the greatest number of Chinook redds each year, see figure 18 - Chinook redd map (personal communication T. Johnson).

Habitat factors limiting recovery of Chinook salmon in the Dosewallips River as identified in the Draft Puget Sound Salmon Recovery Plan include: loss of channel, side channels, and floodway from levee construction, bank hardening, and splash dams; loss of in-channel wood; and loss of estuarine and marsh habitat from levee construction and filling (Shared Strategy for Puget Sound 2005).

Coho Salmon

Coho salmon in the Dosewallips watershed are a part of the Puget Sound/Strait of Georgia Coho ESU. In 1995 NMFS evaluated this stock and determined that this ESU was "Not Warranted" for listing (NMFS 1995). In 2004 the Puget Sound/Strait of Georgia Coho were classified as a "Species of Concern" by the NMFS (NMFS 2004). WDFW rates the Dosewallips coho population as "Unknown" due to a poor data set (SaSI 2002). It is a mixed stock with wild production. Sum-of-season cumulative fish-days for coho in Rocky Brook Creek index are shown in Table 7 (SaSI 2002).

Table 7: Coho fish-days

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002
Fish-	No	503	No	No	0	No	70	541	526

days	data		data	data		data			

Most spawning takes place in the lower 12 miles of the mainstem Dosewallips River and in side channels and small tributaries. In fall 2002 several coho were observed spawning in the side channel opposite the washout site (Shelmerdine, personal communication).

Pink Salmon

The Dosewallips River is part of the Odd Year Pink ESU. In 1995 NMFS evaluated this stock and determined that this ESU was "Not Warranted" for listing (NMFS 1995b). In the 2002 SaSI the Dosewallips pink population was rated as "Depressed" due to chronically low escapements and a short-term severe decline in 1997 and 1999. This is a native stock with wild production. Natural spawning escapement of pink salmon in the Dosewallips River is shown in Table 8 (SaSI 2002 and T. Johnson).

Table 8: Pink spawning escapement

Year	1991	1993	1995	1997	1999	2001	2003	2005
Total	8200	17316	19034	1954	2903	20175	17707	14,800

Most pink salmon spawning takes place in the lower seven miles of the mainstem Dosewallips River, however, pinks have been reported to spawn as far upstream as RM 11.

Steelhead Trout

Dosewallips steelhead populations fall within the Puget Sound Steelhead Distinct Population Segment (DPS). In 2007 NMFS evaluated this stock and listed the Puget Sound Steelhead DPS as threatened (NMFS 2007). Dosewallips Winter Steelhead have been rated as "Depressed" based on chronically low escapements (SaSI. 2002).

Results from annual spawning surveys for winter steelhead are shown in Table 9 (SaSI 2002). Most spawning takes place in the lower 12 miles of the Dosewallips River in similar areas as Chinook spawning (personal communication T. Johnson). The two spawning reaches below the washout are important to steelhead and in some years may also contain the majority of spawning within the river. (Figures 19 and 20 – Steelhead spawning redd map) (personal communication T. Johnson). The Dosewallips Falls create an anadromous fish barrier so steelhead are not present in the river at the location of the proposed park activities.

Table 9: Winter steelhead escapement

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total	79	55	60	49	99	78	89	52	96

Summer steelhead in the Dosewallips still remains a data gap. Stock status is "Unknown" (SaSI 2002). Escapement is not monitored nor has an escapement goal been identified. Spawning takes places in the upper anadromous reaches of the Dosewallips River, but specific spawning locations are unknown.

Coastal Cutthroat Trout

Few data exist concerning historical and present abundance of coastal cutthroat trout in the Dosewallips River. WDFW lumps the Dosewallips coastal cutthroat trout population into the West Hood Canal coastal cutthroat stock complex which encompasses the Skokomish River up north to Shine Creek. Stock status was rated as "Unknown" in the 2000 SaSI. Escapement is not monitored nor has an escapement goal been identified. Coastal cutthroat trout in this complex are native and sustained by wild production.

Summer-run Chum Salmon

The Dosewallips summer chum salmon was listed as Threatened under the Endangered Species Act (ESA) in 1999 (NMFS 1999b). The Dosewallips summer chum population is part of the Hood Canal Summer-Run Chum ESU as designated by NMFS. This ESU includes summer-run chum salmon populations in Hood Canal and in Discovery and Sequim Bays on the Strait of Juan de Fuca. Distinctive life-history and genetic traits were the most important factors in identifying this ESU (Johnson et. al. 1997). Genetic analysis has shown that Dosewallips summer chum are genetically distinct from all other Washington chum stocks (Phelps et al. 1995).

Summer chum population data only extends back to 1972 for the Dosewallips River. Natural spawning escapements have been highly variable (Table 10, SaSI 2002 and T. Johnson). During the 1970's most escapements were over 1,000 spawners, some years were over 3,000. Escapement decreased during the 1980's to less than 100 spawners in some years and several hundred in other years. In 1995 and 1996 escapement rose to almost 3,000 and 7,000, respectively, then declined again in 1997 to under 100 fish. Summer-run chum stocks in the Dosewallips River are a native stock with wild production. Stock status is considered "Depressed" due to chronically low escapement (WDFW et. al. 2002).

Table 10: Summer chum escapement

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total	225	2,787	6,976	47	336	351	1260	990	1627	7066	11,549	2,658

Summer-run chum stocks spawn from late August through late October. They emerge from the gravel from February through May. Out-migration begins in March and continues through April (WDFW et. al 2000). Natural barriers and high stream gradients limit summer chum to the lower 4.3 miles of the Dosewallips and most spawning occurs below RM 2.5, off the National Forest.

Fall Chum

Fall chum in the Dosewallips River are part of the Puget Sound/Strait of Georgia Chum ESU. This ESU was evaluated by NMFS in 1998 and was determined "Not Warranted" for federal listing (NMFS 1998). WDFW rates the Dosewallips Fall Chum population as "Healthy" (SaSI 2002). This is a native stock with wild production. Most of the fall chum spawning takes place in the lower mile of the Dosewallips River, off the National Forest. Natural spawning escapement of late fall chum in the Dosewallips River is shown

in Table 11 (SaSI 2002 and T. Johnson).

Table 11: Late fall chum escapement

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total	1556	3028	1000	2302	753	163	1852	838	248	2073

Bull Trout

Bull trout on the Olympic Peninsula were listed as "Threatened" under the Endangered Species Act (ESA) in 1999 (USFWS 1999). Bull trout in the Dosewallips River are part of the Coastal Puget Sound Bull Trout Distinct Population Segment (DPS) as designated by the USFWS**.** There is one recently documented account of bull trout being caught by anglers in the lower Dosewallips River and there are no documented observations of bull trout in the Dosewallips River above that point. ONP fisheries crews did not detect any bull trout in the upper Dosewallips inside the park during fish inventory work in 2002. They surveyed 10 tributaries and 7 sites along the main stem river and only observed brook trout and rainbow trout. The Dosewallips estuary and anadromous zone of the Dosewallips River are considered to be potential Forage, Migration, and Over-wintering habitat for bull trout, however a self-sustaining population of bull trout does not exist in the watershed (USFWS 2004).

Federally Listed Threatened Fish

Puget Sound Chinook, Puget Sound steelhead and Hood Canal summer chum have been listed as Threatened by the National Marine Fisheries Service and are present in the Dosewallips River. Critical Habitat for Puget Sound Chinook and Hood Canal summer chum has also been designated by NMFS. Critical habitat for Puget Sound Steelhead will be designated in the future.

Bull trout have been listed as Threatened by the U.S Fish & Wildlife (USFWS). There is not a self sustaining population of bull trout in the Dosewallips River, however the estuary and anadromous zone of the river are classified as potential Forage, Migration, and Over-wintering habitat. Critical habitat for bull trout has been designated by the USFWS. It encompasses private and state lands on the lower Dosewallips but does not include Olympic National Forest lands.

Essential Fish Habitat

Essential Fish Habitat (EFH) has been designated by NMFS within the Dosewallips watershed under the Magnuson-Stevens Fishery Conservation and Management Act (NMFS 2002). EFH includes all Chinook, coho, and pink salmon habitat, which is the entire anadromous zone in the Dosewallips up to the barrier falls at RM 15.4.

Sensitive Fish Species

Fish species on the Forest Service Region 6 Sensitive Species List that occur within the Dosewallips watershed are: Puget Sound/Strait of Georgia Coho, Puget Sound/Strait of Georgia Chum, and Puget Sound Coastal Cutthroat Trout. Only Puget Sound/Strait of Georgia Coho and Puget Sound Coastal Cutthroat Trout are found with the project area.

Environmental Consequences

Olympic National Forest

The proposed alternatives were analyzed from the selected habitat function indicators (see Affected Environment section for a description) to assess potential environmental effects based on existing conditions at the project and watershed scales (summarized in Table 12). The ratings of these indicators show relative change to the baseline and display if the action would have a beneficial, neutral, or negative impact on the habitat indicator. Within this analysis short-term effects are considered impacts related to the construction phase and 1 year after. Impacts after one year were considered long-term effects. Additionally, effects to Forest Service Sensitive fish species, threatened fish species and critical habitat, and essential fish habitat are discussed.

Olympic National Park

Fish and their habitat are evaluated using the following impact intensities. The thresholds of change for the intensity of an impact to aquatic species and habitat are defined as follows:

Impact Intensity	Intensity Description
Negligible	There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.
Minor	Impacts would be detectable, short-term, and they would not be expected to be outside the natural range of variability of native species' populations, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, short-term, and they could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, long-term, and they would be expected to be outside the natural range of variability. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Impacts would be considered short-term if the aquatic species recovered in less than one year. Impacts would be considered long-term if aquatic species recovery takes more than one year.

Alternative A - No Action

Direct/Indirect Effects

Olympic National Forest
Sediment
Source of spawning gravels and channel function
Prior to 2002 aquatic habitat in the Dosewallips River adjacent to the proposed project area was in a degraded condition due to the presence of FSR 2610 and the associated streambank armoring. The channel was constrained by riprap. Gravel recruitment and large wood recruitment from the high bank had been precluded by bank stabilization. Riparian vegetation was minimal or non-existent between the river and the road corridor within the project area. The Dosewallips Watershed Analysis recognized the issues created by FSR 2610 along the Dosewallips River corridor and rated both road density/location and riparian condition as "At Risk" (USDA 1999).

The January 2002 flood removed the riprap and the road. The stream meander expanded laterally into the high bank, recruiting large quantities of gravel and large wood. Although prior stream survey information is not available it appears that spawning habitat, off-channel habitat, and channel complexity have all improved as a result of the flood and road washout. Aquatic habitat conditions in the Dosewallips River within the proposed project area are currently well on their way to recovery toward natural conditions.

Implementation of this alternative would allow natural channel migration processes to continue in the vicinity of the washout. Continued channel migration and continued erosion of the high bank at the washout site would provide substantial inputs of coarse sediment and woody debris to the stream channel over time. These processes are especially important in this location because of the amount of gravel potentially available, the limited gravel supplies available in adjacent stream reaches, the link between sediment supply and fish habitat, and the high quality and importance of fish habitat immediately downstream of the washout site.

As described under the Introduction section and detailed in the Reach Analysis (Cenderelli et. al 2003), the project area is unique in its ability to contribute substantial quantities of coarse sediments to this portion of the Dosewallips River. Potential coarse sediment inputs into the Dosewallips River are limited in the approximately 5-mile hillslope-confined reach immediately above the project area and in the approximately 3-mile alluvial unconfined reach immediately below the project area. The short terrace transition reach, which includes the washout site provides an abundance of potential spawning gravel to the system because of the high glacial terraces immediately adjacent to the stream channel. The glacial terraces, especially the high bank at the washout site, also contain a high proportion of spawning gravel-size material. Based on an analysis of the volume of eroding streambanks and the composition of the streambank materials the Reach Analysis concluded that approximately 41 percent of spawning gravels supplied to the channel within the project area originated from the eroding high bank at the washout

site (Cenderelli et. al 2003).

Spawning and Rearing Habitat within the Project Area

Episodic inputs of coarse sediment and large wood are recognized as an important aspect of creating and maintaining complex high quality fish habitat (Reeves et al. 1995). The large inputs of coarse sediment and large wood into the Dosewallips River from channel migration and erosion processes at the washout site are critical in developing and maintaining the high quality spawning and rearing habitat in the reach immediately downstream of the washout. A key assumption implicit in this analysis is that a large source of coarse sediment and wood immediately upstream from a key habitat area is more important to maintaining that habitat than smaller sources of coarse sediment and wood further away from the site.

The high quality complex habitat that extends from the washout approximately 1 mile downstream to the old Steelhead Campground is extremely important from a watershed context. This reach is one of three alluvial valley segments that are disproportionately important as salmon spawning and rearing areas in the Dosewallips watershed (Labbe et al. 2005). It is also one of the three primary spawning areas for Chinook and steelhead within the Dosewallips watershed.

How much gravel the bank erosion of the high bank at the washout would ultimately contribute to the stream channel, the timing and amount of sediment inputs, and how long the stream channel would continue to erode the glacial terrace are all unknown. The stream channel would likely continue to be dynamic in the vicinity of the washout and alter both its location and shape in response to large flood events. The rate of bank erosion along the outer bank at the washout site would probably decline over time as trees fall into the channel from the upper terrace and naturally stabilize the bank. There is no indication that the stream channel will naturally shift locations away from the washout site within the near future. Sediment inputs from the washout site would likely continue to be episodic (pulses) rather than a continuous steady input over the long-term.

Turbidity and Fine Sediment

The existing road system upstream from the washout site would gradually deteriorate due to lack of maintenance. There could be some adverse impacts to the Dosewallips River due to sediment generated from road failures and subsequent erosion of the drainage system, but adverse impacts are anticipated to be minor. Site reconnaissance did not identify any major mass wasting concerns. Much of the road was built using full bench construction in rock. Eventually a few small fills could deteriorate to the point of slope failure. A number of stream crossings exist, but these are generally small, less than 1000 cubic yards each, and are not expected to produce large or catastrophic failures. The impact would more likely be a relatively long-term deterioration of the road and the associated drainage structures with chronic small erosion inputs to stream channels (see Soils section for additional discussion).

The largest potential adverse impact from the lack of road maintenance and the subsequent deterioration of FSR 2610 would be the Bull Elk Creek bridge crossing. Due to the high sediment load of the stream channel there is the potential of the stream being

diverted out of the stream channel and re-routed onto the road. This would substantially increase the amount of both fine and coarse sediment carried into the mainstem of the Dosewallips until a new stream channel developed and stabilized. Potential adverse impacts would be limited because Bull Elk Creek is in the hillslope-confined reach upstream near Olympic National Park boundary and well upstream from the primary Chinook or steelhead spawning areas,.

Overall at the project scale this alternative would have a negative impact (degrade) on this habitat indicator. At the watershed scale effects of increased sediment input to the Dosewallips River due to lack of maintenance and deterioration of the FSR 2610 above the washout would be small and would likely be indistinguishable from natural background levels (maintain).

Large Woody Debris
Natural recruitment of large wood would be allowed to continue at the washout thus maintaining this indicator. This indicator would be maintained at both the project and watershed scales.

Pool Frequency and Quality
Natural processes would be allowed to continue at the washout thus maintaining this indicator at both the project and watershed scales.

Off-Channel Habitat
This alternative would not affect off-channel habitat and would maintain this indicator at both the project and watershed scales.

Width/Depth Ratio
This alternative would allow the river channel to migrate. The stream channel geometry would be allowed to evolve naturally thus maintaining this indicator at both the project and watershed scales.

Streambank Condition
Natural processes would be allowed to continue at the washout thus maintaining this indicator at both the project and watershed scales.

Drainage Network Increase
Alternative A would not affect this indicator and would maintain it at both the project and watershed scales.

Road Density and Location
Road density would not change under this alternative, the road beyond the washout would still exist and would not be decommissioned. The road would not be built in the main channel of the Dosewallips River. This indicator would be maintained at both the project and watershed scales.

Temperature

Alternative A would not affect stream temperature and would maintain this indicator at both the project and watershed scales.

Riparian Reserve Function
Natural processes would be allowed to continue at the washout thus maintaining this indicator at both the project and watershed scales.

Sensitive Fish Species
This alternative would likely benefit Puget Sound/Strait of Georgia Coho and Puget Sound Coastal Cutthroat Trout by creating or maintaining high quality, complex spawning and rearing habitat at the washout site and in the reach immediately below the washout.

Threatened Fish and Critical Habitat
Under ESA effects determination this alternative would have no effect on Puget Sound Steelhead, Puget Sound Chinook, Hood Canal summer chum, and Coastal Puget Sound bull trout. Puget Sound Chinook and Hood Canal summer chum Critical Habitat would also have a no effect determination.

Essential Fish Habitat
This alternative would have no effect on EFH, which includes Chinook, coho, and pink salmon habitat.

Summary
This alternative would provide the greatest benefit and have the least adverse impacts to aquatic resources of all the alternatives.

Olympic National Park
Impacts from the existing conditions are negligible and would be due primarily to run off and sedimentation from the existing road at the Dosewallips Falls site. This sedimentation can enter the Dosewallips River and create temporary spikes in turbidity, temporarily impacting fish habitat downstream and resulting in negligible to minor, short-term adverse impacts to fisheries resources.

Conclusion
There would be no impairment to this resource from the no action alternative.

Cumulative Effects

Although the Dosewallips watershed is considered one of the more relatively intact watersheds in the Puget Sound it is considered to have impaired ecological integrity (Frissell et at. 2000). Past and present activities in the watershed that have had a lasting detrimental affect on fish habitat include: timber harvest, splash dam operations, road building, bank hardening, LWD removal, dike construction, dispersed recreation, and conversion of floodplain to pasture land and residential development. Impacts to fish habitat occur on a gradient within the watershed. The magnitude and frequency of

impacts as identified above to fish habitat are greater lower in the watershed, and as you move up river fish habitat and the processes affecting habitat are less impaired.

Inputs of fine sediments could increase somewhat as a result of the lack of road maintenance of the FSR 2610 above the washout and the subsequent deterioration of the road and the associated drainage structures, but additional sediment inputs would likely be small and would likely be indistinguishable from natural background levels below the washout site.

Foreseeable activities on National Forest System lands include the Jackson Timber Sale, which would commercially thin approximately 1000 acres and construct 3 miles of temporary road in the Rocky Brook subwatershed. There would be short-term sediment impacts associated with temporary road building and log haul, however they are anticipated to be relatively minor. Any effects would occur well downstream from the FSR 2610 washout and would not interact with effects of this alternative so there would be no cumulative impacts.

Maintenance of FSR 2610 below the washout would continue. There are a number of areas along the road where the river and road are adjacent to each other and the riprap and other bank stabilization measures at these points would continue to be maintained over time. These activities would occur well downstream from the washout and would not interact with effects of this alternative so no cumulative impacts are anticipated.

Past ONP road and facility construction and maintenance has modified the amount of impervious or hard packed surface in the developed area of the park and likely changed the area drainage patterns slightly. Under this alternative there would be no future road maintenance. If road maintenance does not occur there is the potential for increased run-off and erosion due to filled ditches and plugged culverts. This could result in adverse, temporary to long-term impacts to fisheries resources from decreased water quality, resulting in minor adverse impacts. By doing nothing, run off is expected to continue, but it would be small and likely not contribute to decreased water quality in the Dosewallips River. Therefore there would be no cumulative effects to water quality from park actions proposed under the no action alternative.

Existing and foreseeable non-Federal activities in the lower Dosewallips watershed include timber sales, road construction, bank hardening, dike construction, LWD removal, and the conversion of floodplain to pasture lands and residential development. Assuming population increases in the lower watershed and population densities rise, these future private and state actions will persist and will likely increase, thus exacerbating the adverse effects on salmonid habitat within the lower watershed. Because these activities would occur well downstream from the washout and would not interact with effects of this alternative no cumulative impacts are anticipated.

Over the past 10 years approximately 10.1 miles of road have been decommissioned on National Forest System lands within the Dosewallips watershed. Two miles of existing roads are planned to be decommissioned on National Forest System lands within the next

several years. In addition there have been several positive efforts made to improve salmonid habitat in the lower watershed by local environmental groups, tribal, state and county governments. Projects such as levee removal, placing large wood, land acquisition and conservation easements to protect high value floodplain and riparian areas have been accomplished and are underway.

Implementing Alternative A would add to salmon habitat recovery efforts which have already been completed or are underway in the watershed. Allowing natural channel migration and erosion processes to continue at the washout site would allow natural restoration of stream habitat at the washout site. It would also help maintain the complex, high quality, and extremely important spawning and rearing habitat that currently exists in the reach immediately below the washout.

Forest Plan Amendments

Olympic National Forest
This alternative is consistent with Forest Plan standards and guidelines and as such no site-specific, non-significant Forest Plan amendments to these standards and guidelines are proposed.

Alternative B - Reroute 1 Bench Emphasis

Direct/Indirect Effects

Olympic National Forest
Sediment

Source of spawning gravels and channel function

The effects of Alternative B to this aspect of the sediment indicator would essentially be the same as the effects previously described for Alternative A.

Spawning and Rearing Habitat within the Project Area

The effects of Alternative B to this aspect of the sediment indicator would essentially be the same as the effects previously described for Alternative A.

Turbidity and Fine Sediment

There would be some unavoidable short-term sediment inputs into the non-fish bearing streams and to the small unnamed coho rearing tributary to Gamm Creek coming off the hillslope during the construction of the new road under this alternative. Adverse impacts related to increased fine sediments during road construction are anticipated to be minor. Conducting earth moving construction activities during the summer and following standard de-watering and erosion control mitigation measures would minimize the amount of fine sediment entering streamcourses. Potential sediment impacts from road construction are anticipated to be unobservable after 1-2 years, when the fill and cutslopes stabilize and revegetate.

There is some potential to increase long-term chronic delivery of fine sediment to the Dosewallips River from erosion of the cut and fill slopes, and potential mass movements

along road segment 2. Segment 2 of the new road would cross steep, unstable soils, with frequent wet undefined seep areas. Sheet and rill surface erosion off the new cutslopes and fillslopes in these segments would also generate additional fine sediments for several years until the bare soils revegetate. Fine sediments generated from segment 2 would be routed to the unnamed coho rearing tributary and eventually into the Dosewallips River. Negative impacts of sediment and turbidity to fish utilizing the unnamed tributary would range from gill trauma, avoidance/displacement, and disruption of feeding behavior. Fine sediment would settle out and not be readily transported or flushed downstream because of the low gradient and wetland characteristics of the unnamed tributary. Potential long-term sediment impacts from chronic erosion or mass wasting would be limited to the small unnamed coho rearing tributary. Because of its much larger size and its greater ability to transport sediment, fine sediment impacts would not be observable in the mainstem of the Dosewallips River.

Overall at the project scale this alternative would have a negative impact (degrade) on this habitat indicator for the first and second order perennial streams. There would be a neutral impact to the mainstem of the Dosewallips River and at the watershed scale.

Large Wood Debris
Under Alternative B a number of large conifer trees, 36 inch in diameter and greater, would be removed in order for the new road to be built. Few, if any, of the trees to be removed would likely reach the mainstem of the Dosewallips River if they were to fall down naturally. Large wood recruitment into the Dosewallips River would not be affected.

A few of the trees to be removed would have the potential of falling into the unnamed coho rearing tributary and becoming instream wood if they were left to fall naturally. Due to the small size of the tributary it would be highly unlikely for any of the downed trees to be transported to the mainstem of the Dosewallips River. The potential loss of large wood in the small rearing tributary due to clearing for the new road would be more than offset in the overall watershed context by the continued input of large wood into the mainstem Dosewallips at the washout site that would be maintained by this alternative.

Overall this indicator would be degraded at the project scale and maintained at the watershed scale.

Large trees such as the trees that would be removed to build the new road are critical to successful large wood stream restoration projects, but they are often difficult to find and expensive to acquire. Under this alternative the trees removed to construct the new road would be made available for large wood restoration projects. Having a source of large wood available adjacent to the Dosewallips River would make future large wood stream restoration projects much more feasible.

Pool Frequency and Quality
Alternative B would allow natural pool formation and habitat processes to continue at the washout site and would maintain the high quality, complex rearing habitat immediately

downstream of the project area. This indicator would be maintained at both the project and watershed scale.

Off-Channel Habitat
The glacial nature of the Dosewallips valley provides few low gradient tributaries for overwintering, and off-channel habitat is limited within the anadromous portion of the river (USDA Dosewallips baseline 1999). Road construction in segments 1 and 2 has the potential to alter the hydrology of the unnamed coho rearing tributary by intercepting and rerouting groundwater that feeds the springs and seeps that contribute flow to this stream. Groundwater in the hillslope above the tributary would be captured by the cutslopes and road drainage ditches. Some of the water would be routed off-site into the numerous stream channels. Some of the water would be returned to the forest floor downslope of the road prism. The transport efficiency of the groundwater in the hillslope above the tributary would likely increase somewhat – meaning the water would likely run off faster, thus affecting water storage capacity. The quantity of groundwater in the hillslope could also be reduced if it is captured and routed off site. These changes would impact the hydrology of the small tributary by drying up some of the springs and seeps that feed the stream or causing some of them to go intermittent during the dryer summer season.

Potential adverse impacts to groundwater and the hydrology of the tributary would be minimized by utilizing permeable road fill materials where possible and installing frequent ditch relief pipes.

The magnitude of the potential change in the hydrology of the small coho and cutthroat rearing tributary is unknown. The usefulness or capacity of the tributary to provide off-channel rearing habitat would likely be reduced somewhat, especially during the summer low flow period. Approximately 450 feet along the unnamed tributary would be affected. Substantial impacts are not anticipated.

For the above reasons this indicator is rated as degrade at the project scale but since these effects would be localized to the project area this indicator would be maintained at the watershed scale.

Width/Depth Ratio
This alternative would maintain the natural channel migration and habitat forming processes within the Dosewallips River. Stream channel dimensions, width/depth ratios, and pool/riffle sequences would be allowed to evolve naturally. This indicator would be maintained at both the project and watershed scales.

Streambank Condition
This alternative would maintain the natural channel migration and erosion processes within the Dosewallips River. In the area of the washout the river channel would be allowed to naturally erode the outer high bank and provide inputs of coarse sediment and large wood to the river. This indicator would be maintained at both the project and watershed scales.

Drainage Network Increase
Constructing 0.84 mile of new road through sometimes steep and wet soils would require substantial road ditches to meet drainage needs. Cutslopes and road ditches would intercept surface runoff and groundwater. There would be some potential to create new first order channels at the outlet of ditch relief pipes in wet and unstable areas. There would also be some potential for water in road ditches to be routed directly into some of the many first and second order tributaries which currently exist on the hillslope.

Potential adverse changes due to capturing and routing water in road ditches would be minimized by utilizing permeable road fill materials where possible, installing frequent ditch relief pipes, locating ditch relief pipes so that they discharge onto the forest floor rather than into established stream channels, and armoring relief pipe outlets to prevent erosion.

The magnitude of the potential change due to capturing and routing water in road ditches would likely be small and limited to the immediate project area. The most obvious changes would likely occur within the small coho rearing Gamm Creek tributary downslope of road segments 1 and 2. These are discussed in the previous Off-Channel Habitat section.

For the above reasons this indicator is rated as degrade at the project scale but since these effects would be localized to the project area this indicator would be maintained at the watershed scale.

Road Density and Location
This alternative would construct 0.84 mile of new road and decommission 0.7 mile of existing road, for a net increase of 0.14 mile. Affects to road density would be minimal. Current road densities in both the Upper and Middle Dosewallips subwatersheds are low, with 0.2 mile/sq. mile and 0.6 mile/sq. mile respectively. No adverse impacts are anticipated from the minor increase in road density. This indicator would be maintained at both the project and watershed scales.

Temperature
The lower portion of the Dosewallips River from River Mile 0 to River Mile 0.7 is designated as a water quality impaired 303d listed waterbody due to elevated water temperatures (Washington State 303d list, 2004). There are no 303(d) listed stream segments upstream on National Forest or National Park lands.

Trees along the new road alignment shade first and second order streams and help maintain cool temperatures in these waterbodies. The small number of shade trees that would be removed at the individual stream crossings and the short distances involved on each stream would not measurably affect stream temperatures in the first and second order tributaries within the project area or in the Dosewallips River. This alternative would have no measurable effect on water temperatures in the lower watershed.

This indicator would be maintained at both the project and watershed scales.

Riparian Reserve Function
This alternative would create adverse impacts to the Riparian Reserves. The majority of the project area is within Riparian Reserve. Approximately 7.1 acres of Riparian Reserve would be cleared to construct the new road. Segments of the new 0.84 mile reroute road would be constructed in steep, wet, and unstable soils. Substantial areas of new road cuts and fills would be created. A number of large conifer trees, 36 inch in diameter breast height (DBH) and greater would be cut down in order to build the road. This indicator would be degraded at the project scale.

However 0.7 mile of the existing FSR 2610 that is within the immediate riparian zone adjacent to the Dosewallips River would be decommissioned. This would result in the long-term improvement of soil production, through ripping, decompaction, and revegetation treatments.

This alternative would maintain all of the watershed-scale aquatic processes and functions of riparian reserves within the project area. In particular, it would maintain the natural channel migration and erosion processes along the mainstem of the Dosewallips River at the washout site. These are extremely important because of the unique geomorphologic characteristics of the washout site and the influence of coarse sediment and large wood from the washout site on maintaining the productive fish habitat immediately downstream.

There would be minor adverse impacts to fine sediment and surface flow dynamics in the small non-fish bearing tributaries draining the hillside and in large wood recruitment and hydrology within the unnamed coho rearing tributary. All of these impacts would be small and would be limited to the immediate project area. They would not tend to affect the overall functioning of the riparian reserve within the Dosewallips watershed. This indicator would be maintained at the watershed scale.

Sensitive Fish Species
This alternative may impact individuals or habitat for Puget Sound/Strait of Georgia Coho and Puget Sound Coastal Cutthroat Trout but it will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Threatened Fish and Critical Habitat
This alternative “may affect, and is not likely to adversely affect” Puget Sound Steelhead, Puget Sound Chinook, Hood Canal summer chum, and Coastal Puget Sound bull trout. Puget Sound Chinook and Hood Canal summer chum Critical Habitat would also have a “may affect, and is not likely to adversely affect” determination. Coordination with US Fish and Wildlife Service and National Marine Fisheries Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Essential Fish Habitat
Alternative B would adversely affect EFH (Chinook, coho, and pink salmon habitat)

because of the unavoidable sediment delivery to the unnamed coho tributary from segment 2 of the new road construction. Sediment effects would gradually diminish as bare soils at cut and fillslopes revegetate and stabilize, see previous Sediment section.

Summary
Alternative B would allow the natural stream channel migration and erosion processes to continue at the washout site. The washout site would continue to provide substantial inputs of coarse sediments and large wood into the Dosewallips River. Spawning and rearing habitat at the washout site would continue to develop and the important Chinook and steelhead spawning habitat and high quality, complex rearing habitat immediately below the washout site would be maintained. The new road would have a substantial buffer between the road and the mainstem of the Dosewallips River so riparian conditions and functions along the mainstem of the river would not be impacted.

Alternative B would have somewhat greater adverse impacts than the No Action Alternative because the new road construction associated with this alternative would remove riparian vegetation and place road fill along a 450 feet reach of a small coho and cutthroat rearing stream. This alternative would also install a new fish passage culvert in the tributary. Road construction along the wet slopes above the small stream and wetland area would have the potential to route water away from existing springs and seeps and change the hydrology of this off-channel rearing habitat.

Adverse impacts due to increased sedimentation, removal of riparian vegetation, and changes in hydrology would be both short and long-term however they would be limited in magnitude and extent. None of the potential adverse effects created by Alternative B would be observable beyond the immediate project area. Potential adverse effects from Alternative B would be more than offset by the positive aspects (as compared to locating the road in the river bottom) of maintaining the natural channel migration and erosion processes in the mainstem of the Dosewallips River and maintaining a substantial vegetated buffer between the river and the new road as compared to the in-river action alternative.

Cumulative Effects

Although the Dosewallips watershed is considered one of the more relatively intact watersheds in the Puget Sound it is considered to have impaired ecological integrity (Frissell et at. 2000). Past and present activities in the watershed that have had a lasting detrimental affect on fish habitat include: timber harvest, splash dam operations, road building, bank hardening, LWD removal, dike construction, dispersed recreation, and conversion of floodplain to pasture land and residential development. Impacts to fish habitat occur on a gradient within the watershed. The magnitude and frequency of negative impacts as identified above to fish habitat would be greater in the lower reaches of the watershed. In the upper reaches of the river fish habitat and the processes affecting habitat would be less impaired.

Inputs of fine sediments into the small hillslope tributaries and into the small coho rearing

tributary within the project area could increase somewhat as a result of constructing the new reroute. These additional inputs are likely to be small and localized within the project area. Fine sediment levels in the mainstem of the Dosewallips River would be indistinguishable from natural background levels below the washout therefore no discernable cumulative impacts are anticipated.

Foreseeable activities on National Forest System lands include the Jackson Timber Sale, which would commercially thin approximately 1,000 acres and construct 3 miles of temporary road in the Rocky Brook subwatershed. There would be short-term sediment impacts associated with temporary road building and log haul, however they are anticipated to be relatively minor. Any effects would occur well downstream from the 2610 washout and would not interact with project effects so there would be no cumulative impacts.

Maintenance of FSR 2610 below the washout would continue. There are a number of areas along the road where the river and road are adjacent to each other and the riprap and other bank stabilization measures at these points would continue to be maintained over time. These activities would occur well downstream from the washout and would not interact with project effects so no cumulative impacts are anticipated.

Existing and foreseeable non-Federal activities in the lower Dosewallips watershed include timber sales, road construction, bank hardening, dike construction, LWD removal, and the conversion of floodplain to pasture lands and residential development. Assuming population increases in the lower watershed and population densities rise, these future private and state actions will persist and will likely increase, thus exacerbating the adverse effects on salmonid habitat within the lower watershed. Because these activities would occur well downstream from the washout and would not interact with project effects no cumulative impacts are anticipated.

With the reopening of the road beyond the washout a larger area of bank hardening would be maintained in Alternative B (as in all the other action alternatives) than in Alternative A, with riprap associated with portions of the added 5 miles of road beyond the washout and the two campgrounds. Maintenance of these hard points maintains a degraded fish habitat condition but as there is no overlap of effects to this aspect of fish habitat with this alternative there would be no cumulative impacts.

Past road and facility construction by the park has modified the amount of impervious or hard packed surface in the developed area of the park and likely changed the area drainage patterns slightly. Under this alternative, with the reopening of the road, park operations and road maintenance would be reinstituted. These activities would be confined to the existing road and developed area and could create negligible adverse impacts to fisheries resources from road maintenance activities such as grading, and facility operation and use. This work could improve drainage as culverts are cleaned and ditches are cleared, resulting in beneficial, indirect effects to fisheries resources from decreased run off and improved water quality. Overall, the cumulative effects to fisheries resources would be negligible to minor, short-term, and both beneficial and adverse.

Over the past 10 years, approximately 10.1 miles of road have been decommissioned on National Forest System lands within the Dosewallips watershed. Two miles of existing roads are planned to be decommissioned on National Forest System lands within the next several years. In addition there have been several positive efforts made to improve salmonid habitat in the lower watershed by local environmental groups, tribal, state and county governments. Projects such as levee removal, placing large wood, land acquisition and conservation easements to protect high value floodplain and riparian areas have been accomplished and are underway.

Implementing Alternative B would add to salmon habitat recovery efforts which have already been completed or are underway in the watershed. Allowing natural channel migration and erosion processes to continue at the washout site would allow natural restoration of stream habitat at the washout site. It would also help maintain the complex, high quality, and extremely important spawning and rearing habitat that currently exists in the reach immediately below the washout. Utilizing the large trees that would need to be removed to construct the road as a source of large wood for stream restoration projects would make these types of projects more feasible on both National Forest lands and on State and private lands within the watershed.

Overall several habitat indicators would be degraded at the project scale but there would not be a change in the baseline watershed indicator rating. Because the magnitude of effects are anticipated to be small, intermittent, and not rise to the level of affecting resident and anadromous fish populations across the watershed. The incremental impacts from this project when added to the impacts of the previously mentioned past, present, and reasonably foreseeable actions would not result in substantial cumulative impacts to the resource, or affect the ability of the resource to sustain itself.

Forest Plan Amendments

Olympic National Forest
This alternative would not meet the Riparian Reserves standards and guidelines requirement for avoiding wetlands entirely when constructing new roads. This alternative would directly impact about 0.019 acre of wetlands. The proposed Forest Plan amendment would waive this standard and guideline to avoid wetlands entirely in the project area for this specific project, and allow this alternative to be consistent with the Forest Plan. The impact of this amendment is mitigated by activities which restore or enhance wetlands/riparian areas. The impacts of waiving this standard and guideline are disclosed in various sections of this chapter, particularly the Wetlands section. Additionally there are proposed Forest Plan amendments to terrestrial based standards and guidelines (see Terrestrial Species and Habitat section of this chapter for details).

Alternative C – Reroute 2 Retaining Wall Emphasis

Direct/Indirect Effects

Olympic National Forest
All Matrix Indicators
The effects of Alternative C to the aquatic environment would essentially be identical to the effects created by Alternative B, with a minor difference with regard to sediment.

Due to the over steepened fill and cutslopes primarily in segment 2 associated with road construction there would be a longer time for bare soils to revegetate and stabilize. This would result in a longer period of time (2-3 years) than Alternative B that sediment would be delivered to the unnamed coho tributary (see Soils section). The overall differences between Alternative B and Alternative C would be minor. At the project scale this alternative would have a negative impact (degrade) on this habitat indicator for the first and second order perennial streams. There would be a neutral impact to the mainstem Dosewallips River and at the watershed scale.

Sensitive Fish Species
The effects of Alternative C on Puget Sound/Strait of Georgia Coho, Puget Sound/Strait of Georgia Chum, and Puget Sound Coastal Cutthroat Trout would be identical to the effects created by Alternative B.

Threatened Fish and Critical Habitat
ESA determinations for Puget Sound Steelhead, Puget Sound Chinook, Hood Canal summer chum, and Coastal Puget Sound bull trout are the same as for Alternative B. Puget Sound Chinook and Hood Canal summer chum Critical Habitat determinations are the same as for Alternative B. Coordination with US Fish and Wildlife Service and National Marine Fisheries Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Essential Fish Habitat
Affects to EFH would be similar to Alternative B, however adverse affects would persist longer as bare soils at cut and fillslopes would take longer to revegetate and stabilize.

Summary
Alternative C would have similar impacts on the aquatic environment as described for Alternative B.

Cumulative Effects

The cumulative effects of Alternative C to the aquatic environment would be similar to the cumulative effects created by Alternative B.

Forest Plan Amendments

Olympic National Forest
This alternative would not meet the Riparian Reserves standards and guidelines requirement for avoiding wetlands entirely when constructing new roads. This alternative

would directly impact about 0.020 acre of wetlands. The proposed Forest Plan amendment would waive this standard and guideline to avoid wetlands entirely in the project area for this specific project, and allow this alternative to be consistent with the Forest Plan. The impact of this amendment is mitigated by activities which restore or enhance wetlands/riparian areas. The impacts of waiving this standard and guideline are disclosed in various sections of this chapter, particularly the Wetlands section. Additionally there are proposed Forest Plan amendments to terrestrial based standards and guidelines (see Terrestrial Species and Habitat section of this chapter for details).

Alternative F – Bridge

Direct/Indirect Effects

Olympic National Forest
Sediment

Source of spawning gravels and channel function

Under the bridge alternative most of the natural stream channel migration and erosion processes would be allowed to continue at the washout site. Although riprap would be placed along the upstream and downstream bridge approaches, 80 to 90 percent of the high bank would still be allowed to erode and contribute coarse sediments to the Dosewallips River.

Spawning and Rearing Habitat within the project area

The high quality spawning and rearing habitat immediately downstream of the washout would be maintained.

Turbidity and Fine Sediment Input

Constructing the bridge would create some substantial local inputs of fine sediment and turbidity into the Dosewallips River. Most of the fine sediment inputs associated with the project would occur during the instream water diversion activities, excavation for the bridge piers, temporary road crossings, and placement of riprap along bridge approaches. Turbidity and sediment inputs would be locally severe during these activities. These inputs would generally be short-term during specific construction activities and would disappear quickly once those construction activities ended. While the input of fine sediments into the river would be unavoidable, the required best management practices would minimize impacts. Some additional streambed disturbance and generation of fine sediments and turbidity would be anticipated for at least one year as the streambed changes in response to the channel alterations.

Fine sediment generated in the Dosewallips River from construction activities would likely settle out within a short distance. Based on field experience with other construction projects deposition of fine sediments would be unlikely to be observable more than a few thousand feet below the project area.

Negative impacts of sediment and turbidity to fish immediately downstream of the project area during the instream construction would range from gill trauma, avoidance/displacement, and disruption of feeding behavior. Additionally the increased level of fine sediment generated during the in-channel construction work could reduce spawning, incubation, and rearing success, within and immediately downstream of the project area for a short period. However the gradient, stream velocity, and discharge of Dosewallips River are sufficient to flush fines out of the system rather quickly. The newly deposited sediments would be remobilized rapidly by high water flows during the fall and winter. At most, observable fine sediment deposition within the project area from construction activities would be unlikely after a few years. At a watershed scale the amount of sediment generated by this project would be indistinguishable in relation to the

high levels of natural sediment carried by the river during typical frequent storm events.

Because the Dosewallips River is relatively swift and there are few substantial tributaries the turbidity created during construction activities would likely remain in suspension for long distances. There would be a potential for short-term increases in turbidity to be observed down into the lower watershed.

The in-stream work would occur during summer and fall from July 1 to October 15. This expanded in-stream work window is needed in order to complete in-river work in one year versus having aquatic impacts over two years. Because of this extended instream work window there would potential direct impacts to migrating and spawning Chinook, coho and pink salmon. Additionally juvenile coho, steelhead, cutthroat trout would be present in the river during the instream construction period. The above mentioned fish species have the potential to be impacted by the turbidity and fine sediment generated from the instream construction. Actual adverse impacts would depend on the magnitude and duration of the sediment and turbidity releases and the distance of the fish from the project area.

Overall at the project scale this alternative would have a negative impact (degrade) on this habitat indicator and there would be a neutral impact to the mainstem Dosewallips River at the watershed scale.

Large Woody Debris
Under this alternative the high bank would continue to erode. Large wood that gets caught up along the piers of the bridge would be moved off the piers as necessary in order to maintain structural bridge integrity and continue the ability of the river to erode the high bank. Large wood moved downstream off the piers would be left intact as much as operationally possible, minimizing cutting up of large wood pieces, thus preventing loss of LWD to the river. This indicator would be maintained at the project and watershed scale.

Pool Frequency and Quality
Scour would occur around the piers, however pools would lack cover and complexity. Pool frequency would increase in the project area but the quality of habitat would be low. In general, this would have a neutral effect to fish habitat. This indicator would be maintained at the project and watershed scale.

Off-Channel Habitat
This alternative would not affect off-channel habitat and would be maintained at both the project and watershed scales.

Width/Depth Ratio
For the most part this alternative would allow the river channel to migrate. The stream channel geometry would be allowed to evolve naturally. The only exception would be at the bridge approaches that would be protected by riprap.

Streambank Condition
A small area of the high bank would be hardened with riprap to protect the approaches of the bridge. Eighty to ninety percent of the bank would be allowed to erode. At the project scale this indicator would be rated as degrade, although effects would not be observable at the watershed scale and rated as maintained.

Drainage Network Increase
Alternative F would not affect this indicator and would be maintained at both the project and watershed scales.

Road Density and Location
The amount of road (in the form of a bridge) added to the subwatershed road mileage total in this alternative is so small that it would not change the road density within the subwatershed. This indicator would be maintained at both the project and watershed scale.

Temperature
Alternative F would not affect this indicator and would be maintained at both the project and watershed scales.

Riparian Reserve Function
Localized disturbance to soil and vegetation would occur during project construction however this would be limited in extent and would be expected to recover rapidly. The primary function of the riparian area at the washout is for large wood recruitment. Natural erosion processes which are the mechanism for large wood input into the river would more-or-less be allowed to continue. This indicator would be rated as maintain for both project and watershed scales.

Sensitive Fish Species
The determination to Sensitive fish species, Puget Sound/Strait of Georgia Coho and Puget Sound Coastal Cutthroat Trout found within the project area as related to this alternative would be “May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species”.

Threatened Fish and Critical Habitat
This alternative “may affect, and is likely to adversely affect” Puget Sound Steelhead, Puget Sound Chinook, and Critical Habitat for Puget Sound Chinook. For Hood Canal summer chum, and its associated critical habitat, and Coastal Puget Sound bull trout this alterative “may affect, and is not likely to adversely affect”. Coordination with US Fish and Wildlife Service and National Marine Fisheries Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Essential Fish Habitat
Alternative F would adversely affect EFH because of the short-term sediment and

turbidity impacts associated with the instream construction phase to Chinook, coho, and pink habitat in the mainstem Dosewallips River (see previous Sediment section).

Summary
This alternative would have greater impacts on the aquatic environment than Alternatives B and C. While armoring the bridge approaches would preclude some erosion processes the high bank at the washout would for the most part be allowed to erode and supply spawning gravels to the channel. To a degree large wood would be allowed to rack up along the piers of the bridge and create deep pools and complex fish habitat.

Cumulative Effects

Although the Dosewallips watershed is considered one of the more relatively intact watersheds in the Puget Sound, it is considered to have impaired ecological integrity (Frissell et at. 2000). Past and present activities in the watershed that have had a lasting detrimental affect on fish habitat include: timber harvest, splash dam operations, road building, bank hardening, LWD removal, dike construction, dispersed recreation, and conversion of floodplain to pasture land and residential development. Impacts to fish habitat occur on a gradient within the watershed. The magnitude and frequency of negative impacts as identified above to fish habitat would be greater in the lower reaches of the watershed. In the upper reaches of the river fish habitat and the processes affecting habitat would be less impaired.

Foreseeable activities on National Forest System lands include the Jackson Timber Sale, which would commercially thin approximately 1,000 acres and construct 3 miles of temporary road in the Rocky Brook subwatershed. There would be short-term sediment impacts associated with temporary road building and log haul however they are anticipated to be relatively minor. Any effects would occur well downstream from the 2610 washout and would not interact with project effects so there would be no cumulative impacts.

Maintenance of FSR 2610 below the washout would continue. There are a number of areas along the road where the river and road are adjacent to each other and the riprap and other bank stabilization measures at these points would continue to be maintained over time. In addition to the numerous bank stabilization projects lower in the watershed there is the riprap associated with the 5 miles of road beyond the washout and the two campgrounds. With the reopening of the road beyond the washout a larger area of bank hardening would be maintained in Alternative F (as in all the other action alternatives) than in Alternative A. Alternative F would potentially add to some cumulative adverse effects to fish habitat within the watershed.

Existing and foreseeable non-Federal activities in the lower Dosewallips watershed include timber sales, road construction, bank hardening, dike construction, LWD removal, and the conversion of floodplain to pasture lands and residential development. Assuming population increases in the lower watershed and population densities rise, these future private and state actions will persist and will likely increase, thus

exacerbating the adverse effects on salmonid habitat within the lower watershed. Because these activities occur well downstream from the washout and would not interact with project effects no cumulative impacts are anticipated.

Past road and facility construction by the park has modified the amount of impervious or hard packed surface in the developed area of the park and likely changed the area drainage patterns slightly. Under this alternative, with the reopening of the road, park operations and road maintenance would be reinstituted. These activities would be confined to the existing road and developed area and could create negligible adverse impacts to fisheries resources from road maintenance activities such as grading, and facility operation and use. This work could improve drainage as culverts are cleaned and ditches are cleared, resulting in beneficial, indirect effects to fisheries resources from decreased run off and improved water quality. Overall the cumulative effects to fisheries resources would be negligible to minor, short-term, and both beneficial and adverse.

Over the past 10 years approximately 10.1 miles of road have been decommissioned on National Forest System lands within the Dosewallips watershed. Two miles of existing roads are planned to be decommissioned on National Forest System lands within the next several years. Additionally there have been several positive efforts made to improve salmonid habitat in the lower watershed by local environmental groups, tribal, state and county governments. Projects such as levee removal, placing large wood, land acquisition and conservation easements to protect high value floodplain and riparian areas have been accomplished and are underway. The beneficial effects of these projects along with the project's beneficial effect to LWD and pool frequency and quality would result in a beneficial cumulative impact.

Turbidity caused during the construction period has the potential to be observed in the lower watershed. When viewed at a larger scale activities at the washout which result in turbidity in the upper watershed affect conditions downstream. However effects (both in terms of sediment and turbidity) of the proposed project would be small in magnitude and not be substantial. There would be a small if any overlap with activities in the lower watershed. In comparing cumulative effects of the other alternatives, this alternative would have a relatively minor impact to fish habitat. Overall while several habitat indicators would be degraded at the project scale there would not be a change in the baseline watershed indicator rating. Because the magnitude of effects are anticipated to be small, intermittent, and not rise to the level of affecting resident and anadromous fish populations across the watershed. The incremental impacts from this project when added to the impacts of the previously mentioned past, present, and reasonably foreseeable actions would not result in substantial cumulative impacts to the resource, or affect the ability of the resource to sustain itself.

Forest Plan Amendments

Olympic National Forest

This alternative would not meet the Riparian Reserves standards and guidelines requirement for avoiding wetlands entirely when constructing new roads. This alternative would directly impact about 0.016 acre of wetlands. The proposed Forest Plan amendment would waive this standard and guideline to avoid wetlands entirely in the project area for this specific project, and allow this alternative to be consistent with the Forest Plan. The impact of this amendment is mitigated by activities which restore or enhance wetlands/riparian areas. The impacts of waiving this standard and guideline are disclosed in various sections of this chapter, particularly the Wetlands section.

Table 12: NMFS matrix indicators

	Effects of the Proposed Alternatives (Project Scale)				Effects of the Proposed Alternatives (Watershed Scale)				Environmental Baseline (Watershed scale)		
Indicator	Alt. A	Alt. B	Alt. C	Alt. F	Alt. A	Alt. B	Alt. C	Alt. F	Properly Functioning	At Risk	Not Properly Functioning
Sediment	D	D*/ M**	D*/ M**	D	M	M	M	M		X	
Large Woody Debris	M	D	D	M	M	M	M	M		X	
Pool Frequency and Quality	M	M	M	M	M	M	M	M		X	
Off-channel Habitat	M	D	D	M	M	M	M	M		X	
Width/Depth Ratio	M	M	M	M	M	M	M	M	Unknown		
Streambank Condition	M	M	M	D	M	M	M	M		X	
Drainage Network Increase	M	D	D	M	M	M	M	M		X	
Road Density & Location	M	M	M	M	M	M	M	M		X	
Temperature	M	M	M	M	M	M	M	M	X		
Function of Riparian Reserves	M	D	D	M	M	M	M	M		X	

(M)aintain = project may affect indicator, but impact is neutral.
(D)egrade = project is likely to have a negative impact on the habitat indicator.
* = first and second order streams coming off the hillslope
** = mainstem of Dosewallips River

Alternatives B, C and F – All Action Alternatives

Direct/Indirect Effects

Olympic National Park
The park lands and the main project site near the Dosewallips Falls are high up in the watershed (about at River Mile 15) and well above the area where Puget Sound Chinook or Puget Sound Steelhead issues occur. Hood Canal summer chum are located primarily in the lower river only, well outside of the park. Therefore there would be no direct effects to these species from proposed project work. There would be no effect to bull trout since they do not occur in the upper Dosewallips River (Brenkman 2004).

The primary issues at the construction site relate to indirect effects as a result of the potential to expand the footprint of the road at the project site. The project design would assure that the footprint of the roadway would not be expanded more than its previous width of 22 feet. All work would occur above the river, outside the floodplain.

Another issue is the potential for sedimentation, both from construction and storm water runoff, retention, and sediment transport once the road segment is completed. Scheduling the project work to occur during the summer (August/September) reduces the potential for sedimentation because it is drier and there is less run-off. However after construction in the long-term there would be beneficial effects from reducing the potential for sedimentation through design and project mitigation. Ideas include using rock piles in the ditchlines to slow the water down and capture silt, and/or to utilize a retention area.

The project work, scheduled around the fish work windows, would be designed within the same or smaller footprint and would likely improve storm water runoff and would result in negligible to minor, indirect, short- and long-term impacts to the fisheries resources, and a NLAA determination by NMFS due to indirect effects associated with the potential for sedimentation and runoff. The deferred road maintenance that would occur on the roadway to open the 1.7-mile stretch of NPS road would not impact fisheries resources or water resources since they are minor and would occur away from the river.

The improved road segment at the falls could result in a beneficial effect over the no action if drainage is improved and sedimentation is reduced.

Conclusion
Because this alternative would result in negligible to minor impacts to fisheries resources, there would be no impairment of this resource.

Terrestrial Species and Habitat (Terrestrial Habitat Analysis Report, January/February 2006 with March 2008 edits)

Introduction

Terrestrial wildlife habitats in the Dosewallips washout project area include old growth or late-successional coniferous forests, younger disturbed forests, and riparian habitats. These habitats provide cover, breeding sites, and forage for a variety of birds, mammals, amphibians, and invertebrates.

The ONF project area is within a Late-Successional Reserve (LSR) designated in the Olympic Forest Plan with the objective of protecting and enhancing conditions of late-successional and old growth forest ecosystems. The proposed project falls within a late-successional forest over 500 years in age containing numerous large old growth trees. In 2003, the diameter-at-breast-height (dbh) of 131 dominant trees in the stand were measured. The average dbh was 39 inches and the largest was 78 inches. Forty-six of the trees were very large (over 50 inches dbh).

Suitable habitat for 2 federally threatened bird species and 12 animal species identified as Sensitive or other rare or uncommon species (one bird, two mammals, three amphibians, and six mollusks) exists in the ONF project area. In addition, habitat is present for five Management Indicator Species (or species groups) designated in the Olympic National Forest Land and Resource Management Plan (USDA 1990a) and four species of concern identified by the U.S. Fish and Wildlife Service (USDI 2003b).

The ONP project area contains suitable habitat for two federally threatened bird species, two Washington Department of Fish and Wildlife species of concern, and species known as endemic to ONP.

This section will address the current habitat condition and species assessment for the above listed species. Only information specific to this project was included in this EIS. The Terrestrial Habitat Analysis for this project contains more general information on these species, such as range and habitat descriptions and life histories. The project area was defined as the immediate area of all action alternative project work. However the entire 5th field Dosewallips watershed was examined for the potential impact analysis.

Affected Environment

Federal Threatened and Endangered Species

Suitable habitat is present in the ONF project area for two species listed as threatened under the Endangered Species Act, the marbled murrelet and northern spotted owl (Table 13); with suitable habitat present in the ONP project area for marbled murrelet and northern spotted owl. Proposed ONF activities are within Critical Habitat Units for the marbled murrelet (CHU WA-06a) and northern spotted owl (CHU WA-49). Based on a review (January 2006 and August 2007 review of Threatened and Endangered list) of species sightings and habitats, no other threatened or endangered terrestrial animal

species has the potential of occurring in or near the project area.

Table 13: ONF ESA listed wildlife species

Common Name	Scientific Name	Federal Status	Habitat Present in Project Area	Documented Sightings
Marbled Murrelet	*Bachyramphus marmoratus*	Threatened	yes	in watershed
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	yes	in watershed

Marbled Murrelet (*Bachyramphus marmoratus)*

Status

The marbled murrelet was federally listed as a threatened species in Washington, Oregon and California in 1992 (USFWS 1992). The primary reason for the listing was extensive harvest of late-successional and old growth forests which provide nesting habitat. Since listing the 5-Year Status Review (McShane *et al.* 2004) was completed which assembled the best available scientific information on the marbled murrelet. The report concluded that the marbled murrelet population is declining in the listed area of Washington, Oregon, and California.

More thorough discussion on life history, habitat, taxonomy, and ecology of the marbled murrelet are found in the Status Review (McShane *et al.* 2004), the Final Rule designating the marbled murrelet as a threatened species (USFWS 1992), the recovery plan for the marbled murrelet (USFWS 1997), and *Ecology and Conservation of the Marbled Murrelet (*Ralph et al. 1995).

Six Conservation Zones were outlined in the Marbled Murrelet Recovery Plan (USFWS 1997). The Dosewallips Washout ONF project is in Conservation Zone 1 (Puget Sound). Lands considered essential for the recovery of the species in Zone 1 include any suitable habitat within an LSR. The Dosewallips washout project area is located within the North Hood Canal LSR (RW-105). Recent demographic modeling indicates that the marbled murrelet population is declining in all conservation zones (McShane *et al.* 2004).

The Northwest Forest Plan 10-year monitoring report provided the first estimates of the amount and distribution of marbled murrelet potential nesting habitat using consistent baseline data in the Forest Plan area. The report estimated that the amount of potential marbled murrelet nesting habitat on the Olympic Peninsula is lower than previously thought.

Project Area

The Dosewallips watershed contains 22,586 acres of marbled murrelet habitat (29 percent of watershed) (USDA 1999). Of the 22,586 acres of suitable habitat, 9,745 acres (43 percent) are in Olympic National Forest, with 12,790 acres in Olympic National Park (57 percent). Suitable habitat is available in large contiguous tracts in the upper watershed. The suitable habitat in the middle Dosewallips and Rocky Brook has been fragmented by

timber harvest and by fires. In the lower Dosewallips watershed suitable habitat is virtually non-existent due to timber harvest, agriculture, and urbanization.

The state priority species database (WDFW database) contains no detections of marbled murrelets near the ONF or the ONP project areas. The nearest documented marbled murrelet detection to the washout site is located 2.7 miles away in the Big Quilcene River watershed. Protocol-level surveys have not been done in the project area to determine marbled murrelet occupancy. However, it is reasonable to assume that marbled murrelet occupy the project area. Suitable nesting habitat for the marbled murrelet occurs in the Dosewallips washout project area and in the forests surrounding the project. Marbled murrelet occupancy has been confirmed in the Dosewallips watershed. Surveys conducted in 1999 and 2000 found marbled murrelet occupancy at the Dosewallips campground in Olympic National Park. Radar studies have detected marbled murrelets at the mouth of the Dosewallips River (Cooper et al. 2001). Marbled murrelet occupancy was also confirmed in the adjacent watershed, the Big Quilcene River, when surveys were conducted in the mid 1990's.

The ONP's Dosewallips area is considered murrelet habitat. Murrelets occur within all the major drainages below about 3,000 feet in elevation within the park. Habitat considered suitable for murrelet occupation includes forested areas to 3,500 feet on the east side of the park and to 3,000 feet on the west side of the park, including the Sol Duc and Skokomish drainages. Even though there are no recent surveys the NPS assumes occupancy.

Designated Critical Habitat for the Marbled Murrelet

Status

The U.S. Fish and Wildlife Service designated critical habitat for the marbled murrelet in 1996 (USFWS 1996). Critical habitat serves to identify lands that are considered essential for the conservation of the listed species. The Service identified two habitat features, referred to as primary constituent elements, associated with the terrestrial environment that support the requirements for nesting, roosting, and other normal behaviors. The primary constituent elements include: (1) individual trees with potential nesting platforms and (2) forested areas within 0.5 mile of individual trees with potential nesting platforms and a canopy height of at least one-half the site-potential tree height.

Project Area

The ONF Dosewallips washout project area is within Critical Habitat Unit WA-06-a (East Olympic Peninsula). Although much of the CHU is fragmented, large blocks of old-growth forest are present in the CHU, especially in the upper watersheds. The CHU is 71,600 acres in size. Forty percent of the CHU is suitable habitat, or about 26,640 acres. Large blocks of suitable habitat are also present in adjacent Olympic National Park. Any suitable marbled murrelet habitat in this area is considered essential (USDI 1996) to the recovery of the species (in a Critical Habitat Unit and Conservation Zone 1).

The project is located near the southwestern edge of CHU WA-06-a, close to wilderness areas and Olympic National Park (neither which are included as designated critical habitat). Both constituent elements of critical habitat are present in the project area.

Northern Spotted Owl (*Strix occidentalis caurina*)

Status

The northern spotted owl was listed as federally threatened throughout its range "due to loss and adverse modification of suitable habitat as a result of timber harvesting and exacerbated by catastrophic events such as fire, volcanic eruption, and wind storms" (U.S. Fish and Wildlife Service 1990b). Since listing, a status report (SEI 2004) and review (USFWS 2004) were completed to determine if the species warrant change in federal status. The review concluded at this time that the species still warrants listing as threatened under the ESA. In May 2007 the U.S. Fish and Wildlife Service released a draft recovery plan for the northern spotted owl that identified actions needed to stop the owl's decline, reduce threats, and return the species to a stable population (USFWS 2007).

More thorough discussion on life history, habitat, taxonomy, and ecology of the northern spotted owl are found in the draft recovery plan, the 1987 and 1990 U.S. Fish and Wildlife Status Reviews, the Interagency Scientific Committee Report (Thomas et al. 1990), the Forest Ecosystem Management Assessment Team Report (Thomas and Raphael 1993), the Final Rule designating the spotted owl as a threatened species (U.S. Fish and Wildlife Service 1990), and the Scientific Evaluation of the Status of the Northern Spotted Owl (Courtney et al. 2004).

Project Area

Suitable and dispersal habitat available to the northern spotted owl is fragmented in many of the watersheds on the Olympic National Forest, predominately related to past timber harvest of old growth forest. Olympic National Park contains the most contiguous spotted owl habitat in the Olympic Peninsula. The Dosewallips watershed is one of the largest watersheds in the Hood Canal. The upper 60 percent of the watershed is undeveloped and protected within Olympic National Park, while the middle 30 percent of the basin is within the Olympic National Forest. In general, this portion is in a relatively pristine natural condition. The lower 10 percent of the watershed is in private ownership where use is dominated by pasture land, residential development, and intensive forest management. The Dosewallips watershed contains 22,586 acres of late successional/old growth forest (29 percent of the watershed) (USDA 1999). Of the 22,586 acres of suitable habitat, 43 percent are managed by the Olympic National Forest and 12,790 acres are managed by Olympic National Park (57 percent).

Habitat for the northern spotted owl exists adjacent to the washout, along the Dosewallips River Road, and the campgrounds and facilities within the watershed on both National Forest System and National Park lands. Both suitable habitat (nesting, roosting, foraging) and dispersal habitat is present within the project area for the northern spotted owl to utilize throughout the year. Habitat quality varies in the project area from late successional habitat with standing live and dead trees providing suitable nesting structure and numerous downed logs and snags that provide good habitat for prey species, to riparian forest that may provide roosting opportunities, to single layer canopy forest which may function as dispersal habitat.

Northern spotted owls have large home ranges containing extensive acreage of old growth forest to meet their habitat needs. There is extensive suitable habitat for spotted owls in the park, primarily in lower elevations of major drainages. Spotted owl habitat is similar to that for marbled murrelets but extends to higher elevations in the park. One concern is the trend of lower elevation areas increasingly being used by barred owls, a competitor of the spotted owl, rather than spotted owls.

There have been no northern spotted owl surveys completed specifically related to the Dosewallips project on either the National Forest System or National Park land within the project area. Northern spotted owl surveys have been conducted in the Dosewallips drainage since the late 1980s, with the Olympic Demography Study and Olympic National Park Demography Study doing annual surveys in recent times. The surveys are completed to protocol as outlined by the demography studies. The survey efforts from the Olympic Demography Study do not adequately cover the project area to consider the project area as having complete surveys to the established protocol. The Olympic Demography Study does not survey for barred owls, but incidental sightings are documented. Barred owls are known to inhabit the Dosewallips drainage although no barred owls have been detected in the project area.

Based on radio telemetry data (Thomas et al. 1990) the U.S. Fish and Wildlife Service estimated median annual home range size for the spotted owl by province throughout the range of the spotted owl. On the Olympic Peninsula the home range is based on a 2.7-mile radius circle (14,271 acres) of which the established threshold for the activity center is to have 40 percent of its home range to have at least 5,862 acres of suitable habitat. The Service also uses a 0.7 mile radius circle which delineates the area most heavily used (core area) by spotted owls during the nesting season. Within the core area at least 500 acres of suitable habitat should be present.

From the Olympic Demography Study two activity centers which have been surveyed annually have their 2.7-mile home range overlap within the ONF Dosewallips project area. However surveys for the spotted owl specific to the project area were not conducted to determine occupancy.

The first and closest to the project area, designated #160, has been surveyed for the last nine years. Records indicate the last occupancy of either a single bird or pair was in 2000. The last year a pair of owls was confirmed at this site was 1995, no birds have been located in the last six years (Olympic Demography Study 2005). The activity center's core area is not within the project area boundary. This activity center has 5,888 acres of suitable habitat (nesting, roosting, foraging) within its home range. This activity center is currently considered to be at above the habitat threshold.

The second activity center, a site designated as #24, also has its 2.7-mile home range within the project area, and its core area is about 1.25 miles from the project area boundary. The activity center has been surveyed for about 17 years. The last detection of a northern spotted owl from this activity center was in 1995, with no birds being found

during the last five survey seasons (Olympic Demography Study 2005). This activity center has 5,502 acres of suitable habitat (nesting, roosting, foraging) within its home range. The established threshold for an activity center with 40 percent of its home range is to have 5,862 acres of suitable habitat. This activity center is currently considered below the habitat threshold by 360 acres.

The ONP's Dosewallips area is suitable habitat for northern spotted owls, and there is an owl site located approximately 0.5 mile away from the Dosewallips Falls project site near the ranger station.

Designated Critical Habitat for Northern Spotted Owl

Status

As required by the Endangered Species Act the U.S. Fish and Wildlife Service has designated critical habitat for the northern spotted owl. Critical habitat for the spotted owl was designated on January 15, 1992 (U.S. Fish and Wildlife Service, 1992a) on National Forest System lands outside congressionally designated wilderness. In June 2007 the U.S. Fish and Wildlife Service issued a proposal to revise the existing designation of critical habitat for the northern spotted owl (USFWS 2007). The conservation principles in developing critical habitat are to: develop and maintain large contiguous blocks of habitat to support multiple reproducing pairs of owls, minimize fragmentation and edge effect to improve habitat quality, minimize distance to facilitate dispersal among blocks of breeding habitat, and to maintain range-wide distribution of habitat to facilitate recovery (Thomas et al. 1990). Critical habitat are lands needed for the eventual recovery and delisting of a species. Critical habitat will not in itself lead to the recovery of the species but is one of several measures available to contribute to species conservation (CFR, Vol 157, no. 10).

Suitable spotted owl habitat include older forests characterized by a multi-layered canopy dominated by large overstory trees; moderate to high canopy closure; a high incidence of trees with large cavities and other types of deformities; numerous large snags; an abundance of large, dead wood on the ground; and open space within and below the upper canopy for owls to fly (Thomas et al., 1990; U.S. Fish and Wildlife Service, 1990a). On the Olympic Peninsula, tree species used in nesting include western hemlock, Douglas-fir, western red cedar, Pacific silver fir, and grand fir; with 78 percent of nests found in live trees and 22 percent in snags (side or top cavities more often used in the eastern side of the Olympic Peninsula (Forsman and Giese 1997). Foraging habitat varies across the range of the owl and contains attributes similar to nesting and roosting habitat, but may also include more open fragmented habitat. The northern flying squirrel and bushy tailed woodrat are usually the predominant prey.

Project Area

The ONF Dosewallips washout project area and vicinity are within designated Critical Habitat Unit (CHU) WA-49. The CHU is 69,207 acres in size of which 25,579 acres (37 percent) are suitable habitat and 20,822 acres (30 percent) is in dispersal habitat. Eighty percent of the CHU is within Late-Successional Reserve. If the proposed revision of critical habitat becomes final, the project area still would be within designated critical habitat.

CHU WA-49 is primarily located in the Dungeness/Graywolf /Quilcene watersheds to the north of the Dosewallips watershed. The Tunnel Creek and Rocky Brook drainages connect the CHU to the Dosewallips watershed. The CHU runs along the Dosewallips River until it meets the national park. The 'cherry stem' of the CHU that is bound by Olympic National Park and adjacent wilderness is the location of the project area. The wilderness and Olympic National Park are not included in designation of critical habitat for the species since they considered as protected contributor ownerships for the long-term recovery of the species.

Forest Service Sensitive Species and Other Rare or Uncommon Species

Species identified by the USFWS as "candidates" for listing under the ESA and meeting the Forest Service criteria for protection are included on the Regional Forester's Sensitive Species Lists. Sensitive Species are those given special management considerations to ensure their continued viability on National Forest lands.

There are 16 animal species found on the Olympic National Forest that are included in the Region's "Special Status/Sensitive Species Program" or are considered as other rare or uncommon species that are known or suspected to occur on the Olympic National Forest (Table 14). Based on a review of habitats and species sightings 12 species have the potential to occur in the Dosewallips washout project area. These species include one bird, two mammals, three amphibians and six mollusk species and are discussed below. Four species are not likely to occur in the project area because their habitats are not present. These include the peregrine falcon (which needs cliffs or rock outcrops for nesting habitat), the common loon (which nests and forages on inland lakes), the Mazama pocket gopher (Olympic) (which occurs in open vegetation habitats such as lowland prairies and high elevation meadows), and one terrestrial mollusk species the Hoko vertigo snail (range is only in northwest Clallam County).

Table 14: ONF Sensitive (S) and other rare or uncommon wildlife species (RU)

Common Name	Scientific Name	Status	Habitat Present In Project Area	Documented Sightings
Terrestrial Mollusks				
Puget Oregonian (snail)	*Cryptomastix devia*	S	yes	no
Burrington's Jumping Slug	*Hemphillia burringtoni*	S	yes	no
Warty Jumping Slug	*Hemphillia glandulosa*	S	yes	yes
Malone's Jumping Slug	*Hemphillia malonei*	S	yes	no
Blue-gray Taildropper Slug	*Prophysaon coeruleum*	S	yes	no
Hoko Vertigo (snail)	*Vertigo n. sp.*	S	no	no
Evening field slug	*Deroceras hesperium*	RU	yes	no
Amphibians				
Van Dyke's Salamander	*Plethodon vandykei*	S	yes	no
Cope's Giant Salamander	*Dicamptodon copei*	S	yes	no
Olympic Torrent Salamander	*Rhyacotriton olympicus*	S	yes	in watershed
Mammals				
Townsend's Big-Eared Bat	*Corynorhinus townsendii*	S	yes	no
Pacific Fisher	*Martes pennanti*	S	yes	no, extirpated*
Mazama Pocket Gopher, Olympic	*Thomomys mazama melanops*	S	no	no
Birds				
Bald Eagle	*Haliaeetus leucocephalus*	S	yes	yes
Common Loon	*Gavia immer*	S	no	no
American Peregrine Falcon	*Falco peregrinus anatum*	S	no	no

*extirpated = historic populations are gone

Terrestrial Mollusks

Status

The warty jumping slug has Sensitive status. The Burrington jumping slug changed status in the 2002 Annual Species review and no longer requires pre-disturbance surveys.

Project Area

Of the seven terrestrial mollusk species listed in Table 14, five are Sensitive species and have habitat in the project area. For the sixth sensitive species, the Hoko vertigo snail, the Dosewallips road washout project is outside the range of the snail. Therefore, the Hoko vertigo is not included in this analysis.

The six species for analysis include: the Puget Oregonian snail; the Burrington, warty and Malone jumping slugs; the blue-gray taildropper slug, and the evening field slug. Habitat

for these six mollusk species include moist coniferous and hardwood forests of varying ages, with down wood, ground cover of low vegetation, shrubs, litter and debris that provide cool, moist microhabitats.

The Puget Oregonian snail is associated with hardwood shrubs and trees, including big leaf maples (*Acer macrophyllum*) and vine maple (Acer circinatum). Although one shell of the Puget Oregonian was found on the southern part of the Hood Canal District, no live animals have been discovered to date. The warty and Burrington jumping slugs may be found in a range of moist forest conditions, including coniferous and hardwood forests, from young forest stands to late-seral conditions as found in the Dosewallips project area. Both of these slugs have been found in other areas on the Forest.

Habitat for the Malone jumping slug also occurs in moist coniferous and hardwood forests, especially where dense sword fern, conifer logs, coarse wood debris, and large decaying stumps are present. The evening field slug is reported to be associated with wet meadows in forested habitats and moist surface vegetation within close proximity to perennial wetlands, spring, seeps, and riparian areas. There are no documented locations of the Malone or evening slugs on the Forest.

Mollusk surveys were completed in the Dosewallips washout project area in the spring of 2002 and the fall of 2004, according to the 2003 survey protocol (Duncan et al. 2003). No rare or uncommon mollusk species were found. One location of the Sensitive warty jumping slug was reported 200 feet away from proposed road construction routes in all of the action alternatives.

Amphibians

Van Dyke's Salamander (*Plethodon vandykei*)

Status

In addition to listing as a Sensitive Species under the Regional Forester's Sensitive Species Program the Van Dyke's salamander is a state species of concern in Washington state (WNHP 2004), and is ranked by the Washington Natural Heritage Information System as G3 (very rare or local globally) and S3 (rare or uncommon in Washington State).

Project Area

Amphibian surveys have been sporadic on the Olympic National Forest, sometimes done in conjunction with stream or fish surveys and sometimes as a specific effort. However nothing systematic has been implemented for Van Dyke's salamander. Surveys were not conducted in the Dosewallips project area. There are no mapped sightings for Van Dyke's salamander in or near the project area, however habitat does exists along many of the numerous streams within the project area.

Cope's Giant Salamander (*Dicamptodon copei*)

Status

In addition to listing as a Sensitive Species under the Regional Forester's Sensitive Species Program the Cope's giant salamander is a state species of concern in Washington State (WNHP 2004) and is ranked by the Washington Natural Heritage Information

System as G3.

Project Area
There are no known sightings of Cope's giant salamander in or near the Dosewallips project area. Surveys were not completed for the project area, however habitat for the species is within the project area.

Olympic Torrent Salamander (*Rhyacotriton olympicus*)
Status
In addition to listing as a Sensitive Species under the Regional Forester's Sensitive Species Program the Olympic torrent salamander is a federal Species of Concern under the Endangered Species Act (WNHP 2004), and designated G3 and S3 by the Washington Natural Heritage Information System as G3G4 (intermediate between rare or local and apparently secure globally) and S3S4 (intermediate between rare or uncommon and apparently secure in Washington State).

Project Area
Information on specific locations of the Olympic torrent salamander on the Olympic National Forest is limited. The streams and riparian forests of the project area provide suitable habitat for this species. There are three known sightings of Olympic torrent salamander in the middle and upper Dosewallips watershed. The sites are in three different tributaries of the Dosewallips River within 0.5 mile of the project area, two of them in the national park and one over a mile downstream of the washout. Surveys to locate the Olympic torrent salamander specific to the project area were not conducted and it is assumed that the species is present in the project area due to habitat availability.

Mammals
Townsend's Big-eared Bat (*Corynorhinus townsendii*)
Project Area
This species uses caves and human-made structures, including bridges, for hibernacula and roost sites. Individuals will also roost in cavities or areas beneath sloughing bark in large trees. There are no known sightings of Townsend's big-eared bats in the watershed. In 2005 a bridge over the Dosewallips River less than one mile upstream from the project area was surveyed for day and night roosting bats. No bats were detected at this bridge. There are no other human structures or caves suitable for bat roosting or hibernacula in the area. However the forests in and surrounding the project area contain large trees and snags suitable for bat roosting. Tree-roosting bats could potentially occur in the project area.

Pacific Fisher (*Martes pennanti*)
Status
The species was listed as a state endangered species in 1998 and was added to the list of federal candidate species in April 2004. The species is not listed as endangered or threatened by the US Fish and Wildlife Service, therefore the fisher does not receive federal protection. In 2005 a feasibility assessment based on availability of suitable habitat and habitat connectivity for reintroducing fishers to Washington, including the Olympic Peninsula, was completed by the Washington Department of Fish and Wildlife.

No known populations of fishers exist in Washington and it is thought that the species is extirpated from the state (WDFW 2005). The Washington Department of Fish and Wildlife and Olympic National Park recently complete work on an environmental analysis on the reintroduction of fisher to the Olympic Peninsula, and reintroductions of fisher have occurred in the park. While the Dosewallips watershed does contain suitable habitat in the upper reaches of the drainage including the surrounding forested lands amongst the project area, reintroduction locations do not include the Dosewallips watershed as a candidate release area.

Project Area

The project area with its greater proportion of older seral stage forested stands, lower elevation, and adjacency to the park provide habitat for the fisher. However the 2004 WDFW feasibility report identifies the western, northern, and southwest portion of Olympic National Park as having higher quality of habitat for the species. The analysis area does provide the opportunity for fisher to forage, but not the resting and denning habitat which is limited in managed forests. The adjacent Olympic National Park provides ideal landscape characteristics that could support a fisher population.

Birds

Bald Eagle (*Haliaeetus leucocephalus*)

Status

The bald eagle was listed in 1978 as a threatened species under the Endangered Species Act (USFWS 1978) but was removed from the list on August 8, 2007 (USFWS 2007). The bald eagle was added to the Regional Forester's Sensitive Species List after delisting as a threatened species. The bald eagle is also designated as a Management Indicator Species in the Olympic National Forest Land and Resource Management Plan (LRMP) (USDA 1990a). The US Fish and Wildlife Service is recommending monitoring the status of the bald eagle for twenty years after delisting (USFWS 2007).

Project Area

Suitable bald eagle nesting and winter roosting habitat exists in the Dosewallips watershed. Reports from various incidental sightings, mid-winter bald eagle surveys in the 1990's, and winter surveys conducted in 2004 and 2005 have confirmed bald eagle occurrence in the watershed. It is reasonable to assume that eagles use the Dosewallips drainage for night roosting, diurnal perching, and foraging. During winter bald eagle surveys in 2004 and 2005, eagles were observed in the early-morning (before light), indicating night roosting in the watershed. Bald eagles have also been observed near the mouth of the Dosewallips. According to the Washington State priority species database the nearest bald eagle nests are located along Hood Canal, 0.7 mile south and 1.8 miles north of the mouth of the Dosewallips River. However, no known bald eagle nesting territories are located in the main Dosewallips watershed. The watershed analysis (USDA 1999) explains eagles were more commonly seen in estuaries or the lower part of the watershed. Past surveys conducted up the Dosewallips found no nests despite the presence of suitable nesting habitat (USDA 1999, S. Ament, pers. comm. 2006).

The ONF Dosewallips washout project area contains suitable bald eagle habitat. Bald eagles use the washout project area for perching and may use the area for night roosting.

Suitable nest, roost, and perch trees occur in the project area. Eagles were observed close to the washout at River Mile 10 and 11 during winter eagle surveys in January 2004 and 2005. However, there is no confirmation of nests or communal roost sites in the project area despite eagle surveys and field reconnaissance. An aerial survey up the Dosewallips River to the washout project area by the Washington Department of Fish and Wildlife in December 2005 found no bald eagles or nests other than near the river mouth.

The ONF Dosewallips washout project is in a Bald Eagle Management Area (BEMA-200) designated in the Olympic National Forest LRMP (USDA 1990a, page IV-92-94). The goal of a BEMA is to provide sufficient habitat for nesting and wintering bald eagles so as to expedite their removal from the Federal and State threatened or endangered species lists. To achieve this goal a BEMA should contain at least two uneven-aged forest stands a minimum of 32 acres in size each (total of 64 acres). The Dosewallips BEMA is 105 acres in size of which about 55 acres are late-successional forest. About 16 acres consist of non-forest and riparian habitats along the river. The remaining 34 acres in the BEMA are early- or mid-successional forests that have been disturbed by humans or fire. About two acres in northwest corner of the BEMA were salvage logged about 35 years ago. Several dispersed campsites occur along the Dosewallips River in the southern portion of the BEMA.

Olympic National Forest Management Indicator Species

Regulations pursuant to the National Forest Management Act of 1976 require each National Forest to identify "management indicator species" (MIS) to focus management attention on a species, species group, or habitat element to improve resource production, population recovery, maintenance of population viability, or ecosystem diversity. MIS are either selected species whose welfare is believed to be an indicator of the welfare of other species using the same habitat or species whose condition can be used to assess the impacts of management actions on a particular area (Thomas 1979). Table 15 includes those species that were identified as MIS for the Olympic National Forest (USDA 1990a).

Indicator Species represent an association of animals that respond to the same set of structural habitat components. It is assumed that management which maintains or enhances the habitat of the indicator species would likewise maintain or enhance that of its association. Two MIS, the bald eagle and northern spotted owl, were previously addressed. The bald eagle is Sensitive to management in riparian areas. The northern spotted owl represents wildlife species associated with mature and older coniferous forests. The other three MIS are addressed below.

Table 15: ONF Management Indicator Species (MIS)

Management Indicator Species or Species Group	Habitat of Association	Habitat Present in Project Area
Bald Eagle	Mature forest	yes
Northern Spotted Owl	Old growth/Mature forest	yes
Columbian Black-tailed Deer/ Roosevelt Elk	Balance of cover and forage; amount of vehicle disturbance	yes
Pileated Woodpecker/ Pine Martin	Mature coniferous forest	yes
Primary Cavity Excavators	Dead and dying trees, down wood	yes

Columbian Black-tailed Deer (*Odocoileus hemionus columbianus) and* Roosevelt Elk *(Cervus canadensis roosevelti)*

Status

Columbian Black-tailed deer and Roosevelt Elk are management indicator species needing a balance of cover areas and forage openings dispersed throughout their range.

Project Area

The late-successional forests in the Dosewallips washout project area serve as optimal cover, having understory and overstory components which provide forage and snow-intercepting cover. The Dosewallips watershed contains 35,760 acres (50 percent) of forests over 200 years (USDA 1999) which is a good estimate of optimal thermal cover. However much of this is located in Olympic National Park on summer range. About 7,000 acres are on the National Forest.

Columbian black-tailed deer occur throughout the Dosewallips watershed. A small herd of Roosevelt elk resides in the lower watershed. Forty-one elk were counted in the lower watershed during an aerial survey conducted by the WDFW in December 2005. In the winter the herd ranges from the mouth of the Dosewallips up the river about six miles (USDA 1999). In the summer a portion of the herd migrates up the drainage, passing through the project area to the national park while a portion remains in the lower Dosewallips all year.

The Olympic National Forest LRMP requires that twenty percent of the area necessary for winter survival should be managed as optimal cover. Winter range is typically defined as lands less than 1500 feet elevation (USDA 1990a). By this definition the project area is in winter range. However it appears that the Dosewallips elk herd winters lower in the watershed and that the project area primarily serves as a migration area between winter and summer ranges.

Deer and elk are also indicators of vehicular harassment to wildlife populations. The Washington State Department of Fish and Wildlife (1991) recommends that road densities are kept below 1.5 miles per square mile in summer range and below 1.0 mile

per square mile in winter range. Olympic National Forest LRMP states that roads should be managed to reduce wildlife disturbance. The road density is lowest in the middle and upper watershed and highest in the lower watershed. The road density in the Dosewallips watershed is about 0.7 mile per square mile. The road density in the middle Dosewallips subwatershed where the washout project is located is currently about 0.5 mile per square mile (USDA 1999). There are no open roads in the upper Dosewallips.

Pileated Woodpecker (*Dryocopus pileatus*) and Pine Marten (*Martes americana*)

Status

The pileated woodpecker and pine marten are MIS for mature and old growth forest conditions. The marten is classified as a furbearer in Washington and appears to be rare on the Olympic Peninsula. Surveys conducted by the national park for marten from 2000 to 2002 failed to detect marten (P. Happe, Olympic NP, pers. comm.).

Project Area

The majority of the forests present in the upper Dosewallips watershed in the vicinity of the project area provide suitable habitat for pileated woodpeckers, pine marten, and the species association they represent. Signs of pileated (e.g., excavations) are present in the project area where large diameter trees are available for foraging, roosting, and denning. Recently there has been an unconfirmed sighting of a marten in the Dosewallips watershed. Within the project area the high amount of downed wood and standing dead trees would provide suitable habitat for the species, although the species is typically found at higher elevations.

Primary Cavity Excavators

Status

This MIS group represents a broad group of species associated with standing dead or partially dead trees or snags and down logs, who excavate their own nests, hence the name “primary cavity excavator” (Table 16).

Table 16: Primary cavity excavators

Primary Cavity Excavator Species Group	Habitat of Association	Habitat Present in Project Area	Presence in Watershed
Red-breasted Sapsucker	snags	yes	documented
Downy Woodpecker	snags, dead parts of live trees, down wood	yes	documented
Hairy Woodpecker	snags, dead parts of live trees, down wood	yes	documented
Three-toed Woodpecker	snags, down wood	yes	documented
Northern Flicker	snags, hollow living trees, dead parts of live trees, tree cavities	yes	documented
Pileated Woodpecker	snags, hollow living trees, dead parts of live trees, down wood	yes	documented
Black-capped Chickadee	snags, dead parts of live trees, tree cavities, down wood	yes	documented
Mountain Chickadee	snags	yes	documented
Chestnut-backed Chickadee	snags, dead parts of live trees, tree cavities	yes	documented
Red-breasted Nuthatch	snags, dead parts of live trees, tree cavities, bark	yes	documented
Northern Flying Squirrel	snags, hollow living trees, dead parts of live trees, tree cavities, down wood	yes	documented

Source: DecAID (Mellen et al. 2006). Westside Lowland Conifer-Hardwood Forest, WA Coast Wildlife Habitat Type and Larger Trees Structural Condition Class

Dead wood (standing or down) plays an important role in the overall ecosystem health, soil productivity, and numerous species' habitat. This dead wood habitat is crucial in the continuation of species that depend on snags and logs for all or parts of their life cycle. Bird and mammal species rely on dead wood for dens, nests, resting, roosting, and/or feeding on animals and organisms that use dead wood for all or parts of their life cycle. Snags come in all sizes and go through breakdown and decay processes that change them from standing hard to soft, and then left on the ground to continue decaying into soil nutrients.

Information pertaining to individual or groups of species use of dead wood can be found in the DecAID advisory tool. DecAID is a web-based advisory tool to help managers evaluate the effects of forest conditions and existing or proposed management activities on organisms that use snags and down wood. It is a summary, synthesis, and integration of published scientific literature, research data, wildlife databases, forest inventory plot information, and expert judgment and experiences. Information regarding species habitat associations with dead wood in the project area were provided from references and information provided in DecAID.

Project Area

The Dosewallips watershed and project area provides foraging, roosting, and nesting habitat for the majority of these species. At the 5th field watershed scale the landscape is dominated by stands greater than 80 years of age (53% of watershed) (USDA 1999), and assuming that much of those forested stands have not had stand manipulation (e.g., timber harvest which would have removed dead wood) the amount of standing dead and downed wood would have the density and distribution of varying size classes within the desired range. The remaining 47 percent of the watershed is non-forested or forest less than 80 years old and likely do not contain the dead wood abundance and distribution of size classes that would be at normal stand levels. Overall the watershed provides a high amount of dead wood for wildlife species dependent on such structure.

The project area contains high quality and quantity of standing dead and down wood, especially in the large diameter size classes which functions as habitat for a greater amount of wildlife species than those of smaller diameter. Many of the primary cavity excavators listed previously are using the project area during some part of their seasonal needs.

Federal Species of Concern

The following species were listed as Species of Concern (USDI 1993), a category defined as those species that might be in need of conservation action (Table 17). These actions may include periodic monitoring of populations and threats as well as possible listing as threatened or endangered. There is no legal protection for Species of Concern and the term does not necessarily mean they will be listed. Many of these Species of Concern have been surveyed for on the Olympic National Forest, either by the Forest Service PNW Research Station, Olympic National Forest, or university researchers.

Table 17: USFWS species of concern

Common Name	Scientific Name	Other Designations	Habitat Present In Project Area	Documented Sightings
Cascades Frog	*Rana cascadae*	State Monitor	no	no
Long-eared Myotis	*Myotis evotis*	State Monitor	no	no
Long-legged Myotis	*Myotis volans*	State Monitor	no	no
Makah's Copper Butterfly	*Lycaena mariposa charlottensis*	State Candidate	no	no
Northern Goshawk	*Accipiter gentilis*	State Candidate	yes	in watershed
Olive-sided Flycatcher	*Contopus cooperi*		yes	in watershed
Tailed Frog	*Ascaphus truei*		yes	yes
Western Toad	*Bufo boreas*	State Candidate	yes	no

The Cascades frog and the two *myotis* bat species are likely not present in the project area

because they occur in higher elevation habitats. Suitable habitat for the Makah's Copper Butterfly (open wetlands and prairies) also does not occur in the project area.

Northern Goshawk (*Accipiter gentilis*)

Status

The northern goshawk uses mid- to large-diameter trees for nesting and perching and requires an open flight corridor beneath the canopy to be successful in searching for food and capturing prey. Suitable nesting habitat for the northern goshawk includes mature or old coniferous forest with relatively closed canopies and multiple canopy layers. Finn et al. (2002a, b) found a higher occupancy rate on the Olympic Peninsula when shrub cover was relatively low in the stand. In a study on the Olympic Peninsula by Bloxton (2002) the dominant prey included grouse, pigeons, and Stellar's jay, with the important mammals fed upon including snowshoe hare, Douglas squirrel, and northern flying squirrel.

Project Area

Suitable goshawk habitat occurs in the Dosewallips washout project area and the species has been documented in the watershed One goshawk nest site has been found in the middle Dosewallips subwatershed about one mile from the project area (Washington State Department of Wildlife database). Goshawks have also been documented in the upper Dosewallips subwatershed in Olympic National Park. Although surveys have not been conducted in the project area it is likely that goshawks occupy the area.

Olive-sided Flycatcher (*Contopus borealis*)

Status

The olive-sided flycatcher is a long-distance, neotropical migrant that breeds throughout coniferous forest in western Washington and Oregon. Preferred habitat consists of mid- to high-elevation montane and coniferous forests, often associated with forest openings and edges. Optimal habitat for the species is natural or man-made edges and forest openings (e.g., timber harvest units, post-fire habitat, natural edges of bodies of water, or old growth forest with extensive areas of broken canopy) where tall trees and snags are present for singing and foraging perches. Various diameters of hemlock and either Pacific silver or noble firs are preferred nest trees. This species is considered the only bird species positively associated to edge habitats, landscape heterogeneity, and juxtaposition of early and late-seral habitats (Hagar et al. 1995). Presence in early successional forests appears to depend on availability of snags or live trees that provide suitable foraging and singing perches.

Project Area

Suitable habitat for the olive-sided flycatcher does exist in the project area. Olive-sided flycatchers have been observed in the watershed and could occur in the project area. Habitat for the olive-sided flycatcher could be present along the Dosewallips drainage that provides a mixture of deciduous forest and late-seral habitat.

Tailed Frog

Status

Suitable habitat for the tailed frog consists of fast cold streams with cobble or boulder

substrates at sea-level to high elevation. They can also be found along stream banks and in riparian forests. Tailed frog is vulnerable to management practices that alter the riparian or aquatic zones of streams, especially those that change the moisture regime, increase stream temperature, increase sediment load, reduce woody debris input, and change bank integrity (WA DNR 2007). Protection of the upper reaches of streams is particularly important for this species.

Project
The streams and riparian forests of the project area provide suitable habitat for this species. This species was found in the project area (one individual) on August 22, 2004.

Western Toad

Status
The western toad typically occurs in ponds and shallow lakes but also can be found near streams during dry periods. Threats to western toad include vulnerability to road traffic during adult movements to and from breeding sites in the spring and dispersal of newly metamorphosed toads away from the breeding sites in the summer and fall (WA DNR 2007). Breeding waters for western toads is usually permanent and includes wetlands, ponds, lakes, and still water off-channel habitats of rivers. Breeding sites appear to be vulnerable to successional changes in vegetation.

Project
Based on existing habitat this species could potentially occur in the project area, but there are no known sightings in the area. Western toads would likely use the wetlands in the project area.

Migratory Birds (Forest Landbirds)

Status
Executive Order (EO) 13186 signed by the President on January 10, 2001, defined the responsibility of federal agencies to protect migratory birds and their habitats. The intent of the EO was to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through consideration in land use decisions and collaboration with the US Fish and Wildlife Service (FWS). Pursuant to EO 13186 the Forest Service entered into a Memorandum of Understanding with the FWS in January 2001 with the express purpose of incorporating migratory bird habitat and population management objectives and recommendations into the agency planning processes.

The Olympic National Forest falls within the Northern Pacific Rainforest delineation of Bird Conservation Regions (BCR) identified by the North American Bird Conservation Initiative (Partners in Flight 1998). The coastal rainforest conservation region stretches from the western Gulf of Alaska south through British Columbia and the Pacific Northwest to northern California. Heavy precipitation and mild temperatures characterize its maritime climate. Forests of western hemlock and Sitka spruce in the far north dominate the region, with balsam fir, Douglas-fir, and coast redwood becoming more important farther south. Broadleaf forests are found along large mainland river drainages. High priority breeding forest birds include the northern spotted owl (*Strix*

occidentalis caurina), marbled murrelet (*Brachyramphus marmoratus*), northern goshawk (*Accipiter gentiles*), chestnut-backed chickadee (*Parus rufescens*), red-breasted sapsucker (*Sphyrapicus rubber*), and hermit warbler (*Dendroica occidentalis*). The Dosewallips project area provides habitat for these species.

Many neotropical migratory birds which migrate long distances between breeding grounds in North America and wintering grounds in Latin America are experiencing population declines in Pacific northwest forests. While many of these species occur in coniferous forest, some, such as the willow flycatcher (*Empidonax traillii*), Hammond's flycatcher (*Empidonax hammondii*), Swainson's thrush (*Catharus ustulatus*), and warbling vireo (*Vireo gilvus*), are particularly associated with hardwoods or riparian areas. Some species are associated with tall trees while others occur more in understory shrubs or in early seral habitats. In coniferous forests of Western Oregon and Washington 27 species have experienced significant recent declines (1980-1996) or long-term (1966-1996) declining trends based on Breeding Bird Surveys, while 12 species have seen significantly increased population trends (Link and Sauer 1997). The reasons for the decline vary with species. Past intensive forest management practices may have led to declines due to the loss of older forest habitats. However forest management may have led to the increase of some species due to the increase in a variety of forest seral stages across the landscape. For many species the reason behind the decline is unknown.

Hardwood stands are of particular importance as a key habitat for breeding neotropical (and winter resident) songbirds.

Project Area

Hardwood stands and mixed hardwood/conifer stands are present along the Dosewallips River. Although there have been no surveys done specifically for forest landbirds in the project area several species are likely to occupy the project area including the golden-crowned kinglet (*Regulus satrapa*), Hutton's vireo (*Vireo huttoni*), and brown creeper (*Certhia americana*).

Washington State Species of Concern (ONP)

Washington Department of Fish and Wildlife Species of Concern list includes those species listed as State Endangered, State Threatened, State Sensitive, or State Candidate, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service. Olympic National Park addresses Washington State listed species in their environmental analyses for proposed projects (Table 18).

Table 18: Washington State species of concern

Common Name	Scientific Name	Other Designations	Habitat Present In Project Area	Documented Sightings
Vaux's Swift	*Chaetura vauxi*	None	yes	no
Keen's Myotis	*Myotis keenii*	None	yes	no

Vaux's Swift

Status

Vaux's swift, a small, short-tailed swift, does not perch, rather they cling to vertical surfaces at nest and roost sites. They roost communally in cavities of hollow trees (usually broken top with vertical entrance) in old growth forests.

Project Area

The project area and surrounding forested environment contains habitat for the Vaux's swift.

Keen's Myotis

Status

Little information is known about this rarely encountered bat of the Olympic Peninsula and British Columbia pacific coast and its current population status or behavior. The species is believed to inhabit dense coniferous forests apparently roosting in tree cavities, rock crevices, and small caves (which it shares with the little brown bat). The insectivore hunts the forest edges and in openings and over ponds. Surveys for the species have been conducted on the Olympic Peninsula with minimal captures.

Project Area

Without specific information on habitat preferences by Keen's myotis it is assumed the project area has the habitat components that the species would use.

Environmental Consequences

Olympic National Park

Terrestrial species and their habitat are evaluated using the following impact intensities.

Wildlife Impact Intensity Descriptions

The thresholds of change for the intensity of an impact to wildlife are defined as follows:

Impact Intensity	Intensity Description
Negligible	There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.
Minor	Impacts would be detectable, short-term, and they would not be expected to be outside the natural range of variability of native species' populations, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Impacts on native

	species, their habitats, or the natural processes sustaining them would be detectable, short-term, and they could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, long-term, and they would be expected to be outside the natural range of variability. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Impacts would be considered short-term if the wildlife recovered in less than one year. Impacts would be considered long-term if wildlife recovery takes more than one year.

T&E Species Impact Intensity Descriptions

The thresholds of change for the intensity of an impact to threatened and endangered wildlife are defined as follows:

Impact Intensity	Intensity Description
Negligible	The action could result in a change to a population or individuals of a species, but the change would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to a USFWS determination of "may affect, not likely to adversely affect."
Minor	The action could result in a change to a population or individuals of a species. The change would be measurable, but small and localized and not outside the range of natural variability. Mitigation measures, if needed, would be simple and successful. This impact intensity equates to a USFWS determination of "may affect, not likely to adversely affect."
Moderate	Impacts on special-status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present; animals are present during particularly vulnerable life stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit, or conservation zone. Mitigation measures would be extensive and likely successful. This impact intensity equates to a USFWS determination of "may affect, likely to adversely affect."
Major	The action would result in a noticeable effect to viability of the population or individuals of a species. Impacts on special-status species of the natural processes sustaining them would be detectable, both in and outside of the park. Loss of habitat might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed. The impact intensity equates to a USFWS determination of

	"may affect, likely to jeopardize the continued existence of a species."

Impacts would be considered short-term if the species recovered in less than one year. Impacts would be considered long-term if the species takes more than one year to recover.

Alternative A - No Action

Direct/Indirect Effects

Olympic National Forest

Under this alternative no maintenance would occur on the surfaced road, campgrounds or other facilities on the National Forest or National Park land above the washout. Upstream of the washout 5 miles of road (estimated at 15 acres using the 25-foot road width) and campground areas (14 acres) would eventually fill in with vegetation. There would be no immediate effect or change on the wildlife habitats although through time the riparian hardwood and coniferous forest habitats would continue going through natural succession that would provide better habitat conditions for wildlife in the watershed. Through succession these areas would become forage for deer and elk (low vegetation), then hiding cover (shrubs and smaller trees), and eventually older forest habitats. Once conifers are established on the 29 acres of road and campground areas these areas would in the long-term become suitable for northern spotted owl, marbled murrelet, bald eagle, pileated woodpecker, cavity nesters, tree-roosting bats, terrestrial mollusks, and numerous other species that occur in older forests. Over time there would be the development of constituent elements of critical habitat for both the marbled murrelet and northern spotted owl.

There would be no increase in vehicular disturbance under this alternative. Human use of the road would continue as non-motorized. There is an expectation that non-motorized use would be at higher densities during the spring through fall which follows the typical recreational use season. The road density in the middle Dosewallips subwatershed would remain at 0.5 mi/mi² (prior to the washout the density was at 0.6 mi/mi²) and in the upper Dosewallips subwatershed would remain at a road density of 0 mi/mi² (from 0.2 mi/mi² prior to washout), both in the desirable range for wildlife species.

There would be "no impact" to terrestrial Sensitive species, Management Indicator Species, species of concern, migratory birds, or any other terrestrial species.

Preliminary ESA Determinations

The implementation of this alternative would result in "no effect" determinations for the marbled murrelet and northern spotted owl. The alternative would have "no effect" determinations for designated Critical Habitat for the marbled murrelet and northern spotted owl. Coordination with US Fish and Wildlife Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Olympic National Park

Washington State Species of Concern
No direct or indirect impacts.

Cumulative Effects

Past activities that removed late-successional forest habitat in the Dosewallips watershed include fire, timber harvest, road construction, and the development of Elkhorn Campground and national park facilities. A total of 10,838 acres of regeneration timber harvest has occurred in the Dosewallips watershed on all ownerships since the 1920's. Seven fires, totaling 19,700 acres, burned in the watershed since the 1800's. These areas of fire and timber harvest are now mid-successional forest, about 20 to 135 years old. According to the watershed analysis (USDA 1999) the amount of late successional forest (forests over 200 years) remaining in the watershed is 35,760 acres (50 percent). The amount of lower elevation late-successional forests which provide marbled murrelet and spotted owl habitat is 22,586 acres (29 percent of watershed). This alternative would not add to the aggregated effects since there would be no removal of late-successional habitat in the National Forest. No thresholds (such as elk cover) would be exceeded.

Future timber harvest activities include the proposed Jackson thinning on National Forest land composed of 70 to100+ year old (mid-successional) forest including about 1,000 acres in the Rocky Brook subwatershed. This proposed sale may in the short-term degrade habitat for terrestrial mollusks, cavity nesters, and thermal cover for deer and elk. Alternative A would not add to the aggregated effects of habitat degradation and there will be no cumulative effects.

Present and past activities that disturb wildlife include using and maintaining the road system year round. There are about 116 miles road being used and maintained in the watershed. Alternative A would not add to the aggregated effects of wildlife disturbance by use of roads and campgrounds beyond the washout. The road density in the middle and upper watershed would not change and would still be relatively low, consequently there would be no cumulative negative effects.

If future planning determined that the facilities would be removed from the Dosewallips area there could be future minor to moderate adverse impacts related to the demolition and removal of the facilities and the decommissioning of the roadway. These adverse impacts relate to the potential use of heavy lift and light helicopters to transport materials and equipment to and from the project site, and noise from equipment use. A follow-up plan would be necessary to identify alternatives and analyze potential effects. Future project work would generally be scheduled to avoid the most sensitive nesting seasons for murrelets and owls, but could still result in temporary, minor adverse impacts, resulting in a may affect, not likely to adversely affect determination if the future project work was carried out during late nesting season. However since no project work would occur under this alternative there would be no cumulative effects.

Changing the base of aerial operations to a location outside of park lands (see Park Operations section) would shift the impacts related to aerial operations (noise and harassment of listed bird species) to additional areas above private and Forest Service lands, including potential habitat for northern spotted owls and marbled murrelets. There are approximately four missions a year to transport trail maintenance supplies (spring and fall), manage the backcountry privy at Mt. Constance (fall), and for search and rescue operations. Normally the trail maintenance activities and privy management are scheduled outside the breeding season for nesting birds, reducing the potential adverse effects to these species. Search and rescue operations can occur anytime and could result in moderate impacts from harassment if the flights occur during breeding season. These require emergency consultations with USFWS. These periodic park flight operations could result in minor to moderate (depending on the flight schedule) adverse impacts to murrelets and owls because the flight lines would be longer if the landing zone would be outside the park versus the location at Dosewallips. Since the No Action alternative would not result in any project work and there would be no adverse impacts, there would be no cumulative effects to listed bird species.

There would be no impairment to this resource since there would be "no effects" to listed species as a result of the No Action alternative and since there would be no effect to general wildlife there would be no impairment to this resource.

Wildlife habitat has been removed or modified in the Dosewallips by the construction of the roads and facilities. Construction in the area has been minimal and the facilities and road have been in place for years. Since this is a relatively low use and more primitive developed area the roads and facilities do not preclude the use and occupancy of most wildlife. Future activities if the road remains closed could benefit wildlife habitat through restoration. Since there would be no action and no construction under this alternative there would be no cumulative negative effects to wildlife. A total of 10.1 miles of road have been closed or decommissioned in the Dosewallips watershed in recent years. Keeping this road closed (5 additional miles) would add to the aggregated positive effects of closing roads.

Summary of Terrestrial Effects - Alternative A

There would be no immediate effect on wildlife habitats, although through time 29 acres of campground and road would fill in with vegetation, go through natural succession and eventually become suitable habitat for many forest wildlife species.

There would be no increase in vehicular disturbance to wildlife under Alternative A. This alternative would provide the greatest benefit and have the least adverse impacts to terrestrial species and habitats. There would be no effect to the federally listed northern spotted owl, marbled murrelet or their critical habitats. There would be no impact to sensitive species, management indicator species, species of concern, or other wildlife species.

Alternative B - Reroute 1 Bench Emphasis

Direct/Indirect Effects

Olympic National Forest

Introduction

Road-associated factors that affect wildlife include snag or downed log reduction; edge effects; avoidance or displacement from an area; habitat loss and fragmentation; creating a movement barrier or a route for competitors or predators; and disturbance at a specific site (Gaines *et al.* 2003). Effects of these factors include reduction in density of snags and downed logs due to their removal along roads; changes to habitat microclimate associated with the edge induced by the road or trail; spatial shifts in populations or individual animals; loss and resulting fragmentation of suitable habitat due to the establishment of roads and trails; the alteration of wildlife dispersal or other movements; a change in the environment that provide access for competitors or predators; and the displacement of individual animals from a specific location being used for reproduction or rearing young. Wildlife affected include ungulates, wide-ranging carnivores, late-successional and riparian-associated species, and cavity excavators.

Road construction results in habitat loss by converting preexisting habitats to road corridors. Some animal species are more vulnerable to habitat loss than others. Species whose habitat is limited to forest interior are particularly vulnerable to declining forest patch sizes, because smaller patches have a larger proportion of edge habitat (or forest edge), which is generally avoided by forest interior species. Removal of forest typically involves an increase in the proportional amount of edge habitat in a landscape. For species that cannot live in forest edge, this results in a disproportional decrease in amount of habitat. Mobility of a species will also dictate the ability to cope with habitat loss. Reduction in habitat quality and quantity from road corridors can influence wildlife species through displacement or avoidance of an area, or through a decrease in abundance or density of breeding (Forman and Sperling et al. 2003).

Under this alternative there would be the permanent removal of about 7.1 acres of late-successional forest habitat from road construction. Additional habitat removal may occur during construction through the removal of dead and dying trees identified as hazardous to workers. One indirect effect of edge is degradation of the adjacent forest habitat by opening up the forest to light and increasing susceptibility to wind-throw along the forest edge. A total of 14.9 acres late-successional forest habitat adjacent to the road would be degraded (amount of habitat within 100 feet of road construction).

Another indirect effect would be the potential for the spread of invasive weed species to encroach into areas currently weed-free, this would impact native plants through competition thereby affecting terrestrial wildlife habitats. The equipment used to construct the road reroute, decommission roads, or haul material could spread seeds of noxious weeds.

Federal Threatened and Endangered Species

Marbled Murrelet and Designated Critical Habitat

Direct effects of this alternative include permanently removing approximately 7.1 acres of late-successional forest habitat by constructing a road. The forest is high quality nesting habitat for the marbled murrelet, containing large trees up to 72 inch (or more) diameter at breast height with large lateral branches that would provide the structure needed for nesting. The nearest known marbled murrelet site to the washout project area is 2.7 miles away. However, without surveys to determine marbled murrelet occupancy the project area is assumed to be occupied. Management Requirements for this alternative require that suitable murrelet habitat be removed outside the breeding season (April 1 through September 15). Therefore there would be no direct mortality or injury of marbled murrelets from the tree-felling. Since marbled murrelets have high nest site fidelity, marbled murrelets occupying the forest stand likely would return and attempt to re-nest in adjacent unoccupied habitat. If unoccupied suitable habitat is not available nesting murrelets would be displaced causing them to expend more energy to locate new nest sites (USDI 1996).

Indirect effects to marbled murrelets include degrading adjacent habitat from creating edge through the forest. Creating edge would also increase the risk of predation since nests near a forest edge are more likely to be subject to predation than nests located in interior forest. This is of particular concern with the marbled murrelet which has high levels of nest site predation by corvid predators. The threat of predation on eggs, chicks, and adult marbled murrelets has increased since the species listing and continues to be a serious threat to the species (McShane *et. at.* 2004). Management Requirements would include clean up of garbage at work sites during the construction period to reduce (but not eliminate) the risk of predation by corvids.

Using equipment, including motorized tools, chainsaws, rock drills, bulldozers, trucks and other heavy equipment during the breeding season from April 1 to September 15 could disturb marbled murrelets nesting in adjacent habitat. The potential disturbance-caused injuries include flushing from the nest, aborted feeding attempts, and postponed feedings (USDI 2003a). Marbled murrelets are particularly vulnerable to disturbance during the early breeding season (April 1 – August 5) when they are producing and incubating eggs. The risk of injury is much less during the late breeding season when adults are only present at the nest when they are feeding the young.

Under this alternative noise generating equipment would be operated during a portion of the early breeding season, from July 15 to August 5 and during the late breeding season, August 6 – September 15. The injury threshold distance for marbled murrelets from operating heavy equipment and motorized tools is 35 yards (USDI 2003a). Operating heavy equipment and motorized tools during a portion of the early breeding season within 35 yards of suitable habitat would adversely impact marbled murrelets. A total of 15.7 acres of suitable habitat would be impacted by noise disturbance (amount of habitat within 35 yards of the proposed road). In addition, the road construction requires a big disposal site to which approximately 1700 dump truck loads of material would be hauled. Potentially occupied marbled murrelet habitat adjacent to the haul route would also be impacted, if hauling occurs during the early breeding season. Impacts from noise would

last three breeding seasons, the duration of the project.

Operating equipment during the late breeding season (August 6 to September 15) would minimize disturbance impacts. Since marbled murrelets typically visit their nests at dawn or dusk, avoiding mechanical equipment work within two hours of sunrise and sunset during the breeding season, as outlined in the Management Requirements, would also reduce (but not eliminate) disturbance impacts. Operating outside of the breeding season would avoid disturbance impacts. As stated previously the tree felling of murrelet habitat for road construction would occur outside the entire breeding season so there would be no direct mortality, injury, or harassment to nesting marbled murrelets from the tree felling.

The road reroute would be constructed in marbled murrelet Critical Habitat Unit WA-06a. This road construction would adversely affect marbled murrelet critical habitat by removing 7.1 acres of forest containing both the constituent elements of critical habitat. Of the 28,640 acres suitable habitat within the CHU the removal of 7.1 acres represents less than 0.01 percent of the total amount of suitable habitat currently available. However, any critical habitat is considered essential to the conservation of the species (USDI 1996) especially in the context of permanent removal of habitat containing high quality constituent elements. The forest stand contains numerous trees (over 200) with potential nesting platforms which is one constituent element of critical habitat. The second constituent element is forest surrounding (within 0.5 mile of) suitable nesting trees with a canopy height of at least one-half the potential tree height. The canopy height of the forest stand is well over one-half the potential tree height, about 100 feet. This issue is further addressed in the Preliminary ESA Determinations section of this document.

Preliminary ESA Determinations

Under this alternative the proposed activities "may affect, and is likely to adversely affect" the marbled murrelet due to the permanent removal of 7.1 acres suitable habitat and to harassment from noise generating activities during the early breeding season. There would not be direct mortality or injury to nesting marbled murrelets from tree-felling. This alternative would also result in a "may affect, likely to adversely affect" determination for designated Critical Habitat Unit WA-06a because of the permanent removal of primary constituent elements. Coordination with US Fish and Wildlife Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Northern Spotted Owl and Designated Critical Habitat

Direct effects of the road reroute construction include permanently removing up to approximately 7.1 acres of late-successional forest habitat which is considered suitable (nesting, roosting, and foraging) habitat for the northern spotted owl. The forest stand represents good-quality habitat for this species, containing contiguous mature and old growth forest the spotted owl utilizes as habitat (large diameter standing live and dead trees, multi-layered stand, numerous down logs). Some of the standing trees that would be felled for road construction are very large, up to 72 inch (or more) dbh and some trees have deformities that could function as a nest cavity. The permanent removal of the estimated 7.1 acres of suitable habitat would reduce the availability of nesting structures

in the drainage. The surrounding forest outside the immediate project area on both National Forest and National Park lands would continue to provide quality suitable habitat. Currently the Dosewallips watershed in both the Olympic National Forest and National Park contains about 29 percent of late successional/old growth habitat.

This alternative would include the permanent removal of an estimated 7.1 acres of suitable habitat (nesting, roosting, and foraging) which is a primary constituent element within a designated critical habitat unit. Of the 25,579 acres of suitable habitat within CHU WA-49 the removal of an estimated 7.1 acres represents less than 0.0003 percent of the total amount of suitable habitat currently available in the CHU. Even with the permanent removal of 7.1 acres of nesting habitat, that would prohibit the future development of constituent elements, the CHU as an entire unit would continue to provide for the long-term recovery of the northern spotted owl. The surrounding National Forest wilderness and LSR, and Olympic National Park lands would continue to function as providing the necessary habitat requirements for the species.

The existing road prism immediately above and below the washout which includes a riparian area would be decommissioned and would eventually develop into dispersal habitat or suitable habitat, but would take over 200 years for the development equal to the loss of old growth habitat upslope.

No known occupied northern spotted owl nest sites are within the washout area (though surveys were not completed specific to the project, therefore the area is considered occupied). Two spotted owl home ranges (2.7 mile radius) overlap the project area. This alternative would remove about 7.1 acres of suitable nesting habitat within each activity center. Site #24 is below habitat threshold of 5,708 acres of suitable habitat by 206 acres. Removal of an estimated 7.1 acres would further reduce the activity center below habitat threshold. The amount of habitat in the home range would be below the habitat threshold by 213 acres under this alternative. Site #160 would remain above the habitat threshold. It is expected this activity center would have sufficient nesting, roosting, and foraging habitat within the home range to continue future successful occupation.

The project area also provides habitat for northern spotted owl primary prey, the northern flying squirrel and bushy-tailed woodrat. Implementation of this alternative would permanently remove habitat for prey species although the surrounding mature and late seral forest would continue to provide habitat for the species.

Removal of northern spotted owl suitable habitat through tree felling for road construction would occur outside the entire breeding season (March 1 to September 30) to reduce the effects to the species by eliminating the potential for harm to the possible nesting northern spotted owls. Under this alternative no removal of suitable habitat would be allowed from March 1 through September 30.

Disturbance resulting from noise generating activities (use of heavy equipment and motorized hand tools) would occur during construction activities to surrounding suitable habitat adjacent to the project area. Using equipment to build the road, including

motorized tools, chainsaws, rock drills, bulldozers, trucks and other heavy equipment, during the breeding season from March 1 to September 30 could disturb spotted owls nesting in adjacent habitat. Though the removal of suitable habitat would occur outside the breeding season, construction of the road and associated activities would need to occur during the breeding season for up to three years. The risk of disturbance is greatest during the early breeding season, March 1 – July 15, when egg laying, incubation, hatching, and feeding of nestlings occur; while the risk is much less during the late breeding season, July 16 – September 30, when most young have fledged. The noise generating activities will not occur during the early breeding season. The activities would occur only during the late breeding season, minimizing impacts from noise.

Under this alternative the dispersed recreation area adjacent to the washout along with portions of FSR 2610 (approximately 2 acres) would be used for staging equipment for the reroute. Afterwards the areas would be closed to motorized use and be rehabilitated through invasive species removal and native planting, and would eventually provide future lesser quality habitat for the spotted owl.

Preliminary ESA Determinations

Under this alternative the proposed activities "may affect, likely to adversely affect" the northern spotted owl due to the permanent removal of an estimated 7.1 acres of suitable habitat within two activity centers, one which is below habitat threshold. There would not be direct harm to nesting northern spotted owls. This alternative would also result in a "may affect, likely to adversely affect" to designated Critical Habitat Unit WA-49 because of the permanent removal of a primary constituent element. Coordination with US Fish and Wildlife Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Forest Service Sensitive

Bald Eagle

Direct effects to bald eagles include removing approximately 7.1 acres of bald eagle habitat due to road construction and removing danger trees adjacent to the road. Trees suitable for bald eagle nesting, perching, and winter roosting would be permanently removed within the Dosewallips Bald Eagle Management Area (BEMA). The Olympic National Forest LRMP requires maintaining at least 64 acres of uneven-aged forest stands in the BEMA. Currently the BEMA contains 89 acres of forest of which 55 acres are late-successional forest and 34 acres are younger aged forest with previous disturbance. However much of the younger forest stands were disturbed by fire over 100 years ago and provide habitat features (uneven-aged canopy for roosting, snags for perching, close proximity to river). Therefore the BEMA would still be within the Forest Plan objectives of providing sufficient bald eagle habitat. The uneven-aged forest in the BEMA would be decreased from 89 acres to 82 acres. Portions of FSR 2610 and the dispersed camping areas (approximately 2 acres) near the washout would be closed and rehabilitated through native vegetation treatments which would provide future bald eagle habitat in the BEMA.

Implementation of this alternative likely would not impact known bald eagle nests or communal roost sites as field reconnaissance, aerial surveys, and species database review

did not locate any sites in the project area. However individual bald eagles perched in the area while foraging could be disturbed by the project activities. During the tree falling and other project activities bald eagles could be temporarily displaced from the project area. Any eagles displaced from the removed trees would likely return to use adjacent habitat after project completion.

Under this alternative the proposed activities may impact individuals or habitat for the bald eagle but would not likely contribute towards federal listing or cause a loss of viability to the populations or species. Individual bald eagles may be affected but no known nest territories or communal night roosts would be impacted. Furthermore the BEMA objectives of maintaining sufficient bald eagle habitat would be maintained.

Terrestrial Mollusks

Direct effects to terrestrial mollusks include removing approximately 7.1 acres of suitable habitat from the road construction, removing danger trees, and damaging any undiscovered individuals by heavy equipment. Indirect effects include altering adjacent vegetation through created edges, affecting about 14.9 acres. Portions of FSR 2610 and the dispersed camping areas (approximately 2 acres) near the washout would be closed and rehabilitated through native vegetation treatments which would provide future habitat for terrestrial mollusks.

The Sensitive warty jumping slug has been found at one site in the project area. However the site would be protected since it is over 200 feet from the proposed road construction route. This species is locally common and well-distributed on the Olympic National Forest (Ziegltrum 2001 and 2004). No other special status terrestrial mollusk species have been found in the project area despite conducting surveys using current protocols (Duncan et al. 2003). Implementing this alternative may impact individuals or habitat for one Sensitive mollusk species but would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Amphibians

Effects to amphibians (Van Dyke's Salamander, Cope's Giant Salamander, and Olympic Torrent Salamander) would include alteration to the riparian environment during the road construction. The interruption of contiguous riparian habitat dissected with a road could become a movement barrier as the upslope area provides seep, intermittent, and permanent stream habitats that would be affected by road building. The road construction under this alternative would involve altering 0.019 acre of wetland and crossing 14 tributaries, which provide suitable habitat for amphibians. Direct effects could also include mortality to any undiscovered individuals by heavy equipment but this would be considered minimal in terms of effects upon the entire population. Implementing this alternative may impact individuals or habitat for three Sensitive amphibian species, but would not likely contribute towards federal listing or cause a loss of viability to the population or species.

Bats

Direct effects to tree-roosting bats include removing approximately 7.1 acres of suitable forest habitat, removing danger trees which may provide suitable roost sites, and

damaging any undiscovered individual bats. Indirect effects include altering adjacent suitable habitat through created edges. However no caves or human structures used by bats would be affected. Removing the trees may impact individuals or habitat for a Sensitive species, the Townsends big-eared bat, but would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Fisher

If reintroduced fishers eventually colonize the Dosewallips watershed the effects to fisher under this alternative would include the removal of an estimated 7.1 acres of late seral habitat, including downed logs that may provide foraging or denning opportunities. The removal of up to about 7.1 acres of forest vegetation from the existing landscape of extensive tracts of lowland undisturbed late-successional coniferous forest would result in minimal impacts to potential fisher habitat. Implementing this alternative may impact the fisher, a Sensitive species, but would not likely contribute towards federal listing or cause a loss of viability to the population or species.

Olympic National Forest Management Indicator Species

Primary Cavity Excavators, Pileated Woodpecker and Pine Marten

Direct effects to primary cavity excavators including the pileated woodpecker would be removal of an estimated 7.1 acres of good quality foraging and nesting habitat. The surrounding forest in mature and late seral class in the watershed would continue to provide this habitat to the species. Overall the watershed provides a high amount of forests containing dead wood for wildlife species dependent on such habitat.

Direct effects to the pine marten under this alternative would be the removal of approximately 7.1 acres of late seral habitat including downed logs that may provide denning opportunities. Although the location of the area with an existing road would not discourage the use by marten the species is likely found further from high human use areas and at higher elevations. The surrounding forest in mature and late seral class would continue to provide habitat to the marten.

The removal of an estimated 7.1 acres which includes large diameter standing and down dead would not affect the viability of wildlife species dependent upon such structure.

Deer and Elk

Direct effects include removing approximately 7.1 acres of optimal thermal habitat for deer and elk from the road construction and disturbing deer and elk in the area during the road construction and hauling activities. This is in an area of elk wintering or migration between winter and summer ranges. However optimal thermal cover for deer and elk still would be available in the area. The Dosewallips watershed contains 35,760 acres (46 percent) of forests over 200 years old (USDA 1999) with about 7,000 acres of these forests on National Forest System lands. Portions of FSR 2610 and the dispersed camping areas (approximately 2 acres) near the washout would be closed and rehabilitated through native vegetation treatments which would provide future habitat for deer and elk.

About 5 miles of road above the washout would be opened for motorized access which

would increase potential vehicular harassment by humans to wildlife such as deer and elk. In addition recreational use of the campgrounds in the National Forest and national park would increase. The campgrounds and the road are in riparian areas and many terrestrial wildlife species use riparian areas for food, cover, water, and as travel routes. This increased harassment would be an indirect effect of the project. However, since the road density in this area is low (below the recommended density of 1.0 miles road per square mile (WDFW 1991), this impact appears minimal. The road density in the middle Dosewallips subwatershed would increase from 0.5 to 0.6 mi/mi², and the road density in the upper Dosewallips subwatershed would increase from 0 to 0.2 mi/mi².

Federal Species of Concern

Northern Goshawk

Direct effects to the northern goshawk include removing approximately 7.1 acres of suitable forest habitat, removing danger trees in suitable habitat, and disturbing any goshawks in the project area. Indirect effects include altering adjacent suitable habitat through created edges, affecting about 14.9 acres. Since the road construction would be done during the breeding season it could potentially disturb any undiscovered goshawks nesting in or adjacent to the project area. Nesting birds would be displaced, causing them to expend more energy to locate new nest sites. However suitable habitat would be available in the surrounding area. Goshawk habitat would be removed during the non-breeding season so there would be no direct injury or mortality to nesting goshawks from the tree-felling. About 0.7 mile of road and the dispersed camping areas near the washout would be closed and rehabilitated through native vegetation treatments which would provide future habitat for goshawk. Implementing this alternative likely would not contribute towards federal listing or a need for conservation action for the northern goshawk.

Olive-sided flycatcher

Riparian-dependent species including the olive-sided flycatcher would benefit from the rehabilitation and decommissioning of the lower road and dispersed area along the river that would provide additional deciduous habitat in the future.

Tailed Frog and Western Toad

Effects to tailed frog and western toad would include alteration to the riparian environment during road construction. The interruption of contiguous riparian habitat dissected with a road could be a movement barrier for the tailed frog as the upslope area provides seep and stream habitats that would be affected by road building. The road construction under this alternative would involve altering approximately0.019 acre wetland and crossing 14 tributaries, which provide suitable habitat for amphibians. Direct effects could also include mortality to any undiscovered individuals by heavy equipment but this would be considered minimal in terms of effects upon the entire population.

Migratory Birds (Forest Landbirds)

Direct effects to the migratory birds that are dependant upon late-successional forests would be affected by the loss of an estimated 7.1 acres of habitat although many species likely would occupy the surrounding stands of similar habitats. The operation restriction for tree removal during the marbled murrelet and northern spotted owl breeding season

would be a benefit resulting in no loss of migratory birds during the breeding season through habitat removal and potential harm to individual birds.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

Olympic National Park
Federal Threatened and Endangered Species
There would be no habitat loss within the NPS portion of the project and no trees removed. The adverse effects would be reduced because of timing restrictions (project to be conducted between August 6 and the end of September) outside of early nesting seasons. There would be harassment from the noise of construction activities with the primary noise coming from the 2 months of work at the Dosewallips Falls site. Therefore there would be short-term, minor impacts from the road construction project resulting in a NLAA determination if consultation for this activity were to occur separately from the ONF activity.

Washington State Species of Concern
The project is on a road. There would be some temporary disturbance associated with project noise that could cause wildlife to avoid using the area during construction. During the reopening of the roadway some wildlife, particularly small mammals and birds, would be temporarily displaced or forced to relocate outside the project limits. This would increase the potential for predation and competitive stress. Direct mortality could occur in the rare circumstances when wildlife is unable to move away from equipment. The displacement could result in a slight population depression adjacent to the road corridor.

Wildlife in the area would be adversely affected by the noises from equipment used during the project work. There would be negligible to minor adverse impacts to area wildlife from reopening the road to vehicular traffic which would place wildlife at risk from collisions with automobiles and disturbance associated with vehicle use and noise.

Conclusion

Because this alternative would result in only minor impacts to murrelets and northern spotted owls, resulting in a finding of may affect, but not likely to adversely affect (if the ONP activity were consulted on its own, separate from ONF activities), there would be no impairment of this resource.

Cumulative Effects

Past activities that removed late-successional forest habitat in the Dosewallips watershed include fire, timber harvest, road construction, and the development of Elkhorn Campground and national park facilities. A total of 10,838 acres regeneration timber harvest has occurred in the Dosewallips watershed on all ownerships since the 1920's. Seven fires totaling 19,700 acres burned in the watershed since the 1800's. These areas of fire and timber harvest are now mid-successional forest, about 20 to 135 years old.

According to the watershed analysis (USDA 1999) the amount of late successional forest (forests over 200 years old) remaining in the watershed is 35,760 acres (46 percent). The amount of lower elevation late-successional forests which provide marbled murrelet and spotted owl habitat is 22,586 acres (29 percent of watershed). Alternative B would add to the aggregated effects by removing an estimated7.1 acres late-successional habitat in the National Forest.

Future timber harvest activities include the proposed Jackson thinning on National Forest land composed of 70 to100+ year old (mid-successional) forest including about 1,000 acres in Rocky Brook subwatershed. This proposed sale may in the short-term degrade habitat for terrestrial mollusks, cavity nesters, and thermal cover for deer and elk. Alternative B would add to the aggregated effects of habitat degradation by removing approximately7.1 acres of late-successional forest habitat from road construction and removing danger trees along the road.

Present and past activities that disturb wildlife include using and maintaining the road system year round. There are about 116 miles road being used and maintained in the watershed. Alternative B would add to the aggregated effects of wildlife disturbance by opening 5 miles of road and 14 acres of campground that have not been used by motorized vehicles since the washout in 2002. The miles of roads in the watershed would increase from 116 to about 122 miles. However the road density in the middle and upper watershed would still be relatively low. The road density in the middle Dosewallips subwatershed would increase from 0.5 to 0.6 miles/sq mile, and the road density in the upper Dosewallips would increase from 0 to 0.2 miles/sq mile.

Past ONP activities including the construction of the road and park facilities removed a small portion of northern spotted owl and murrelet habitat from the park. However these species still utilize the Dosewallips area and they are not necessarily disturbed by the existing use and operation of the area roads and facilities. The area facilities, maintenance activities, and visitor use has not precluded the development of a spotted owl nest site near the ranger station. Park operations including day-to-day maintenance and visitor use of the facilities as well as maintenance activities on the 1.7 miles of park road would be reinstituted in the Dosewallips area after the road is open. These activities would be confined to the existing road corridor and in the developed area, would be short-term, and could disturb listed birds. In addition it is possible that if the facilities are reopened that several danger trees would be removed. These trees may provide habitat to murrelets or owls. Timing restrictions would reduce the potential for direct loss of nests or individuals. Mitigation includes inspection of the trees by NPS wildlife biologists prior to removal. If a nest site is found in a danger tree the immediate area would be closed and the tree would not be removed until after nesting season. Overall, short-term, minor, adverse impacts would result from noise and harassment and potential removal of trees. However since this work would occur after the project is completed there would be no cumulative effects from noise and activities related to project work and since no trees would be removed from NPS lands under this alternative there would be no cumulative effects related to habitat removal.

Under this alternative, with the reopening of the road, the aerial operations landing zone would be reestablished within the park. Visitor use would increase. Most of these activities would occur during the spring to fall months (primary season of work and visitor use mid-May to mid-September). Aerial operations occur after the nesting seasons except in emergency situations such as search and rescues. Aerial operations that occur during or after late nesting seasons for listed bird species would result in negligible to minor adverse effects to listed bird species. Those aerial operations which occur during early nesting season, restricted to emergency operations, could result in adverse effects to listed bird species. The contribution of this alternative to these impacts is small since the project would be of short duration, avoiding sensitive nesting seasons. Therefore there would be very minor cumulative effects associated with ONP proposed activities.

Overall there would be very minor increases in adverse cumulative effects to wildlife in the watershed and no thresholds (such as elk cover) would be exceeded. The incremental impacts from this project when added to the impacts of the previously mentioned past, present, and reasonably foreseeable actions would not result in substantial cumulative impacts to the resource, or affect the ability of the resource to sustain itself.

Summary of Terrestrial Effects – Alternative B

Effects of alternative B include permanently removing approximately 7.1 acres of late-successional forest by constructing a road and altering habitat microclimate associated with the edge induced by the road. This would occur in high-quality suitable habitat for two federally listed species, the marbled murrelet and northern spotted owl. Suitable habitat removal would occur within the home range of a spotted owl pair already below the habitat threshold (the minimum necessary to maintain territorial owls). The habitat removal would be in designated critical habitat for both the northern spotted owl and the marbled murrelet, lands considered essential to the conservation of the species. Noise generated from the project activities during the marbled murrelet early breeding season would disturb 16 acres suitable habitat assumed occupied by marbled murrelets. Under this alternative the proposed activities “may affect, and is likely to adversely affect” the marbled murrelet, the northern spotted owl, and their designated critical habitats.

The approximately 7.1 acres of forest removal and associated edge effects would be in suitable habitat for a variety of other animal species, including the bald eagle, primary cavity excavators, terrestrial mollusks, amphibians, tree-roosting bats, deer and elk, northern goshawk, and migratory and resident forest landbirds. Of these species, 12 have the status Sensitive, five Management Indicator Species or species groups, and four species of concern. The activities under this alternative may impact habitat for these species or displace individuals, but likely would not contribute towards federal listing or cause a loss of viability to the populations or species, cause a need for conservation action, or affect the persistence of any species. The approximately 7.1 acres of habitat removal would be in a Bald Eagle Management Area (BEMA), but the amount of habitat in the BEMA would remain within ONF LRMP objectives.

Under this alternative, portions of a Forest Service road and dispersed camping areas,

approximately 2 acres total, would be closed and rehabilitated through native vegetation treatments. The two acres would develop into riparian hardwood/ coniferous forest habitat in the long-term, benefiting many terrestrial wildlife species.

There would be minor increases in adverse cumulative effects to wildlife in the watershed. Big game cover and road densities, however, would remain within required levels.

Of all the alternatives, Alternative B would have the greatest impacts to terrestrial wildlife and habitat. Effects to the federally listed marbled murrelet and northern spotted owl particularly would be considerable due to removal of high-quality suitable habitat within designated critical habitat units and in a spotted owl home range already below threshold habitat level.

Forest Plan Amendments

Olympic National Forest
This alternative would not meet the Late-Successional Reserves standards and guidelines requirements for marbled murrelet preproject surveys, protection of marbled murrelet recruitment habitat within a 0.5 mile radius of an occupied site, the requirement that new roads minimize adverse impacts to LSR habitat, or the guideline that nonsilvicultural activities located inside LSR be neutral or beneficial to the creation and maintenance of late-successional habitat. The proposed four terrestrial Forest Plan amendments to the Olympic Forest Plan would allow this alternative to be consistent with the Forest Plan. The impact of the amendment to waive the preproject survey requirement is mitigated by assuming occupancy. The adverse impacts of not providing the protection buffer, not minimizing adverse road impacts, and removing an estimated 7.1 acres of late-successional habitat are described in detail in the preceding environmental consequences section. Additionally there is a proposed Forest Plan amendment to aquatic based standards and guidelines (see Aquatic Species and Habitat Conditions section of this chapter for details).

Alternative C – Reroute 2 Retaining Wall Emphasis

Direct/Indirect Effects

Olympic National Forest
Introduction
The effects to wildlife species and habitats are the same as under Alternative B except the permanent removal of late-successional forest habitat would be approximately 6.5 acres instead of 7.1. All Management Requirements under this Alternative would be the same as Alternative B.

Federal Threatened and Endangered Species
Marbled Murrelet and Designated Critical Habitat
The effects to marbled murrelet are the same as Alternative B except the permanent removal of late-successional forest habitat would be approximately 6.5 acres, about an 8

percent decrease. This would remove an estimated 6.5 acres of forest containing constituent elements in designated Critical Habitat Unit WA-06a. There would also be more impact to potentially occupied marbled murrelet habitat adjacent to the haul route, if hauling occurs during the early breeding season, since road construction would require a material source site from which approximately 3380 dump-truck loads of material would be hauled to the project area. This is almost twice the number of truck loads compared to Alternative B.

All Management Requirements under Alternative B would be applied to this alternative. Since the road realignment would be the same as in Alternative B, the amount of suitable habitat that would by subjected to noise disturbance during the early breeding season would be the same, 15.7 acres (amount of habitat within 35 yards of the proposed road).

Preliminary ESA Determinations

Under this alternative the proposed activities "may affect, likely to adversely affect" the marbled murrelet due to the permanent removal of an estimated 6.5 acres of suitable habitat and to harassment from noise generating activities during the early breeding season. There would not be direct mortality or injury to nesting marbled murrelets from tree-felling. This alternative would also result in a "may affect, likely to adversely affect" determination for designated Critical Habitat Unit WA-06a because of the permanent removal of primary constituent elements. Coordination with US Fish and Wildlife Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Northern Spotted Owl and Designated Critical Habitat

The effects to northern spotted owl are the same as Alternative B, except the permanent removal of late-successional forest habitat would be approximately 6.5 acres, about an 8 percent decrease. This would remove an estimated 6.5 acres of forest containing constituent elements in designated Critical Habitat Unit WA-49. There would also be more impact to potentially occupied northern spotted owl habitat adjacent to the haul route if hauling occurs during the early breeding season, since road construction would require a material source site from which approximately 3380 dump-truck loads of material would be hauled to the project area. This is almost twice the number of truck loads compared to Alternative B.

All Management Requirements under Alternative B would be applied to this alternative.

Preliminary ESA Determinations

Under this alternative, the proposed action would have an effect determination for the northern spotted owl as "may affect, likely to adversely affect" due to the permanent removal of an estimated 6.5 acres of suitable habitat within two activity centers, one which is below habitat threshold. There would not be direct harm to nesting northern spotted owls. This alternative would also result in a 'may affect, likely to adversely affect' designated Critical Habitat Unit WA-49 because of the permanent removal of primary constituent element. Coordination with US Fish and Wildlife Service has been on-going throughout the development of this project. These preliminary determinations

are based in part on feed-back from the federal regulatory agencies.

Forest Service Sensitive

Bald Eagle

The effects to bald eagle are the same as under Alternative B except the permanent removal of late-successional forest habitat would be approximately 6.5 acres, about an 8 percent decrease. Within the BEMA, the amount of older forest would decrease from 89 acres to 82.5 acres.

Under this alternative the proposed activities may impact individuals or habitat for the bald eagle but would not likely contribute towards federal listing or cause a loss of viability to the populations or species. Individual bald eagles may be affected but no known nest territories or communal night roosts would be impacted. Furthermore the BEMA objectives of maintaining sufficient bald eagle habitat would be maintained.

Terrestrial Mollusks

The effects to mollusks would be the same as under Alternative B except the permanent removal of late-successional forest habitat would be approximately 6.5 acres, about an 8 percent decrease. Implementing this alternative may impact individuals or habitat for one Sensitive mollusk species, the warty jumping slug, but would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Amphibians

The effects to Van Dyke's salamander, Cope's giant salamander, and Olympic torrent salamander are the same as Alternative B except the permanent removal of late-successional forest habitat (which is all within a Riparian Reserve) would be approximately 6.5 acres, about an 8 percent decrease. The removal of an estimated 6.5 acres which includes large diameter standing and down dead and disturbing a small wetland and tributaries would not affect the viability of the species dependent upon such structure.

The effects to the Van Dyke's salamander, Cope's giant salamander, and Olympic torrent salamander would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Bats

The effects to bats are the same as Alternative B except the permanent removal of late-successional forest habitat would be approximately 6.5 acres, about an 8 percent decrease. Removing the trees may impact individuals or habitat for a Sensitive species, the Townsends big-eared bat, but would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Fisher

The effects to fisher would be the same as Alternative B except the permanent removal of late-successional forest would be approximately 6.5 acres, about an 8 percent decrease. Implementing this alternative may impact the fisher, a Sensitive species, but would not likely contribute towards federal listing or cause a loss of viability to the population or species.

Olympic National Forest Management Indicator Species

Pileated Woodpecker and Pine Marten, Primary Cavity Excavators

The effects to the above listed species are the same as Alternative B except the permanent removal of late-successional forest habitat (which is all within a Riparian Reserve) would be approximately 6.5 acres, about an 8 percent decrease. The removal of an estimated 6.5 acres which includes large diameter standing and down dead would not affect the viability of the species dependent upon such structure.

The effects to pileated woodpecker, pine marten, and primary cavity excavators would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

The effects to snag and down log densities are the same as Alternative B except the permanent removal of late-successional forest would be 6.5 acres, about an 8 percent decrease. The implementation of this alternative would not affect viability of species dependent on these habitat elements.

Deer and Elk

The effects to deer and elk would be the same as under Alternative B except the permanent removal of optimal thermal cover would be approximately 6.5 acres, about an 8 percent decrease. The increase in road density would be the same as in Alternative B, from 0.5 to 0.6 mi/mi² in the middle Dosewallips subwatershed and from 0 to 0.2 mi/mi² in the upper Dosewallips subwatershed.

Federal Species of Concern

Northern Goshawk

The effects to northern goshawk are the same as Alternative B except the permanent removal of suitable forest habitat would be approximately 6.5 acres, about an 8 percent decrease. Implementing this alternative likely would not contribute towards federal listing or a need for conservation action for the northern goshawk.

Olive-sided flycatcher

The effects to this listed species are the same as Alternative B except the permanent removal of late-successional forest (which is all within a Riparian Reserve) would be approximately 6.5 acres, about an 8 percent decrease. The removal of an estimated 6.5 acres, which includes large diameter standing and down dead, would not affect the viability of the species dependent upon such structure.

The effects to olive-sided flycatcher would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Tailed Frog and Western Toad

The effects would be the same as those for Alternative B except the permanent removal of late-successional forest habitat would be approximately 6.5 acres, about an 8 percent decrease.

Migratory Birds (Forest Landbirds)

The effects to these species are the same as Alternative B except the permanent removal

of late-successional forest habitat (which is all within a Riparian Reserve) would be approximately 6.5 acres, about an 8 percent decrease.

Cumulative Effects

The cumulative effects for this alternative are the same as Alternative B.

Summary of Terrestrial Effects – Alternative C

Alternative C would have similar impacts on the terrestrial species and habitats as described for Alternative B, except the permanent removal of late-successional forest habitat removal would be approximately 6.5 acres, about an 8 percent decrease. Of the action alternatives, the impacts to terrestrial wildlife species would be slightly less than Alternative B and greater than Alternative F.

Forest Plan Amendments

Olympic National Forest
This alternative would not meet the Late-Successional Reserves standards and guidelines requirements for marbled murrelet preproject surveys and protection of recruitment habitat within a 0.5 mile radius of an occupied site, or the guideline that nonsilvicultural activities located inside LSR be neutral or beneficial to the creation and maintenance of late-successional habitat. The proposed three terrestrial Forest Plan amendments to the Olympic Forest Plan would allow this alternative to be consistent with the Forest Plan. The impact of the amendment to waive the preproject survey requirement is mitigated by assuming occupancy. The adverse impacts of not providing the protection buffer and removing approximately 6.5 acres of late-successional habitat are described in detail in the preceding environmental consequences section. Additionally there is a proposed Forest Plan amendment to aquatic based standards and guidelines (see Aquatic Species and Habitat Conditions section of this chapter for details).

Alternative F - Bridge

Direct/Indirect Effects

Olympic National Forest
Marbled Murrelet and Designated Critical Habitat
Using equipment including motorized tools, chainsaws, rock drills, impact drivers, bulldozers, trucks and other heavy equipment during the breeding season from April 1 to September 15 could disturb marbled murrelets nesting in adjacent habitat. The potential disturbance-caused injuries include flushing from the nest, aborted feeding attempts, and postponed feedings (USDI 2003a). Marbled murrelets are particularly vulnerable to disturbance during the early breeding season (April 1 – August 5) when they are producing and incubating eggs. The risk of injury is much less during the late breeding season when adults are present at the nest only when they are feeding the young. Noise generating equipment would be operated during the late breeding season, August 6 – September 15 and a portion of the early breeding season, July 1 – August 5. The injury

threshold distance for marbled murrelets from operating impact drivers is 60 yards and 35 yards from heavy equipment and motorized tools (USDI 2003a). Operating the pile driver within 60 yards and operating heavy equipment/motorized tools within 35 yards of suitable habitat during a portion of the early breeding season would adversely impact marbled murrelets. A total of approximately 2.5 acres of suitable habitat would be impacted by noise disturbance (amount of habitat within 60 yards of the proposed bridge work). Impacts from noise would last for three breeding seasons.

The danger tree removal would occur within a one-acre area in a marbled murrelet Critical Habitat Unit. Since the trees in this area are small (less than 21 inches dbh) this action likely would not impact potential marbled murrelet nest trees, the first constituent element of critical habitat. However the danger tree removal may affect the second constituent element of critical habitat which is forest within 0.5 mile of suitable nest trees with a canopy height of at least one-half the potential tree height.

Preliminary ESA Determinations

Under this alternative the proposed activities "may affect, and is likely to adversely affect" the marbled murrelet due to harassment from noise generating activities during the early breeding season. There would be no direct mortality or injury to nesting marbled murrelets from tree-felling. This alternative "may affect, likely to adversely affect" designated Critical Habitat Unit WA-06a due to affecting a constituent element of critical habitat. Coordination with US Fish and Wildlife Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Northern Spotted Owl and Designated Critical Habitat

Alternative F would involve the following activities that may affect the northern spotted owl: increasing noise above ambient levels during the early breeding seasons and danger tree removal that would alter about 1.0 acre of forested habitat. The 1.0 acre affected by danger tree removal would not involve trees of substantial large diameters and stand complexity as in the reroute alternatives, but the stand is within suitable habitat component therefore the removal would constitute removal of about 1 acre of suitable habitat.

Constructing the bridge would increase noise above the natural ambient level during the early breeding season and could adversely affect the northern spotted owl. Operations occurring between July 16 and September 30 would create noise above ambient levels potentially causing disturbance over 7 acres of suitable habitat. Because of the lack of surveys within the analysis area, all suitable habitat is presumed occupied.

Spotted owls are more vulnerable to noise disturbance early in the breeding season (March 1 through July 15). Above ambient noise produced during the early breeding season could potentially disrupt normal behavior patterns making potentially nesting owls more susceptible to harassment (USDI 1996). After July 15 potential effects become less of a concern and of no concern beyond September 30. Operation of pile driver equipment, heavy equipment, and motorized tools would be scheduled to occur during a portion of the spotted owl early breeding season, July 1 – 15, and during the late breeding

season, July 16 – September 30. The injury threshold distance for spotted owls from operating impact drivers is 60 yards and from heavy equipment and motorized tools is 35 yards (USDI 2003a). Operating the pile driver within 60 yards and operating heavy equipment/motorized tools within 35 yards of suitable habitat during the early breeding season would adversely impact spotted owls. A total of 2.5 acres of suitable habitat would be impacted by noise disturbance (amount of habitat within 60 yards of the proposed bridge construction work).

Impacts from project generated noise are expected to last for three breeding seasons, the duration of the project. However once the road is reopened motorized traffic is expected to return to pre-flood event levels.

The equipment used to construct the bridge could spread seeds of noxious weeds. Also disturbed soils could become invaded with noxious weeds. If the existing noxious weed populations spread they could impact native terrestrial habitats. Management requirements would be taken to prevent the spread of noxious weeds.

Preliminary ESA Determinations

Under this alternative the proposed activities "may affect, is likely to adversely affect" the northern spotted owl resulting from noise disturbance during construction activities and the removal of one acre of suitable habitat that would further reduce one activity center below habitat threshold. For designated Critical Habitat Unit WA-49 the effects of implementing this alternative would result in a "may affect, is likely to adversely affect" due to permanent removal of constituent habitat elements. Coordination with US Fish and Wildlife Service has been on-going throughout the development of this project. These preliminary determinations are based in part on feed-back from the federal regulatory agencies.

Forest Service Sensitive

Bald Eagle

Direct effects to bald eagles include removing danger trees in the Dosewallips BEMA. The danger tree removal would alter about 1.0 acre of bald eagle habitat. However since the trees in this area are small (less than 21 inches dbh) potential nest or winter roost trees likely would not be affected. Trees suitable for diurnal perching could be removed under this alternative and individual bald eagles perched along the river could be disturbed by project activities.

Under this alternative the proposed activities may impact individuals or habitat for the bald eagle but would not likely contribute towards federal listing or cause a loss of viability to the populations or species. Individual bald eagles may be affected but no known nest territories or communal night roosts would be impacted. Furthermore the BEMA objectives of maintaining sufficient bald eagle habitat would be maintained.

Terrestrial Mollusks

Direct effects to one Sensitive terrestrial mollusk include degrading about 1.0 acre of habitat from danger tree removal and damaging any undiscovered individuals by heavy equipment. Indirect effects include the spread of noxious weeds invading habitats.

About two acres of dispersed camping areas near the washout would be closed and rehabilitated through native vegetation treatments which would provide future habitat for terrestrial mollusks.

One Sensitive mollusk species, the warty jumping slug, has been found at one site in the project area. However the site would be protected since it is over 200 feet from the proposed bridge construction route. This species is locally common and well distributed on the Olympic National Forest (Ziegltrum 2001 and 2004). No other terrestrial mollusk species have been found in the project area despite conducting surveys using current protocols (Duncan et al. 2003). Implementing this alternative may impact individuals or habitat for this Sensitive mollusk species but would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Amphibians

Direct effects to Van Dyke's Salamander, Cope's Giant Salamander, and Olympic Torrent Salamander would include the degradation of about 1.0 acre of riparian forest habitat, where amphibians may be present. The removal of danger trees, however, would be located in an area away from streams where the aquatic life form of these species would reside. This alternative would involve altering about 0.016 acre of wetland, which provides suitable habitat for amphibians. The alteration and disturbance to upslope seeps and springs that would occur under the re-route alternatives, would not occur under this alternative. Direct effects could also include mortality to any undiscovered individuals by heavy equipment, but this would be considered minimal in terms of effects upon the entire population.

The effects to the Van Dyke's Salamander, Cope's Giant Salamander, and Olympic Torrent Salamander would not likely contribute towards federal listing or cause a loss of viability to the population or species.

Bats

Direct effects to tree-roosting bats include removing trees in an estimated 1.0 acre area which may provide suitable roost sites and damaging any undiscovered individual bats. However the trees to be removed provide low-quality habitat due to small tree size. Furthermore no caves or human structures used by bats would be impacted. Implementing this alternative may affect individuals or habitat for a Sensitive species, the Townsends big-eared bat, but would not likely contribute towards federal listing or cause a loss of viability to the populations or species.

Fisher

Direct effects to fisher include the removal of danger trees for approximately 100 feet from the top of the slope which involves about 1 acre of forest. Implementing this alternative may impact individuals or habitat for the fisher, a Sensitive species, but would not likely contribute towards federal listing or cause a loss of viability to the population or species.

Olympic National Forest Management Indicator Species

Pileated Woodpecker and Pine Marten, Primary Cavity Excavators

Effects to species dependent upon standing and downed dead wood include the removal of about 1 acre of forested habitat, some that may be used for foraging, roosting, denning, or nesting. The removal of this habitat would not affect the viability of the pine marten, pileated woodpecker, or other primary cavity excavators as the amount of high quality habitat for these species in the watershed is higher than most watersheds on the eastern flank of the Peninsula.

Deer and Elk

Direct effects to deer and elk include degrading about 1 acre of thermal cover from the danger tree removal and disturbing deer and elk in the area during the bridge construction activities. Indirect effects include increasing vehicular harassment from opening the road. About 5 miles of road above the washout would be opened for motorized access, increasing potential vehicular harassment by humans to wildlife such as deer and elk. In addition recreational use of the campgrounds in the National Forest and the National Park would increase. The campgrounds and the road are in riparian areas and many terrestrial wildlife species typically use riparian areas for food, cover, water, and as travel routes. However since the road density in this area is low (less than 1.0 mile road per square mile) the indirect harassment effects from opening the road appear minimal. The road density in the middle Dosewallips subwatershed would increase from 0.5 to 0.6 mi/mi^2, and the road density in the upper Dosewallips subwatershed would increase from 0 to 0.2 mi/mi^2.

Federal Species of Concern

Northern Goshawk

Direct effects to the northern goshawk include removing trees in approximately 1.0 acre of habitat from felling danger trees. Since the work would be done during the breeding season it could potentially disturb any goshawks nesting in the area. However suitable habitat would be available in the surrounding forested areas of the watershed. The alternative would not likely contribute towards federal listing or a need for conservation action for the northern goshawk

Olive-sided Flycatcher

Under this alternative the removal of about 1 acre of forested upland habitat would have no impact to the olive-sided flycatcher on a landscape or population scale.

Tailed Frog and Western Toad

Direct effects to trailed frog and western toad would include the removal of about one acre of habitat within the Riparian Reserve where these species may be present, and altering about 0.016 acre of wetland, which potentially provides suitable habitat for amphibians. However the alteration and disturbance to upslope seeps and springs would not occur under this alternative. Direct effects could also include mortality to any undiscovered individuals by heavy equipment, but this would be considered minimal in terms of effects upon the entire population.

Migratory Birds (Forest Landbirds)

Under this alternative the removal of about 1 acre of forested upland habitat would have no impact to migratory birds on a landscape or population scale.

Cumulative Effects

Past activities that removed late-successional forest habitat in the Dosewallips watershed include fire, timber harvest, road construction, and the development of Elkhorn Campground and national park facilities. A total of 10,838 acres regeneration timber harvest has occurred in the Dosewallips watershed on all ownerships since the 1920's. Seven fires totaling 19,700 acres burned in the watershed since the 1800's. These areas of fire and timber harvest are now mid-successional forest, about 20 to 135 years old. According to the watershed analysis (USDA 1999) the amount of late successional forest (forests over 200 years old) remaining in the watershed is 35,760 acres (46 percent). The amount of lower elevation late-successional forests which provide marbled murrelet and spotted owl habitat is 22,586 acres (29 percent of watershed). Alternative F would very minimally add to the aggregated effects by altering about 1.0 acre of late-successional habitat in the National Forest.

Future timber harvest activities include the proposed Jackson thinning on National Forest land composed of 70 to100+ year old (mid-successional) forest including about 1,000 acres in Rocky Brook subwatershed. This proposed sale may in the short-term degrade habitat for terrestrial mollusks, cavity nesters, and thermal cover for deer and elk. Alternative F would add to the aggregated effects of habitat degradation by altering about 1.0 acre of late-successional forest habitat from removing danger trees along the road.

Present and past activities that disturb wildlife include using and maintaining the road system year round. There are about 116 miles road being used and maintained in the watershed. Alternative F would add to the aggregated effects of wildlife disturbance by opening 5 miles of road and 14 acres of campground that have not been used by motorized vehicles since the washout in 2002. The miles of roads in the watershed would increase from 116 to about 122 miles. However the road density in the middle and upper watershed would still be relatively low. The road density in the middle Dosewallips subwatershed would increase from 0.5 to 0.6 mile/sq mile, and the road density in the upper Dosewallips would increase from 0 to 0.2 mile/sq mile.

Past ONP activities including the construction of the road and park facilities removed a small portion of northern spotted owl and murrelet habitat from the park. However these species still utilize the Dosewallips area and they are not necessarily disturbed by the existing use and operation of the area roads and facilities. The area facilities, maintenance activities, and visitor use has not precluded the development of an owl nest site near the ranger station. Park operations including day-to-day maintenance and visitor use of the facilities as well as maintenance activities on the 1.7 miles of park road would be reinstituted in the Dosewallips area after the road is open. These activities would be confined to the existing road corridor and in the developed area, would be short-term, and could disturb listed birds. In addition it is possible that if the facilities are reopened that several danger trees would be removed. These trees may provide habitat to murrelets or owls. Timing restrictions would reduce the potential for direct loss of nests or individuals. Mitigation includes inspection of the trees by NPS wildlife biologists prior

to removal. If a nest site is found in a danger tree the immediate area would be closed and the tree would not be removed until after nesting season. Overall, short-term, minor, adverse impacts would result from noise and harassment and potential removal of trees. However since this work would occur after the project is completed there would be no cumulative effects from noise and activities related to project work and since no trees would be removed from NPS lands under this alternative there would be no cumulative effects related to habitat removal.

Under this alternative, with the reopening of the road, the aerial operations landing zone would be reestablished within the park. Visitor use would increase. Most of these activities would occur during the spring to fall months (primary season of work and visitor use mid-May to mid-September). Aerial operations occur after the nesting seasons except in emergency situations such as search and rescue operations. Aerial operations that occur during or after late nesting seasons for listed bird species would result in negligible to minor adverse effects to listed bird species. Those aerial operations which occur during early nesting season, restricted to emergency operations, could result in adverse effects to listed bird species. The contribution of this alternative to these impacts is small since the project would be of short duration avoiding sensitive nesting seasons. Therefore there would be very minor cumulative effects associated with ONP proposed activities.

Overall there would be very minor increases in adverse cumulative effects to wildlife in the watershed and no thresholds (such as elk cover) would be exceeded. The incremental impacts from this project when added to the impacts of the previously mentioned past, present, and reasonably foreseeable actions would not result in substantial cumulative impacts to the resource, or affect the ability of the resource to sustain itself.

Summary of Terrestrial Effects - Alternative F

This alternative would have the least impact to terrestrial species and habitats of the action alternatives. About one acre of riparian forest would be impacted and this would be low quality habitat for spotted owls and marbled murrelets. Noise generated from the project activities during the early breeding seasons would disturb about 2.5 acres of suitable habitat assumed occupied by marbled murrelets and northern spotted owls. About one acre forest would be altered within critical habitat for both the northern spotted owl and marbled murrelet. Under this alternative the proposed activities “may affect, and is likely to adversely affect” the marbled murrelet, the northern spotted owl, and designated critical habitats for the marbled murrelet and northern spotted owl.

Forest Plan Amendments

Olympic National Forest

This alternative is consistent with all terrestrial Forest Plan standards and guidelines and as such no site-specific, non-significant Forest Plan amendments to terrestrial standards and guidelines are proposed. However, there is a proposed Forest Plan amendment to aquatic based standards and guidelines (see Aquatic Species and Habitat Conditions

section of this chapter for details).

Table 19: Summary of effects to terrestrial species

Species or Species Groups	Species Status	Alternative A No Action	Alternative B Reroute 1 Bench Emphasis	Alternative C Reroute 2 Retaining Wall Emphasis	Alternative F Bridge
Marbled Murrelet	T	No habitat impact	Remove 7.1 acres suitable habitat; 15.7 acres noise disturbance	Remove 6.5 acres suitable habitat; 15.7 acres noise disturbance	Remove 1 acre suitable habitat; 2.5 acres noise disturbance
Marbled Murrelet Critical Habitat	Designated	No habitat impact	Remove 7.1 acres, constituent element	Remove 6.5 acres, constituent element	Degrade 1 acre of constituent element
Northern Spotted Owl	T, MIS	No habitat impact	Remove 7.1 acres suitable habitat (one activity center below habitat threshold);	Remove 6.5 acres suitable habitat (one activity center below habitat threshold);	Remove 1 acre suitable habitat (one activity center below habitat threshold); 7 acres noise disturbance
Northern Spotted Owl Critical Habitat	Designated	No habitat impact	Remove 7.1 acres constituent element (nesting, roosting, foraging, or dispersal habitat)	Remove 6.5 acres constituent element	Remove 1 acre constituent element
Bald Eagle	S, MIS	No habitat impact	Remove 7.1 acres habitat in BEMA	Removal 6.5 acres habitat in BEMA	No nest/roost habitat removal; may impact perch trees

Species or Species Groups	Species Status	Alternative A No Action	Alternative B Reroute 1 Bench Emphasis	Alternative C Reroute 2 Retaining Wall Emphasis	Alternative F Bridge
Terrestrial Mollusks	S	No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Remove 1 acre habitat
Van Dykes Salamander	S	No habitat impact	Removal 7.1 acres of Riparian Reserve. Impact 14 tributary crossings and 0.019 acre wetland	Removal 6.5 acres in Riparian Reserve. Impact 14 tributary crossings and 0.02 acre wetland	Removal 1 acre of Riparian Reserve; impact 0.016 acre wetland habitat
Cope's Giant Salamander	S	No habitat impact	Removal 7.1 acres of Riparian Reserve. Impact 14 tributary crossings and 0.019 acre wetland	Removal 6.5 acres in Riparian Reserve. Impact 14 tributary crossings and 0.02 acre wetland	Removal 1 acre of Riparian Reserve; impact 0.016 acre wetland habitat
Olympic Torrent Salamander	S	No habitat impact	Removal 7.1 acres of Riparian Reserve. Impact 14 tributary crossings and 0.019 acre wetland	Removal 6.5 acres in Riparian Reserve. Impact 14 tributary crossings and 0.02 acre wetland	Removal 1 acre of Riparian Reserve; impact 0.016 acre wetland habitat
Townsend's Big-eared Bat	S	No habitat impact	Remove 7.1 acres forest, may be roosting habitat	Remove 6.5 acres forest, may be roosting habitat	May remove 1 acre roost habitat
Pacific Fisher	C, S (extirpated)	No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Degrade 1 acre habitat

Species or Species Groups	Species Status	Alternative A No Action	Alternative B Reroute 1 Bench Emphasis	Alternative C Reroute 2 Retaining Wall Emphasis	Alternative F Bridge
Deer and Elk	MIS	Increase 31 acres forage habitat	Remove 7.1 acres optimal cover; increase road density 0.5 to 0.6 mi/mi²	Remove 6.5 acres optimal cover; increase road density 0.5 to 0.6 mi/mi²	Increase road density 0.5 to 0.6 mi/mi²; reduce optimal cover by 1 acre
Pileated Woodpecker, Pine Martin	MIS	No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Remove 1 acre habitat
Primary Cavity Excavators	MIS	No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Remove 1 acre habitat
Northern Goshawk	SOC	No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Remove 1 acre habitat
Olive-sided Flycatcher	SOC	No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Remove 1 acre habitat
Tailed frog and western toad	SOC	No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Remove 1 acre habitat
Forest Landbirds		No habitat impact	Remove 7.1 acres habitat	Remove 6.5 acres habitat	Remove 1 acre habitat

T = USFWS, Federal, Threatened; SOC = USFWS, Species of Concern; S = R6 Sensitive species; MIS = ONF, Management Indicator Species; C = Candidate species.

Table 20: Terrestrial species effects determinations

Species or Species Groups	Species Status	Alternative A No Action	Alternative B Reroute 1 Bench Emphasis	Alternative C Reroute 2 Retaining Wall Emphasis	Alternative F Bridge
Marbled Murrelet	T	No Effect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Marbled Murrelet Critical Habitat	Designated	No Effect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Northern Spotted Owl	T, MIS	No Effect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Northern Spotted Owl Critical Habitat	Designated	No Effect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Bald Eagle	S, MIS	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species

Species or Species Groups	Species Status	Alternative A No Action	Alternative B Reroute 1 Bench Emphasis	Alternative C Reroute 2 Retaining Wall Emphasis	Alternative F Bridge
Terrestrial Mollusks	S	No impact	For the Sensitive warty jumping slug, May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species.	For the Sensitive warty jumping slug, May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species.	For the Sensitive warty jumping slug, May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species.
Van Dykes Salamander	S	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species

Species or Species Groups	Species Status	Alternative A No Action	Alternative B Reroute 1 Bench Emphasis	Alternative C Reroute 2 Retaining Wall Emphasis	Alternative F Bridge
Cope's Giant Salamander	S	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species
Olympic Torrent Salamander	S	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species
Townsends' Big-eared Bat	S	No impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species

Species or Species Groups	Species Status	Alternative A No Action	Alternative B Reroute 1 Bench Emphasis	Alternative C Reroute 2 Retaining Wall Emphasis	Alternative F Bridge
Pacific Fisher	C, S (extirpated)	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population or Species

T = USFWS, Federal, Threatened; SOC = USFWS, Species of Concern; S = R6 Sensitive species;
MIS = ONF, Management Indicator Species; C = Candidate species.

Botanical Species and Habitat (Botany Report, May 2006 with October 2007 and March 2008 edits)

Affected Environment

Olympic National Forest
Vegetation in the Dosewallips washout project area primarily consists of late-successional and old growth coniferous forests in the silver fir vegetation zone along with riparian hardwood forests of varying ages. Numerous downed logs and snags, and standing live and dead trees exist in the area. The late-seral forests in the washout area have both overstory and understory vegetation components. Tree species include Douglas-fir, western hemlock, Sitka spruce, western redcedar, red alder, Pacific silver fir, and grand fir. There are a large number of understory species and forbs in the washout area, including vine maple, sword fern, salal, Oregon grape, hazel, various blackberry species, rattlesnake plantain, bracken fern, maidenhair fern, three-leaved foam flower, wood sorrel, thimble berry, vanilla leaf, and numerous mosses, liverworts and lichens. Invasive plant species also exist in the project area: herb Robert, tansy ragwort, and hairy catsear.

Pre-field reviews were performed in order to determine whether the activities proposed in this project pose a potential threat to Federally Threatened, Endangered or Proposed botanical species; or Forest Service Sensitive or other rare or uncommon botanical species. The following materials were considered: aerial photographs, the 2004 Regional Sensitive Plant list, the Olympic National Forest Rare Plant Occurrence GIS cover, the 2006 BLM Geographic Biotic Observations database (GeoBOB), the Washington State Natural Heritage program, district files, and the Olympic National Forest Plants of Concern Identification Guide (May 1994).

Findings from the pre-field review and associated surveys are documented below.

Federal Threatened, Endangered and Proposed Species
There are no Federally Threatened or Proposed non-vascular plants, bryophytes, fungi or lichens documented or suspected on the Olympic National Forest.

There is one Federally Endangered vascular plant, *Arenaria paludicola* (swamp sandwort), that is suspected to occur on the Olympic National Forest. This species is currently considered extirpated in Washington with historical sites recorded in Grays Harbor, King, Pacific, Pierce, and San Juan counties (*Olympic National Forest Plants of Concern Identification Guide, May 1994*). Swamp sandwort grows mainly in wetlands and freshwater marshes from sea level to 1476 feet in elevation and can grow in saturated acidic bog soils and sandy substrates with high organic content.

There are no historical sites of swamp sandwort in the project area and due to lack of suitable habitat it is not likely this species would occur there. There would be no direct, indirect or cumulative effects on this Federally Endangered plant. Therefore the implementation of this

project would not affect the viability of this species.

Forest Service Sensitive and Other Rare or Uncommom Botanical Species
The botany analysis assessed potential effects to species on the Pacific Northwest Regional Forester's Sensitive list (USDA Forest Service 2004) and other rare and uncommon species.

Vascular plants
Habitat for Forest Service Sensitive vascular plant species were assessed for the Dosewallips Road Washout project area in May 2002 (Grover 2002). Of the thirty-six documented or suspected Sensitive vascular plant species for the Olympic National Forest, twelve were identified as having potential habitat in the project area (Table 21). In addition, two rare or uncommon vascular plants were considered as having potential habitat in the project area (*Coptis trifolia* and *Platanthera orbiculata* var *orbiculata).*

Table 21: ONF Sensitive and Other Rare or Uncommon vascular plant species

Common name	Scientific Name	Forest Service Sensitive	Habitat
Triangular-lobed moonwort	*Botrychium ascendens*	Yes	Grassy fields and open woods near streams
Yellow-flowered sedge	*Carex anthoxanthea*	Yes	Grassy and boggy places
Golden chinquapin	*Chrysolepis chrysophylla*	Yes	Dry open sites to thick coniferous woodlands
Tall bugbane	*Cimicifuga elata*	Yes	Moist, shady woods, low elevation
Pacific lanceleaf springbeauty	*Claytonia lanceolata var. pacifica*	Yes	Rock ledges, along margins of creeks
Spleenwort-leaved goldthread	*Coptis asplenifolia*	Yes	Moist conifer forests and bogs at low-mid elevation
Branching montia	*Montia diffusa*	Yes	Low elevation forest
Adder's tongue	*Ophioglossum pusillum*	Yes	Moist meadows, boggy areas
Chain-fern	*Woodwardia fimbriata*	Yes	Streambanks and other moist or wet areas
Threeleaf goldthread	*Coptis trifolia*	No	Wet mossy areas in Western hemlock and silver fir forests
Boreal bedstraw	*Galium kamtschaticum*	Yes	Moist, cold conifer forests and mossy areas
Large round-leaved orchid	*Platanthera orbiculata* var. *orbiculata*	No	Mesic-dry forests in the Western hemlock and silver fir zone; shady areas with deep, moist, undisturbed duff

Bryophytes (mosses and liverworts)

The pre-field analysis for Sensitive and other rare or uncommon bryophyte species revealed no known sites in the Dosewallips Washout project area. The project area contains suitable habitat for two moss species that have both Sensitive status (Table 22).

Table 22: ONF Sensitive and Other Rare and Uncommon bryophyte species

Scientific name	Forest Service Sensitive	Habitat
Schistostega pennata Goblin's gold (moss)	Yes	Mineral soil on upturned tree roots
Tetraphis geniculata bent-knee moss	Yes	Cut end of rotten stumps and lower portion of large rotten logs in shaded, humid conditions from low-mid elevation.
Kurzia makinoana (liverwort)	No	Shady, moist, organic substrates in late-successional and old-growth forest

Fungi

There are 17 Sensitive fungi species that are documented or suspected to occur on the Olympic National Forest. (Table 23). Only one, *Bridgeoporus nobilissimus*, has characteristics that make it feasible to conduct pre-disturbance surveys as this rare fungus has a perennial conk (Hibler and O'Dell 1998). The other sixteen of the Sensitive fungi are seasonal in nature with fruiting bodies in the fall or spring but not predictable from one year to the next.

Table 23: ONF Sensitive and Other Rare and Uncommon fungi species

Sensitive Fungi Species	Status*	Ecological Function	Habitat
Albatrellus avellaneus	Sensitive	Mycorrhizal	Fruits on soil in assoc. w/roots of conifers, probably *Picea* spp., Oct. - Jan.
Albatrellus ellisii	Sensitive	Mycorrhizal	Solitary, scattered, gregarious, or in fused clusters on ground in forests. Under conifers or mixed forests associated w/ *Abies, Picea, Pinus, Pseudotsuga, Tsuga* or *Castanopsis.* Observable late summer and autumn.
Bridgeoporus nobilissimus	Sensitive	Wood saprobe	Sporocarps occur in mesic to wet microsites in forests of all seral stages in the *Abies amabili*s zone. Uses large diameter *Abies procera* & *Abies amabili*s material as host. Observable all year.
Clavariadelphus occidentalis	Sensitive	Mycorrhizal	Solitary to gregarious or in caespitose clusters of 2 or 3 sporocarps; on soil or duff under mixed deciduous-coniferous or deciduous forests. Associated with *Abies*, *Calocedru*s, *Picea*, *Pinu*s, *Pseudotsuga*, *Thuja*, *Tsuga*, *Quercu*s and *Arbutus*. Sept. - Mar. sometimes May.

Cordyceps capitata	Sensitive	Parasite	Parasitic on various *Elaphomyces* (Deer truffle) species in hardwood or coniferous forests. Season: autumn
Gomphus kauffmanii	Sensitive	Mycorrhizal	Closely gregarious to caespitose, partially hidden in deep humus under *Pinus* and *Abies* spp. In autumn.
Gyromitra californica	Sensitive	Wood/Litter Saprobe	Found fruiting on or adjacent to well-rotted stumps or logs of coniferous trees or on soil rich in brown rotted wood. Season: June.
Leucogaster citrinus	Sensitive	Mycorrhizal	Found in assoc. with the roots of *Abies concolor*, *A. lasiocarpa*, *Pinus contorta*, *P. monticola*, *Pseudotsuga*, & *Tsuga* from 280 - 2000 m. in elevation. Season: Aug. - Nov.
Phaeocollybia attenuata	Sensitive	Mycorrhizal	Scattered in humus soil and with mosses under mixed coniferous forests or forests associated with *Pseudotsuga*, *Tsuga*, *Picea*, *Abies*, *Pinus* and *Sequoia*. Mid to late autumn.
Phaeocollybia fallax	Sensitive	Mycorrhizal	Scattered to gregarious in highly humus soil in mixed coniferous forests assoc. with *Abies*, *Picea*, *Pseudotsuga*, *Thuja*, *Sequoia* & *Tsuga*. Season: Sept-Dec.
Phaeocollybia oregonensis	Sensitive	Mycorrhizal	Associated with the roots of *Abies amabili*s, *Pseudotsuga*, and *Tsuga*. Fruits Oct. - Nov.
Phaeocollybia piceae	Sensitive	Mycorrhizal	Associated with the roots of *Abies amabili*s, *Pseudotsuga*, and *Tsuga*. Fruits Oct. - Nov.
Ramaria cyaneigranosa	Sensitive	Mycorrhizal	Fruits in Oct. in humus or soil and matures above the surface of the ground. Assoc. w/ Abies spp., *Pseudotsuga* and *Tsuga*.
Ramaria gelatiniaurantia	Sensitive	Mycorrhizal	Fruits in Oct. in humus or soil and matures above the surface of the ground. Assoc. w/ Abies spp., *Pseudotsuga* and *Tsuga*.
Ramaria stuntzii	Sensitive	Mycorrhizal	Fruits in humus or soil and matures above the ground in Oct. or Nov. Assoc. w/ Pinaceae spp.
Sarcodon fuscoindicum	Sensitive	Mycorrhizal	Scattered to gregarious on soil in fall and winter.
Spathularia flavida	Sensitive	Litter Saprobe	In clusters or fairy rings on litter or woody debris of conifer and hardwood forests in summer and fall

Bridgeoporus nobilissimus, the fuzzy Sandozi fungus, was not found during surveys conducted on May 21, 2002 and again on June 1, 2006. None of the other 16 Sensitive fungi species have known sites documented in the project area based on a review of the 2006 database, Geographic

Biotic Observations (GeoBOB).

There is suitable habitat for the sixteen seasonal fungi species in the project area in late successional forest habitat or legacy components that are proposed for disturbance in several alternatives. An analysis of the 16 seasonal fungi species resulted in a low likelihood of occurrence in the proposed project area as the distance to any known site is substantial (greater than 20 miles).

Lichens

The pre-field analysis for Sensitive and other rare or uncommon lichen species revealed no known sites in the Dosewallips Washout project area. The project area contains suitable habitat for 15 Sensitive and other rare or uncommon lichen species documented or suspected on the Olympic National Forest (Table 24).

Table 24: ONF Sensitive and Other Rare or Uncommon lichen species

Scientific name	Forest Service Sensitive	Habitat
Dendriscocaulon intricatulum	Yes	Mesic forests in TSHE and ABAM Zones, mature old growth stands, both riparian and not. On lower twigs of suppressed understory trees.
Hypogymnia duplicata	No	OG (often ≥ 400 years old) in high precipitation areas
Leptogium cyanescens	No	TSHE/ABAM forests, 1400-1600' elevation
Nephroma occultum	Yes	OG (often ≥ 400 years old) PSME, TSHE, ABAM forests, mid-upper canopy
Pseudocyphellaria rainierensis	No	OG, on conifers in cool, humid forests in the TSHE and ABAM Zones
Cetrelia cetrarioides	Yes	On bark, mainly Alnus rubra and hardwoods in moist riparian and valley bottom forests.
Collema nigrescens	Yes	On bark of broad-leaved trees and shrubs in low elevation forest, often riparian.
Dermatocarpon luridum	Yes	Grows on rocks, boulders and bedrock in streams, rivers or seeps between 1000-6500’ in elevation. Usually submerged or inundated for most of the year.
Leiodermia sorediatum	Yes	On ericaceous shrubs and riparian Alnus rubra in damp, humid habitats.
Leptogium burnetiae var. hirsutum	Yes	Typically epiphytic but also on decaying logs, mosses and rock.
Nephroma bellum	Yes	In moist forests often on riparian hardwoods.
Peltigera neckeri	Yes	On mossy logs, soil and tree bases, especially in wet habitats such as lowland forests.
Peltigera pacifica	Yes	On soil, moss, rocks, logs, and tree bases in low elevation, moist forests.
Platismatia lacunosa	Yes	On boles and branches of hardwoods and conifers in moist, cool, upland sites as well as moist riparian forest.
Usnea longissima	Yes	Epiphytic, fruticose species found in coniferous or hardwood stands and riparian areas.

Olympic National Park
The project area is located on the existing roadway, shoulder, and the adjacent bank. Species present in the general vicinity of the road include Douglas-fir, red alder, big leaf maple, pearly everlasting, yarrow, thimbleberry, salmonberry, and blue rye. At the site (the steep slope just above the wall), mineral soil supports scattered patches of pearly everlasting, grasses, and thimbleberry. Undisturbed slopes nearby which have similar slopes and soils also have low vegetation cover (less than 30%). Overall this appears to be a site which does not naturally support a dense vegetative cover. There are no Federally Threatened, Endangered, or Proposed botanical species, or any unique botanical species that would be affected by the project consequently this issue will not be futher discussed as it relates to the park actions.

Environmental Consequences

Vascular plants

Alternatives A, B, C, and F – All Alternatives

Direct, Indirect, and Cumulative Effects

Olympic National Forest
Field surveys were conducted for the 12 vascular plants listed in Table 21 on May 21, 2002 and again on June 1, 2006, and no Sensitive or other rare or uncommon plants were found. There would be no direct, indirect or cumulative effects on Sensitive vascular plants for any of the alternatives. Implementation of the proposed action would have no risk to species viability or a trend towards Federal listing.

Bryophytes (mosses and liverworts)

Alternatives A, B, C, and F – All Alternatives

Direct, Indirect, and Cumulative Effects

Olympic National Forest
Field surveys were conducted for the three bryophyte species in August 2005 and June 2006, and no Sensitive or other rare or uncommon bryophytes were found. There would be no direct, indirect, or cumulative effects on Sensitive bryophytes with implementation of any of the alternatives. Implementation of any of the alternatives would have no risk to the viability of Sensitive bryophytes or a trend towards Federal listing.

Fungi

Alternatives B and C – Reroute Alternatives

Direct, Indirect Effects, and Cumulative Effects

Olympic National Forest
In general the fungi are a cryptic and challenging taxa group. Sporocarps may be seasonal, ephemeral, and annually variable, making detection difficult. In many cases the ecology and habitat requirements are poorly known. As these species are assumed to be associated with late successional habitats, alteration of these habitats has the potential to impact these fungi species.

The degree of this impact however is difficult to quantify given the lack of information on the distribution and habitat requirements of many of these fungi species.

Analysis of the 16 seasonal fungi species resulted in a low likelihood of occurrence in the project area, as the disturbance to any known site is substantial (greater than 20 miles). Additional suitable fungi habitat and potential host trees are located adjacent to the project area in the late-successional reserve and adjacent Wilderness, and these areas would continue to provide habitat for funge species. For this reason, Alternatives B and C would have no direct, indirect, or cumulative effects on Sensitive fungi and no risk to species viability or a trend towards Federal listing.

Alternatives A (No Action) and F (Bridge)

Direct, Indirect, and Cumulative Effects

Olympic National Forest
There are no known sites of the seventeen Sensitive or other rare or uncommon fungi in the project area. Also there is a low likelihood of occurrence of these fungi in the project area as the distance to any known site is substantial (greater than 20 miles). Late-successional fungi habitat is not affected in these alternatives as the proposed ground disturbance has either previously occurred (Alternative A) or the location of Alternative F does not impact late successional fungi habitat.

Implementation of Alternatives A or F would have no direct, indirect, or cumulative effects on Sensitive fungi and no risk to species viability or a trend toward Federal listing.

Lichens

Alternatives A, B, C, and F – All Alternatives

Direct, Indirect, and Cumulative Effects

Olympic National Forest
Field surveys were conducted for these species in May 2002 and in June 2006 and no Sensitive or other rare or uncommon lichens were found. There would be no direct, indirect, or cumulative effects on Sensitive lichens with implementation of any of the alternatives. Implementation of any of the alternatives would have no risk to the viability of Sensitive lichens or a trend towards Federal listing.

Invasive Plants (Botany Report, May 2006)

Affected Environment

Olympic National Forest
Noxious weeds and other invasive plants may pose a serious threat to the health of National Forests. Executive Order 13112 Invasive Species (Feb. 1999) provides direction that "Federal agencies shall: (1) prevent the introduction of invasive species; (2) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (3) monitor invasive species populations accurately and reliably; and (4) provide for restoration

of native species and habitat conditions in ecosystems that have been invaded." Prevention of invasive plant spread or new infestations along with timely treatment and monitoring of infestations are key objectives for the Olympic National Forest (2080 letter from Forest Supervisor, 2/4/2005).

As of October 2005 all projects need to comply with the Record of Decision on the Pacific Northwest Region Invasive Plant Program, Preventing and Managing Invasive Plants (USDA Forest Service 2005b).

Invasive species surveys were conducted during the August 2005 and June 2006 botanical surveys. Three invasive vascular plants were documented in the project area (Table 25).

Table 25: Invasive plants in the ONF project area

Common name	Scientific name	Washington State Weed Classification*
Herb Robert	Geranium robertianum	B
Tansy ragwort	Senecio jacobaea	B
Hairy catsear	Hypochaeris radicata	B

*****B = Non-native species presently limited to portions of the state. Species are designated for control in regions where they are not yet wide-spread. Preventing new infestations in these areas is a high priority. In regions where these species are already abundant, control is decided at the local level with containment as the primary goal.

Geranium robertianum (Herb Robert) is a low growing, herbaceous, winter and spring annual. It is capable of growing under full canopy in very dense populations and thus poses a threat to forest understories and plant biodiversity. It is spreading rapidly in western Washington. This species is found growing in the east end of the project area adjacent to the dispersed recreation area near the Dosewallips River.

Hypochaeris radicata (hairy catsear) is a perennial plant with yellow flowers resembling a dandelion. It is European in origin and widely established. It is a weed of disturbed sites and waste areas. It is found in the proposed project area along the existing road east of the washout.

Senecio jacobaea (tansy ragwort) is typically a biennial herb but may behave as a perennial if the flowering stalk is injured in any way while flowering. Vegetative regeneration can then occur from crowns, root fragments, or intact roots. It also reproduces by seed which can range from 5,000 to 20,000 per plant. It is a weed of disturbed sites, waste areas, roadsides, and forested areas recently harvested for timber. All parts of the plant are toxic to livestock and humans. It is found near the road washout area.

Olympic National Park

Invasive plants in the park project area include Herb Robert, St. Johnswort, and bull thistle. There is a 0.75 acre patch of Canada thistle at the campground.

Hypericum perforatum (St. Johnswort) is a Class C noxious weed. It is a somewhat long-lived perennial herb that spreads by both underground and above ground creeping stems, and by seed. It is toxic to livestock.

Cirsium vulgare (bull thistle) is another Class C noxious weed. It is a biennial plant that reproduces entirely from seed. This aggressive weed can form dense patches, making revegetation difficult and hindering wildlife and human access.

Cirsium arvense (Canada thistle) is a Class C noxious weed. It is a perennial plant that spreads primarily by vegetative expansion of the root system. It threatens natural communities by directly competing with and displacing native vegetation and decreasing species diversity.

Environmental Consequences

Alternative A - No Action

Direct/Indirect Effects

Olympic National Forest and Olympic National Park
Implementation of the no-action alternative would result in continued spread of existing populations and new infestations of invasive plant species in the project area.

Cumulative Effects

Under the No-Action Alternative existing infestations of invasive plant species would likely continue to spread via use of the temporary trail and the dispersed recreation and parking area on the east end of the washout. The spread of invasive plants would eventually extend beyond the project boundaries into adjacent areas.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

Olympic National Forest
Under alternatives B, C, and F there would be newly exposed ground produced in the areas of road construction or foundations for a bridge, as well as areas disturbed by routine maintenance activitites. These areas would be susceptible to noxious weed and invasive plant colonization particularly since there are already invasive species documented in the immediate adjacent area that could provide a ready seed source. In addition, vehicles traveling on roadways can carry seeds and disperse them. Passengers from these vehicles may also unknowingly transport seeds and plant parts as they transition from roadsides to trails and backcountry areas.

In order to control noxious weed colonization and spread under these alternatives weed-spread prevention and weed eradication activities would be implemented before, during, and after project activities (see Mitigations Measures and Management Requirements common to Reroute Alternatives and River Floodplain Alternatives in Chapter 2). Implementation of the mitigation measures would provide positive results in the prevention of invasive plant spread and treatment of current infestations.

Olympic National Park
The project activities would disturb the surrounding area and increase the likelihood for invasive species to become established. Areas disturbed by routine maintenance activities also can create prime habitat for invasives. By reopening the road to vehicle traffic, invasive plants and their seeds may be transported into the park on vehicles, increasing the risk for the spread of exotic plant species. And passengers from these vehicles may also unknowingly transport seeds and plant parts as they transition from roadsides to trails and backcountry areas.

This is not a new impact as vehicle use has historically occurred on the Dosewallips Road. To reduce the potential of spread road maintenance activities are coordinated with the park exotic plant management team (EPMT). Often road maintenance activities are scheduled before the reproductive growth period. Mechanical or treatment by herbicide is also accomplished to mitigate potential spread. Post project monitoring would occur and treatment would be determined on a case-by-case basis. However, there still is some risk of spread if control measures are not successful.

Cumulative Effects

Past activities that have likely contributed to the spread of invasive plant species in the Dosewallips watershed include, but are not limited to, the following:

- Construction of gravel and paved roads providing ease of access to the watershed.
- Timber harvest activities using machinery imported from other geographic areas containing different invasive species propagules.
- Erosion control measures and forage seeding projects introducing non-native invasive plant species in seed mixes and straw sediment barriers.

On going road maintenance in the form of blading, ditch pulling, and hauling away of associated debris to waste sites is currently spreading some of these species as is the use of material for resurfacing from infested rock sources. Recreational use of the area is also currently spreading invasive species. When considering these effects in addition to the potential direct and indirect effects of the action alternatives there would be minor to moderate cumulative effects associated with invasive plants. Overall the incremental impacts from this project when added to the impacts of the previously mentioned past, present, and reasonably foreseeable actions would not result in substantial cumulative impacts to the resource.

Access and Recreation Use (Recreation Report, March 2006)

Affected Environment

Olympic National Forest

FSR 2610 has provided motorized access to the Olympic National Forest Elkhorn Campground since the 1930s. In years prior to the washout the road annually had provided access to thousands of visitors to Forest facilities. Use numbers for Elkhorn Campground for 2001 were 1,908 people using campsites. The road also provided access for administrative use, such as maintaining the campgrounds.

The Olympic National Forest's Elkhorn Campground is approximately one mile beyond the washout and consists of twenty campsites with most accommodating larger camping vehicles as well as tents (Figures 21 and 22). It is located in an old growth wooded area away from busy highways. Water, vault toilets, tables, and fire pits were provided and the campground was generally open from May to September. In the 1980's, Elkhorn Campground consistently exceeded its capacity and was subsequently considered a high priority for expansion by the Olympic National Forest Plan (USDA 1990a). An additional 15 units were planned to be added as money became available. This campground is one of two on the Forest that is considered

"semi-primitive motorized" where campers can experience a high to moderate degree of isolation from the sights and sounds of humans while still enjoying reasonably easy access.

Elkhorn Campground has received no maintenance since the washout in 2002. The vault toilets were boarded closed but have been reopened several times by people. The toilets are full and unusable. Picnic tables and fire rings have deteriorated to the point of being unusable. The river has inundated several sites with gravel and sand deposits. Dispersed camping/picnicking still occurs during the year, however no services have been provided and no monitoring of this use has taken place.

Figure 21: Elkhorn Campground

Figure 22: Elkhorn Campground campsite

A temporary trail has been constructed up and around the washout to provide safe access for hikers, stock, and administrative use. Very limited parking is available near the washout and the road becomes congested in the summer months with vehicles parked along both shoulders.

Olympic National Park

FSR 2610 (becoming The Dosewallips Road when entering the park) was extended past the Elkhorn Campground area to Olympic National Park Dosewallips Campground and trailheads by the Civilian Conservation Corps in the late 1930s and early 1940s. This road up the Dosewallips River valley (FSR 2610 on the ONF and Dosewallips Road on ONP) has been one of the two motorized access points to the eastern wilderness of Olympic National Park, as well as providing access to the developed area at the end of the road. The developed area includes the road, "less developed" campground and restrooms, parking, several trailheads, and a ranger station/housing unit (Figure 23). The developed area was used as a base of operations for aerial activities, including search and rescue operations.

This area is primarily a summer recreational area with visitation reduced to a great extent in the winter months. In 1999 the road use at Dosewallips was 4,299 vehicles annually (NPS traffic counter records). In summer 2001 traffic counts were conducted along U.S. 101 around the park and on access roads within the park. These counts were used to determine the highest daily volumes to park destinations during the summer. Counts for Dosewallips recorded traffic in both directions for a total of 202 vehicles (Parametrix 2002) per day.

Figure 23: ONP Dosewallips Ranger Station

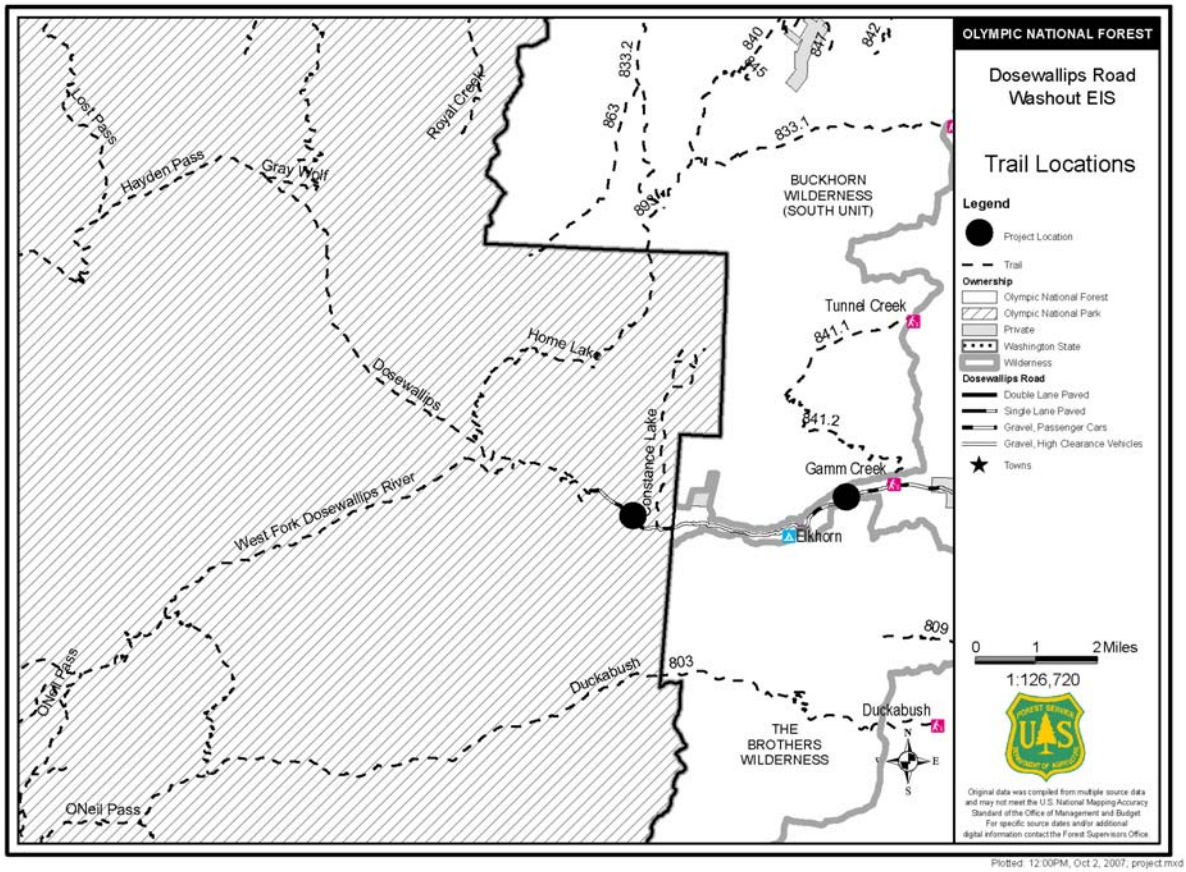
The National Park Service operates a 30-site, less-developed drive-in campground at Dosewallips. The campground was accessible to motorists but generally not accessible to large RVs or vehicles pulling trailers (which are not recommended on the Dosewallips Road past the NPS boundary). In addition Dosewallips park facilities include 30 to 40 unpaved parking spaces in the campground, ranger station area, and at the trail head.

The campground is a popular spot during the summer months and often serves as a first or last night stopover for wilderness travelers. It also provides a more primitive camping opportunity for park visitors. According to area NPS staff the campground was busy during the summer months, approaching capacity during summer weekends prior to the road closure.

Several trailheads (see Figure 24) are located at Dosewallips: the Terrace Loop Trail, and two major cross-park trails. The Main Fork Dosewallips Trail to Hayden Pass leads to the Elwha River, where the trail splits south to Quinault and north to Hurricane Ridge and Elwha. The West Fork Dosewallips Trail leads to Anderson Pass, then down into Enchanted Parkway and Graves Creek, as well as the Quinault area, Lake Constance, and Constance Pass Trail.

Several factors have influenced visitation in the Dosewallips in the past ten years. In 1994 the park determined that the High Dosewallips trail bridge on the West Fork Dosewallips Trail, one of the most popular cross-park wilderness trails, needed to be replaced. In 1996 a major trail bridge on the West Fork Dosewallips Trail was dropped because it was determined to be hazardous. It was replaced by a new bridge in 1998, but that bridge was destroyed by heavy snowloads in 1999. A new bridge was completed in the summer of 2002. Between 1996 and 1998, and 1999 and 2002, no cross park travel on the West Fork Dosewallips Trail was possible as there was no other river crossing available (due to the steepness of the canyon at this point). Therefore visitation in the Dosewallips area and wilderness was greatly reduced during this time.

Figure 24: Trail locations



Since the road was washed out shortly after the bridge was completed the expected increase in travel on the West Fork Dosewallips Trail has not occurred, and wilderness use from the Dosewallips area has decreased. Dosewallips overnight wilderness use in 2002 (pre-road closure) was 1098 parties with 2830 visitors. Post-road closure use has been 315 parties with 812 visitors. According to the NPS Wilderness Information Center staff, permit requests for overnight use in the Lake Constance Basin has also substantially decreased since the road closure.

NPS *Management Policies* 2001 state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the National Park Service is committed to providing appropriate high-quality opportunities for visitors to enjoy the parks.

Part of the purpose of ONP is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

Public scoping input and observation of visitation patterns combined with assessment of what is available to visitors under current management were used to estimate the effects of the actions in the various alternatives in this document. The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources and objectives presented in the park significance statements as derived from its enabling legislation. The potential for change in visitor use and experience proposed by the alternatives was evaluated by identifying projected increases or decreases in access and other visitor uses and then determining whether or how these projected changes would affect the desired visitor experience and to what degree and for how long. The thresholds of change for the intensity of an impact to visitor experiences are defined as follows:

Impact Intensity	Intensity Description
Negligible	Changes in visitor use, experience, and recreational resources would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.
Minor	Changes in visitor use, experience, and recreational resources would be detectable, although the changes would be slight. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate	Changes in visitor use, experience, and recreational resources would be readily apparent. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
Major	Changes in visitor use, experience, and recreational resources would be readily apparent and severely adverse or exceptionally beneficial. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

Visitor use, experience, and recreational resources impacts would be considered short-term if the effects last for the durations of the action. Visitor use impacts would be considered long-term if the effects last longer than the durations of the action.

Environmental Consequences

Alternative A – No Action

Direct/Indirect Effects

Olympic National Forest
FSR 2610 would end at or near the washout. Parking and camping opportunities would be limited and eventually only the most experienced recreationists would access the area. Elkhorn Campground would remain closed. Maintenance would not occur and the site would gradually deteriorate over time with the tables, fire rings, and defined camping sites becoming unusable. The vault toilets would gradually fall apart and the waste would eventually leach into the ground or become diluted with rain or river water. Over time people would still use the area but only for dispersed camping/picnicking. A future decision would be needed on these facilities and on the status of the temporary trail.

The dispersed camping areas along FSR 2610 near the washout would not be disturbed as part of this action.

Olympic National Park
Under the no action alternative recreational opportunities in the Dosewallips area would decrease and visitor use would remain at lower levels than pre-washout conditions. Visitors would no longer be able to utilize vehicles to access Dosewallips ranger station and campground and visitors with accessibility challenges would not be accommodated. Visitors who rely on vehicles for access would not be able to experience the primitive recreational opportunities in the Dosewallips area. Visitors would no longer be able to utilize the campground as it would remain closed.

Visitors who could hike the additional miles into the Dosewallips area may or may not change their plans due to the road and facility closures. Some visitors would hike the additional 5 miles to the NPS trailheads and still enjoy a wilderness experience. Some visitors may hike to Dosewallips and be disappointed that the facilities are closed. Some visitors may choose to visit other areas of the park that are more accessible (where trailheads are closer to the road) and have more facilities available such as campgrounds. These displaced visitors may create crowding in other areas of the park including Staircase, Deer Park, and Quinault, and in adjacent Forest Service areas.

Those visitors who prefer that the road remains closed may benefit from the no action alternative. These visitors would still be able to hike on the road free from the sights and sounds of vehicles which could lead to an improved backcountry experience in a non-wilderness area. There would be no bicycling allowed on the road should it remain closed. NPS regulations prohibit the use of bicycles except on park roads, parking lots, and designated routes. The closed road would be considered a trail and generally bicycles are not allowed on trails due to potential user conflicts between stock users, hikers, and bicyclists. Also if the road remains closed it is likely that fewer NPS wilderness permits would be requested for trails that originate out of Dosewallips, resulting in reduced use of the wilderness in this area. This could benefit wilderness users as it could result in more solitude and less visitor contact.

There could be adverse impacts to park visitors who utilize the wilderness trails out of the Dosewallips area. Trail maintenance and emergency repairs would be reduced under the no action alternative due to restricted access. Therefore trail conditions could deteriorate which could negatively affect the visitor experience in this area.

Overall under the no action alternative there would be decreased visitor facilities and recreational opportunities which would lead to reduced visitor use in the Dosewallips area and could create a moderate to major adverse effect to visitors who would access the area with vehicles.

Cumulative Effects

Dispersed camping along the riparian area below the washout location which is accessed by FSR 2610 would continue. The continued closure of FSR 2610 at the washout site would likely increase the use of these areas, especially those areas close to the washout. The planned Dosewallips Riparian Rehabilitation project which would rehabilitate dispersed recreation sites along the river would reduce the dispersed camping opportunities. The combined effects of these activities could result in creation of new dispersed camping areas as forest visitors seek places to camp while they enjoy day hikes and activities past the washout. Also continued road access restriction past the washout would not provide options for campers looking to stay in campgrounds near the Dosewallips River area such as the Forest's Seal Rock Campground and the state's Dosewallips Campground. Use numbers of the facilities along Highway 101 could exceed capacity on weekends and holidays. The proposed Pleasant Harbor Marina and Golf Resort, located near Brinnon, may result in an increased desire for recreational opportunities in the local area which would not be met under this alternative.

There are nine major park access roads (not including spur roads) in the interior portion of the park that provide vehicular access to park facilities and wilderness trailheads. Park roads can be periodically and temporarily closed due to weather conditions. It is the park's goal to continue to allow vehicular access on existing park roads; however because many of the park roads are located in floodplains or on unstable soils they are at risk from flooding and erosion. Therefore in the future there could be temporary closures due to flood events.

Currently three of the interior roads are closed to vehicular access (Dosewallips, Staircase, and Queets Roads) due to slide and/or erosion issues. This has restricted vehicular access on 33 percent of the park's interior roads and both of the two eastern access roads in the park. Both the Dosewallips and Queets Roads provide access to unique, less developed areas that allow visitors to enjoy more primitive recreational opportunities. If both areas remain closed there could be major adverse effects to visitors who would utilize vehicles to access these areas and would result in the removal of recreational facilities in both areas. Visitors would likely be redirected to other areas of the park resulting in increased visitor use in those areas. Access to the park's Staircase area has also been restricted since November 1, 2007 due to seasonal closures for safety reasons and storm damage. Staircase is the other eastern access road into the park and with its closure there are no access points on the east side of the park.

Cumulative effects from the closure of three developed areas in the park (including the seasonal closure at Staircase) and potential for additional road closures in the future would be long-term, adverse, and moderate to major.

Alternatives B, C and F – All Action Alternatives

Direct/Indirect Effects

Olympic National Forest
Alternatives B and C would restore vehicle access to the upper Dosewallips Valley area via an upland route, and Alternative F would restore vehicle access with a road alignment which approximates the original road location along the river All alternatives would have the same effects on access and recreational use.

Elkhorn Campground would be reopened, providing the semi-primitive motorized camping opportunity that many people desire as is evident from the pre-washout use. Motorized access would provide reasonably easy access for those with accessibility challenges. It would also help meet the overall increase in recreation, especially for day use activities, expected for the Olympic and other national forests in the Puget Sound and Seattle area (Hall 2005). Most of the picnic tables, fire rings, and tent pads would need to be repaired or replaced. Sites that were flooded by the river would be restored or moved. The vault toilets would be pumped and repaired or replaced, and danger trees would be identified and removed. The water system would be reopened and maintained, providing potable water for people in the area.

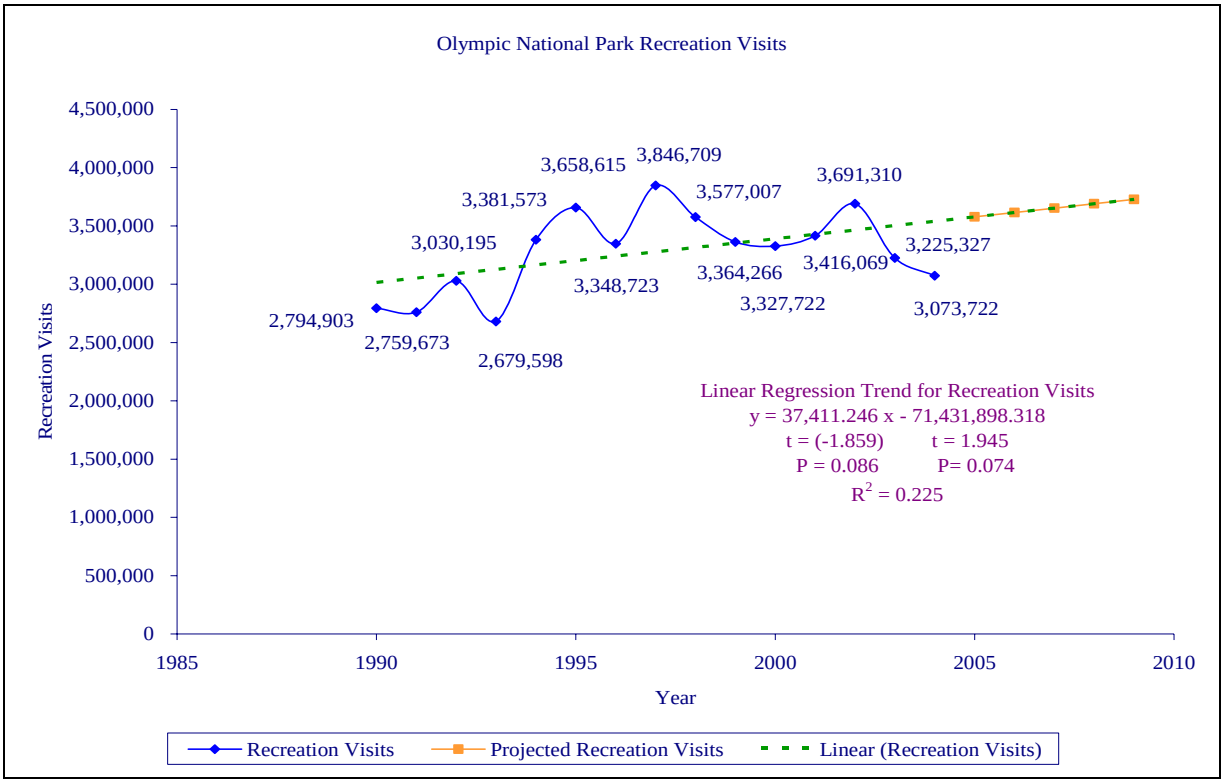
Expenses to reopen the campground are estimated to be $162,000.

The temporary trail would be restored to a natural state where needed and abandoned.

The dispersed camping areas along FSR 2610 near the washout would be used for construction equipment staging and would not be available for public use during construction. These areas would be rehabilitated after construction was finished and would be closed to camping. Dispersed sites (general forest area) are identified in the Forest's July 2007 Outdoor Recreation Strategy (USDA Olympic National Forest 2007) as locations that afford visitors an experience mostly free from the sights and sounds of developed sites. Limited Forest resources are committed to these sites and natural resource degradation is often a serious problem. The Outdoor Recreation Strategy emphasizes that these sites will be managed to reduce resource impacts while meeting user needs. A suggested action is to restore or close high priority dispersed sites. Post construction rehabilitation of the FSR 2610 dispersed camping area would follow the direction in the Outdoor Recreation Strategy.

Olympic National Park
Under these alternatives recreational opportunities in the Dosewallips would be restored to pre-road closure conditions. Visitors would be able to access the Dosewallips area by vehicle. It is expected with restored vehicular access to Dosewallips that visitation would likely be higher at first than pre-road closure conditions due to the area interest and publicity generated through this planning process. However visitation would likely level off and then would be expected to increase in the future similar to the current upward trend in park wide visitation (projected at 0.4 percent). (Figure 25, Source: National Park Service and Bureau of Reclamation)

Figure 25: ONP visitation trend



Visitors with accessibility challenges would be able to access the NPS facilities at Dosewallips. Visitors would still be able to use bicycles or hike the road to access the Dosewallips area. However since the road would be open to vehicular traffic they would no longer be able to enjoy a primitive backcountry experience free of the sights and sounds of vehicles.

Visitors who would prefer that the road remain closed would be adversely impacted by the reopening of the road to vehicular traffic. However within the park and Forest Service areas there are ample opportunities (approximately 611 miles of maintained park trails in park wilderness) for non-motorized recreation and hiking without the presence of vehicles.

Under these alternatives the facilities at Dosewallips would reopen at an estimated expense of $17,600. Visitors would be able to utilize the campground and restrooms which would improve the visitor experience and recreational opportunities in the area. Visitors would be able to access the wilderness more easily by parking at or near the trailheads. Trail maintenance activities would be increased to pre- closure levels and trail conditions would likely improve in the trails accessed from Dosewallips. The Dosewallips area provides access to two of the most popular cross park trails.

Overall these alternatives would lead to increased recreational opportunities and visitor use at Dosewallips and an improved visitor experience.

Cumulative Effects

Motorized access to Elkhorn Campground and the park's Dosewallips Campground would reduce the use of the dispersed campsites located along the Dosewallips River riparian area below the washout. There would be less likelihood of new dispersed sites being created to replace the existing sites rehabilitated by the Dosewallips Riparian Rehabilitation project. Utilization of Elkhorn and the park's Dosewallips Campground would provide a camping opportunity in the Dosewallips River area in the case the campgrounds along Highway 101 become filled, especially during weekends and holidays. The proposed Pleasant Harbor Marina and Golf Resort, located near Brinnon, may result in an increased desire for recreational opportunities in the local area which would these alternatives would meet in part.

Park roads can be periodically and temporarily closed due to weather conditions. It is the park's goal to allow vehicular access on existing park roads; however because many of the park roads are located in floodplains or on unstable soils they are at risk from flooding and erosion. Therefore in the future there could be temporary closures due to flood events.

Reopening the Dosewallips Road would restore vehicular access to one of the three closed roads in the park and this could have major beneficial effects to visitors who would utilize vehicles to access this area and would result in the reopening of recreational facilities at Dosewallips. Therefore these alternatives would not result in adverse cumulative effects to visitor use and recreational facilities and would result in beneficial effects from reopening one of the three currently closed access roads in the park.

Wilderness (Wilderness Report, March 2006)

Affected Environment

Olympic National Forest
The Washington State Wilderness Act of 1984 created the two Wildernesses near the project area, Buckhorn and The Brothers. A boundary adjustment in 1986 between the Forest and ONP altered the size of these two Wildernesses. Wildernesses within the Forest are to be managed to assure that appropriate diversity and existing wilderness character are maintained.

The Buckhorn Wilderness located to the north of the project area is 44,258 acres. It is bordered on the south by the Dosewallips River and ONP on the west. The wilderness boundary in the vicinity of the project is at the 1,000 foot elevation contour. While there are about 68 miles of trail within the Wilderness the only trail in the southern most portion of the Wilderness is the southern end of the Tunnel Creek Trail. At the closest point this trail is about ¾ mile away from the project area.

The Brothers Wilderness located to the south of the project area is 16,682 acres. It is bordered on the north by the Dosewallips River and ONP on the west. The wilderness boundary in the vicinity of the project area follows the southern edge of the river as it was located in 1984 when the wilderness was designated. There are no trails near the project area.

Olympic National Park
Proposed activities are located outside of wilderness boundaries.

Environmental Consequences

Effects of the alternatives on wilderness resources within the Forest were evaluated by using the Arthur Carhart National Wilderness Training Center "Minimum Requirement Decision Guide" (MRDG). While this guide is primarily designed to assist managers in making appropriate decisions about administrative actions in wilderness, the processes used are a useful way to frame the analysis of actions near wilderness boundaries.

Alternative A - No Action

Direct/Indirect Effects

Olympic National Forest
There would be no effects on the preservation of wilderness character in terms of these qualities: untrammeled, undeveloped, natural, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. Consequently there would be no effects that would prevent the wilderness from remaining unimpaired for the future use and enjoyment as wilderness.

There would also be no effect to wilderness heritage and cultural resources; maintaining contrast and skills; special provisions; safety of visitors, personnel, and contactors; and economic and time constraints.

Alternatives B and C – Reroute Alternatives

Direct/Indirect Effects

Olympic National Forest
These alternatives propose no activities within the Buckhorn Wilderness or The Brothers Wilderness and would have no effect on the preservation of wilderness character in terms of these qualities: untrammeled, undeveloped, and natural.

The Brothers Wilderness is located south of the Dosewallips River well away from the proposed activities. The boundary of the Buckhorn Wilderness in the project area is at the 1,000 foot elevation contour. The highest elevation of the proposed reroutes would be at the clearing limits beyond the top of the cut as the road climbs the slope to the northeast of the washout. This elevation would be at about 650 feet. There would be an approximate 350 foot elevation gain or a 500 foot horizontal distance to reach the Buckhorn Wilderness boundary. There are no trails or known recreational activities within the wildernesses near the project area.

There would be some limited effect to the wilderness character of outstanding opportunities for solitude and unconfined type of recreation during road construction. Construction activities would generate noise and dust for limited times within a three year period. However due to the distance of the activity from the wilderness boundaries and the limited use of the wildernesses in the affected area the effect if any would be minor and short-term in nature. The road would result in increased vehicle traffic in the project area and in the area beyond the washout up to the Dosewallips Campground. This increase in traffic would generate some noise and limited dust (road surface would be crushed aggregate), but due to

the distance from the wilderness boundaries combined with the condition that there are no trails in the portions of the Buckhorn Wilderness and The Brothers Wilderness near the project area, this would result in no effect to opportunities for solitude or unconfined recreation over the long-term.

There would also be no effect to wilderness heritage and cultural resources; maintaining contrast and skills; special provisions; safety of visitors, personnel, and contactors; and economic and time constraints.

Alternative F - Bridge

Direct/Indirect Effects

Olympic National Forest
This alternative proposes no activities within The Brothers Wilderness or the Buckhorn Wilderness and would have no effect on the preservation of wilderness character in terms of these qualities: untrammeled, undeveloped, and natural.

There would be some limited effect to the wilderness character of outstanding opportunities for solitude and unconfined type of recreation during road construction. Construction activities would generate noise and dust for limited times within a three year period. However none of the activities proposed under this alternative occur on the south side of the river, and proposed activities would occur close to where FSR 2610 was located at the time of wilderness designation. Due to the distance of the activity from the wilderness boundaries and the limited use of the wildernesses in the affected area, the effect if any would be minor and short-term in nature. The road would result in increased vehicle traffic in the project area and in the area beyond the washout up to the Dosewallips Campground. This increase in traffic would generate some noise and limited dust (road surface is crushed aggregate) but due to the distance from the wilderness boundaries combined with the condition that there are no trails in the portions of the Buckhorn Wilderness and The Brothers Wilderness near the project area, this would result in no effect to opportunities for solitude or unconfined recreation over the long-term. Conditions created by restoring road access at the washout site would not be appreciably different than what existed at the time of wilderness designation.

There would also be no effect to wilderness heritage and cultural resources; maintaining contrast and skills; special provisions; safety of visitors, personnel, and contactors; and economic and time constraints.

Alternatives A, B, C, and F – All Alternatives

Direct/Indirect Effects

Olympic National Park
Wilderness Values: The project occurs outside of wilderness boundaries and therefore is not subject to Wilderness Act requirements.

Cumulative Effects

There are no past, present, and reasonably foreseeable activities in the Wilderness areas near the ONF project area. As such there is no overlap with effects of the project and no cumulative effects.

Social/Economic (Socio/Economic Assessment, March 2006)

Introduction

Information and tools used in this assessment came from a variety of sources. Formal and informal business interviews were conducted in the Brinnon, Quilcene, and Eldon areas in April 2002. A total of six businesses were contacted. Additional informal interviews of six Brinnon area service oriented businesses were conducted in February/March 2006. Information was also gathered from county profile information, 2000 US census information, and Northwest Forest Plan socioeconomic monitoring results.

The economic analysis was conducted using Quick-Silver which is a program for financial and economic efficiency analyses of resource management and capital investment projects. Monetized benefits associated with reestablishing road access on FSR 2610 are difficult to quantify (e.g. the value associated with being able to drive into the Dosewallips area of the park) as are those associated with not restoring motorized access (e.g. the value of solitude in walking the closed road). These benefits are discussed qualitatively in the "Access and Recreation" section. Additionally the affects on businesses such as related jobs and income are not included in financial and economic efficiency analyses. Results of informal interviews with local businesses did not include the quantitative information necessary to include these values in the financial and economic efficiency analysis. Since there are no benefits included in this analysis this is a cost minimization analysis. Cost estimates used in the analysis are the agencies' best approximation. They are used in comparing the alternatives against each other rather than projecting an absolute value. Investment performance is displayed as the present value of discounted costs.

Affected Environment

There are two primary locations of concern with respect to social and economic conditions. One is the small unincorporated community of Brinnon (Figure 26) located in east Jefferson County about 2 ½ hours from Seattle by ferry. The Brinnon Census Designated Place had a population of 803 reported in the 2000 census with the core area situated along Highway 101 near the mouth of the Dosewallips River (Figure 27). As such it is the community most affected by changes in recreation opportunities in the Dosewallips watershed. The other location of concern is the nearby community of Quilcene located about 10 miles north of Brinnon along Highway 101 which is valuable to consider when assessing the social and economic effects of the alternatives as it is a hub for goods and services for the Hood Canal geographic area that includes Brinnon. The community of Quilcene was included in a recent Northwest Forest Plan monitoring report on socioeconomic conditions which provides information useful to this evaluation (USDA 2006a, USDA 2006b).

Figure 26: Brinnon along Highway 101

The economies of Brinnon and Quilcene were highly dependent on the timber industry until the early 1990's. As the timber industry has declined there has been increased employment in all the service industries. Between 1990 and 2000 there was a slightly greater than 100 percent increase in the number of people employed in service industries in east Jefferson County (USDA 2006a). Many local entrepreneurs are focusing on recreation and tourism development and there has been some business development in this arena.

Based on interviews it is clear that local service-oriented businesses along Hood Canal in east Jefferson County depend heavily on recreation as a primary source of income. Income generated between mid-May and Labor Day for these businesses was in the 75 percent range of total annual income indicating a strong reliance on summer recreation for business survival. In context of the overall economy of the eastern Olympic peninsula the effects of reduced access to the upper Dosewallips River valley are a small drop in the bucket. But on an individual business scale the effects become much more meaningful.

Figure 27: Looking up the Dosewallips River valley from Brinnon

Many visitors, including international travelers, come to the eastern Olympic peninsula with specific destinations in mind. Although the upper Dosewallips River valley is not considered the biggest attraction in the area (Dosewallips State Park, shoreline activities such as clamming, and Seal Rock Campground were all mentioned as bigger draws), local businesses did indicate this area has been mentioned as a destination area and they still get questions and comments about access to the area.

Environmental Consequences

Alternative A – No Action

Direct/Indirect Effects

Olympic National Forest and Olympic National Park

Effects experienced by local businesses since the washout in 2002 would continue. Continued loss of the attractions in the upper Dosewallips River valley would likely entail reduced income

for service-oriented businesses in the Brinnon area as well as the potential for reduced employment and the possible failure of businesses heavily dependent on recreation use of the upper Dosewallips River area. It is possible that as the limited access to the upper Dosewallips River attractions has become known that those whose destination would have been this area may have diverted their recreation to somewhere other than Brinnon and vicinity.

Efforts to promote tourism in the area have been hampered by the closure of FSR 2610 (USDA 2006b). While business owners are interested in working with the Forest Service in developing tourism, there are concerns about the potential to exploit and rely on the national forest to support tourism. One business owner commented about the closure of FSR 2610 in the Northwest Forest Plan socioeconomic monitoring report and stated "The washed out road directly affects the businesses and people who rely on tourists who would normally use that road. … Once that access is cut-off people just stop coming" (USDA 2006a).

Most businesses indicated there was a slight adverse effect due to the closure on FSR 2610 (these businesses are more dependent on people passing through the area or in one case the users of the Dosewallips State Park). Some mentioned a decrease in business associated with the belief that some recreationists who would have come to the Brinnon area if the road were open are going elsewhere. While most businesses were unable to quantify these effects, one business reported an 80 percent decrease since 2002, primarily due to this business's location along the Dosewallips Road and its reliance on day-use visitors to the park's Dosewallips facilities. This decrease has resulted in the business no longer providing a livable source of income and the owners have had to supplement their income with other endeavors.

The discounted cost (the current value of costs that occur over time) for this alternative would be $5,000. This reflects an estimate of the expenses associated with safely terminating FSR 2610 at the washout, such as installation of a jersey barrier. Costs associated with developing facilities at the end of the road near the washout are not included in costs of this alternative. Any new facilities would need to be considered in a future analysis and decision. The park would incur no expenses under this alternative.

Cumulative Effects

While the potential effects of the washout on FSR 2610 on local Brinnon area businesses are isolated situations and may not be noticeable at a larger scale the continuation of reduced access to some recreation opportunities on the eastern Olympic peninsula may have some effect on the overall economy of the area. With the increased focus on tourism in the area as a component of economic health any reductions in recreation opportunities could contribute to reduced economic vitality of the area.

Alternatives B, C, and F - All Action Alternatives

Direct/Indirect Effects

Olympic National Forest and Olympic National Park
All the action alternatives reestablish road access on FSR 2610 and would have similar social and economic effects.

Restoration of motorized access to the attractions in the upper Dosewallips River valley would

likely restore recreation use of the area to levels approaching use prior to the washout. This would result in an increase in income for service oriented businesses in the Brinnon area which could lead to increased employment. As it becomes known that road access to these attractions is available visitors could once again make the Dosewallips area a destination in their travels.

The discounted cost of each alternative is shown in Table 26. They were calculated using the Quick Silver economic analysis program and represent the current value of the costs associated with each alternative (including construction and maintenance costs). Alternative A has by far the lowest cost and Alternative F is by far the most expensive having estimated costs in excess of nine million dollars. Costs for park expenses for all action alternatives remain constant.

Table 26: Discounted costs

	Present Value of Discounted Costs	
Alternative	**Forest**	**Park**
A	$5,000	NA
B	$3,116,000	$330,100
C	$4,329,000	$330,100
F	$9,095,000	$330,100

Cumulative Effects

The positive effects of restoring motorized access on FSR 2610 to local Brinnon area businesses may not be noticeable at scales larger than the community. There may be some positive effects to the overall economy of the eastern Olympic peninsula because of improved access to the recreation attractions in the upper Dosewallips River valley. These benefits could increase the focus on tourism which is an important component of the area's economy.

Visual Quality (Visuals Report, March 2006) (Olympic National Forest actions only)

This issue applies only to ONF actions. There is no issue with visuals on ONP lands as there would be no change from the existing condition. ONP actions would occur on an existing road and involve work on existing erosion control structures.

Management Direction

Forest Plan direction for visual resources is provided by the Visual Management System. This system assigned Visual Quality Objectives (VQOs) to all parts of the Forest. The VQOs are categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape. Visitor sensitivity, variety classes, and distance zones were the major criteria used to establish the VQOs.

The VQOs for the project area were established in standard and guideline 2.a. for Natural Management Rivers (under the River Corridor Management Prescription A4BN). This standard and guideline states "Within the river corridor, the Visual Quality Objectives of Retention and

Partial Retention should be met as seen from the river and riverbank." Retention means that activities should not be evident but remain visually subordinate to the characteristic landscape. Partial Retention means that activities may be evident but remain visually subordinate to the characteristic landscape. The Dosewallips project area viewshed is a mix of Retention and Partial Retention.

Additionally there is an area about ½ mile southwest of the project area that is designated "Management Prescription A2 – Scenic" under the Forest Plan. This area is located near the end of FSR 2610040. The project area cannot be seen from this area due to existing mature vegetation and terrain features so there is no effect to the visual quality of this area.

Affected Environment

The existing visual condition for the Dosewallips project area viewshed as described in the Forest Plan FEIS is moderately altered appearance. This indicates that the existing visual appearance of the viewshed has been moderately altered, less than 20 percent, from a natural appearing landscape. The viewshed is the landscape viewed from FSR 2610 and use areas.

The visual condition has been further modified by the road washout which has created the high bank. This is an area of exposed mineral soil, about 500 feet long and 150 feet high.

Environmental Consequences

Alternative A – No Action

Direct/Indirect Effects

The existing visual condition as seen from the river and river bank would be unchanged by management activities. The high bank would remain predominately unvegetated in the short-term as the river continues to periodically erode the base and maintain conditions for continued raveling of the exposed slope. The high bank would continue to be viewed as an area of exposed mineral soil. The VQO of Retention would be met under this alternative.

Alternatives B and C – Reroute Alternatives

Direct/Indirect Effects

There would be minor if any effects to visual quality as seen from the river and riverbank due to the management activities associated with the reroute alternatives. The majority of the reroute would not be visible from the river and riverbank due to existing vegetation screening any view of the newly constructed road. Only in the area above the washout is there a lack of this existing vegetative screen and in this area the terrain blocks the view of the road from the river and riverbank. The road in this area would be constructed on a relatively flat terrace which would not be visible when down on the river. The high bank would continue to develop naturally with no improvement in the visual condition in the short-term. The VQO of Retention would be met under these alternatives.

Alternative F - Bridge

Direct/Indirect Effects

There would be minor effects to the visual quality of the project area as seen from the river and riverbank. The bridge would be constructed of concrete spans, supported by five to seven concrete pilings. This management activity would be noticeable from the river and riverbank but would remain subordinate to the overall characteristics of the existing landscape which includes FSR 2610. The vegetated slopes which make up the majority of the landscape characteristics would be unchanged. The high bank would continue to develop naturally with no improvement in the visual condition in the short-term. The VQO of Partial Retention would be met under this alternative.

Alternatives A, B, C, and F - All Alternatives

Cumulative Effects

None of the past, present, and reasonable foreseeable activities in the Dosewallips River watershed are visible from the project area. As such there is no overlap in space with effects of the project and there are no cumulative effects.

Climate Change (Climate Issues Report, January 2006)

Stream Flows

Affected Environment

Climate trends that may influence stream flows and the frequency of flooding in the future include cyclic effects such as the Pacific Decadal Oscillation (PDO) and long-term effects such as Global Warming. These are both long-term and large-scale phenomenon with fairly subtle changes and a lot variability. Cyclic trends such as PDO are expected to have a greater impact on stream flow (floods) than long-term increases represented by global warming. It is important to note that any effects from global warming or cyclic climate changes would be system wide. The important thing is scale as this would not be a site-specific change.

There is not a currently active stream gage on the Dosewallips River. The Dosewallips gage was discontinued in 1969. The closest stream gage with a substantial period of record is on the Duckabush River (USGS 1205400 Duckabush River near Brinnon, WA). The period of record is from 1939 to present. Looking at the annual peak flow data a trend in increasing peak stream flow over time is evident. All 3 of the flood flows exceeding 9,000 cubic feet per second (cfs) (20 to 25-year recurrence interval flood as calculated in the reach analysis) have occurred in the past 10 years. Seven out of the 10 highest flows on record occurred during this same period, this included 5 floods exceeding Q_{10} (10-year recurrence interval). It seems unlikely that the magnitude of the largest (extreme) flood events would be affected. If any effect is noticeable, an increase in the frequency of annual and modest floods would be most likely.

Increasing peak flows are evident in the streamflow records, the 5-year average with the post 1995 data shows an increasing trend, and it would not be surprising to find an increasing trend in the frequency of bankfull flows as well. The frequency of flows equaling or exceeding bankfull

are of interest because these flow levels are responsible for doing the most work over time in terms of shaping and maintaining the channel.

Climate driven channel adjustments would take place on a scale well beyond the washout site. Examining site specific effects and links to adjacent habitat for example is highly speculative and may be missing the larger effects of changes to or within the system. Predictions of effects at the site level (if any) would be unreliable. Links between the washout and downstream habitat are unknown in this context.

Additional risk or impact to the road from high flows seems more likely. Examining the issue of risk assessment and the potential for future washouts is probably more reasonable in this context.

Environmental Consequences

Direct/Indirect/Cumulative Effects

Alternatives A (No Action); B and C (Reroute Alternatives)

The effects resulting from a change in climate as addressed here really only affect the alternative that puts the road back along the channel margin. It is primarily a function of the interaction of the river and the restored road, and the cost of maintenance and repair. Alternatives A, B, and C are not expected to be affected by increased stream flows.

Alternative F - Bridge

A possible outcome of an increasing trend in peak flows is an increased interaction (and effect) between the river and the bridge. Continued expansion of the washout area (eroding bank area) upstream or downstream would be the primary issue. Flanking of the downstream abutment with a channel shift into the low laying area north of FSR 2610 was a concern suggested by the regional bridge engineer during the Choosing By Advantages analysis. The downstream abutment would be armored accordingly and locating this abutment downstream of the washout area to an area where the river exerts less force on the bank would mitigate this concern. The bridge would be designed such that the deck would be high enough to pass flood water with associated debris. Any changes in streamflow are expected to be fairly small and most prevalent in the frequency of small and moderate floods rather than in the magnitude of the largest peak events. Bridge design should be capable of accommodating these conditions as safety factors typically used are usually intended to address hydrologic variability within the expected range of the 500-year flood (Q_{500}).

Carbon Sequestration

Affected Environment

Carbon sequestration is the uptake and storage of carbon. Forests can play an important role in mitigating climate change by naturally taking carbon out of the atmosphere (Perschel et al 2007). Permanent removal of forested ground, such as due to road construction, could impact carbon sequestration.

The forest vegetation within the proposed reroute alternatives is sequestering carbon. Included in

this vegetation are about 200 trees that are 21 inches dbh or larger.

Environmental Consequences

The No Action Alternative and Alternative F (Bridge) would have little if any impact on carbon sequestration since very little vegetation would be removed and very little ground that currently supports vegetation would be converted to a non-vegetative condition.

Alternatives B and C, the reroute alternatives, would remove about 7 acres of forest and convert it to a roaded condition. This acreage includes the cuts and fills on the steeper side slopes that are not likely to support mature vegetation into the future. It is reasonable to assume that there would be some loss of carbon sequestration under these two alternatives. However this is a complex issue and tools are not available to estimate impacts at the fine project scale and put those impacts into context of the overall carbon budget at a regional scale (Gravenmier per com 2008).

Uncertainty limits our ability to know what effects Alternatives B and C might have on carbon sequestration. The state of our understanding of this issue is not developed enough for us to make conclusions at the project scale. But considering the very small potential impact of this project (7 acres out of the 21,600 acres of National Forest System land in the Dosewallips watershed) it is reasonable to assume that any project impacts would be so small in the regional carbon budget scale that it is acceptable to act even in the face of uncertainty.

Soundscapes (National Park Service Report, January 2006) (Olympic National Park actions only)

Affected Environment

The Dosewallips area is considered a low use area with previous motorized use on the road corridor and in the developed area at the terminus of the road creating the most adverse effects to the natural soundscape. In addition park maintenance and ranger operations do generate noise from the use of equipment and the operation of the hydroelectric system. Visitor noise is also common during the summer months in the campground and parking lots. Since this is a developed area with an access road some human generated noise is expected. Occasional helicopter flights are also a source of noise. Natural sounds predominate away from the developed area and road.

The methodology used to assess noise impacts in this document is consistent with NPS *Management Policies* 2001 and *Director's Order #47: Soundscape Preservation and Noise Management.*

Context, time, and intensity collectively determine the level of impact for an activity. It is usually necessary to evaluate all three factors together to determine the level of noise impact. In some cases an analysis of one or more factors may indicate one impact level while an analysis of another factor may indicate a different impact level, according to the criteria below. In such cases best professional judgment based on a documented rationale must be used to determine which impact level best applies to the situation being evaluated.

- National literature was used to estimate the average decibel levels of the activity.

- Areas of use by visitors were identified in relation to where the activity is proposed. Personal observation from park staff and monthly use reports were used to identify these areas.

Other considerations such as topography and prevailing winds were then used to identify areas where noise levels could be exacerbated or minimized. The thresholds of change for the intensity of an impact to soundscape are defined as follows:

Impact Intensity	Intensity Description
Negligible	Natural sounds would prevail. Effects to natural sound environment would be at or below the level of detection and such changes would be so slight that they would not be of any measurable or perceptible consequence to the visitor experience or to biological resources.
Minor	Natural sounds would prevail in those areas where management objectives call for natural processes to predominant. In areas where activity noise is consistent with park purpose and objectives (i.e. road corridors), noise would predominate during daylight hours and would not be overly disruptive to noise-sensitive visitor activities in the area; in such areas, natural sounds could still be heard occasionally. Activity noise would be localized, short-term, and would be small and of little consequence to the visitor experience or to biological resources. Mitigation measures, if needed to offset adverse effects, would simple and successful.
Moderate	In areas where management objectives call for natural processes to predominate, natural sounds would predominate, but activity noise could occasionally be present at low to moderate levels. In areas where activity noise is consistent with park purpose and zoning, the natural soundscape would be impacted most of the day. Effects to the natural sound environment would be readily detectable, localized, short- or long-term, with consequences at the regional or population level. Natural sounds would be occasionally heard during the day. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	In those areas where management objectives call for natural processes to predominate, natural sounds would be impacted by activity noise frequently for extended periods of time. In areas where activity noise is consistent with park purpose and zoning, the natural soundscape would be impacted most of the day, with disruptions to conversation for long periods of time, making enjoyment of other activities in the area difficult. Effects to the natural sound environment would be obvious, long-term, and have substantial consequences to the visitor experience or to biological resources in the region. Extensive mitigation measures would be needed to offset any adverse effects and success would not be guaranteed.

Short-term disturbances are defined as noise limited to the construction period, while long-term disturbances are defined as noise events occurring after construction has been completed.

Environmental Consequences

Alternative A - No Action

Direct/Indirect Effects

There would be no adverse impact to soundscapes from the no action alternative. There would be more natural sounds as a result of the road remaining closed to vehicular traffic except during periods of overflights (including search and rescue flights) which would result in short-term minor adverse impacts to the park soundscape.

Cumulative Effects

There would be temporary, short-term, minor to moderate adverse impacts to the park soundscape in the Dosewallips area if helicopter use increases due to the closure of the road. The further work projects are from access points, the more challenging it is to transport equipment and supplies into project sites. The use of helicopters would likely increase for trail maintenance activities in this area. If future planning determines that the facilities would be removed from the Dosewallips developed area then there would be temporary, adverse, and minor to moderate impacts during removal operations. After the facilities are removed human generated noise would be reduced and natural sounds would be predominate resulting in a beneficial effect to the park's soundscape in this area. Under the no action alternative there would be no adverse impact to soundscapes thus there would be no cumulative effects to the area soundscape.

There would be no impairment to the park's soundscape under the no-action alternative as noise from the potential use of helicopters would be very infrequent (approximately four missions per year) and temporary in nature.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

The following is a summary of the equipment that would be used in addition to the total time required for each.

Equipment	Decibel Ranger	Amount of Use Required
Tracked Excavator	62-75 db at 300'	15 days
Bulldozer	72-98 db at 50'	15 days
End Loader	72-99 db at 50' 50-61 db at 0.75 mile	15 days
10-yard Dump Truck	70-96 db at 50'	15 days
Vibratory roller/compactor	71-89 db at 50'	15 days
Rock drill	84-94 db from 100' to 200' direct or obstructed view	2 days

Sources: Handbook of Noise Control, Cyril M. Harris 1979, Table 3.11-1
And, U.S. Forest Service Programmatic Biological Assessment for Forest Management,

Appendix G

Project activities would create temporary, moderate impacts on the natural soundscapes on and adjacent to the road corridor. Other maintenance and operational activities would occur on the road and in the developed area and would also generate noise. However these activities would be short-term in an area where activity noise is consistent with park purpose and zoning (park developed area) resulting in minor to moderate, temporary, adverse impacts to the natural soundscape.

Cumulative Effects

Park operations would resume to their preexisting levels with scheduled road and facility maintenance each spring and subsequent maintenance and roadwork as needed in the spring, summer, and fall. Equipment utilized during this project work includes graders, backhoes, power washers, chain saws, trucks, hand tools, and other mechanized equipment such as power saws. This equipment use creates noise but only temporarily in a developed area where a certain amount of human generated noise is expected. Noise related to visitor use of the road, campground, and facilities would resume to pre-road closure levels. Noise would not be generated throughout the entire day, would rarely occur at night, and is of little consequence to the visitor experience or biological resource, resulting in minor, temporary, adverse effects. Because this noise would occur after project work is completed, there would be no cumulative effects from this alternative.

Park Operations (National Park Service Report, January 2006) (Olympic National Park actions only)

Affected Environment

Dosewallips Road leads to a seasonal ranger station, a campground, and several trailheads and is generally open year round and only closed due to weather conditions. Prior to the washout annual maintenance on the Dosewallips Road included spring clean-up work including but not limited to clearing the 8 to 10 culverts, grading, road sign maintenance and replacement, removing downed trees and rocks, pulling ditches, and checking gabions.

The structures that are maintained at the Dosewallips area include: one ranger station, one residence, a flush comfort station, a maintenance shop, hydroelectric building, and one vault toilet. Maintenance activities on the structures could include routine maintenance such as pressure washing of roofs, siding, and decks; propane system maintenance; water system maintenance and monitoring; and occasional painting and repair work (i.e. roof repairs, interior and exterior painting). From May 15 through September maintenance staff work at the Dosewallips area an average of three days a week except during special projects when they are present more often. During the remaining days seasonal ranger staff covers the day-to-day maintenance activities.

Each spring prior to the washout the 30-site campground was prepared for use. Campground maintenance included grading the roadways, danger tree assessments and removal, replacement of damaged picnic tables and grills, cleaning and opening the restrooms, maintaining the intake for the hydroelectric system, and maintaining the water system including weekly chlorine and

turbidity tests. The campground has been closed since the road closure.

The Dosewallips area provides access to two major cross park trails. Prior to the washout trail maintenance activities were frequently staged out of the Dosewallips station for the eastern portion of the park. The Dosewallips was also used as a base for aerial operations for trail maintenance activities and supplies and equipment were often staged at Dosewallips.

The ranger station was also seasonal quarters and was occupied between Memorial Day weekend to mid-September and was used as a base of operations for park backcountry staff and trail maintenance operations. Prior to the washout there was one ranger in residence at the Dosewallips, a permanent ranger assigned to the area that lived off-site, a seasonal ranger based out of the West Fork, and a volunteer at Lake Constance. During the first year after the washout the ranger station was occupied by a seasonal ranger in the summer. Since that time there has been infrequent use of the cabin by the ranger staff during their occasional patrols in the Dosewallips area.

The Dosewallips area has been used in the past as a base of operation for search and rescues on the east side of the park. The Dosewallips landing zone is on the road on an open, level location above Dosewallips Falls. During operations the road was temporarily closed in no more than 15 minute increments when the helicopter landed and during refueling operations. In the past at least three flight missions a year took place out of Dosewallips including trail maintenance and supply transport flights, Mt. Constance backcountry privy management flights, and search and rescue operations. On average one search and rescue was flown out of the Dosewallips each year (Nickey pers. comm). The Dosewallips landing zone was used for search and rescues in the Dosewallips, Duckabush, and, depending on weather, Mt. Anderson areas. Due to other priorities the park has had to limit the amount of on the ground work out of the Dosewallips area since the washout occurred in 2002. As future operations are funded it is anticipated that there will be an increased need in aerial operations.

Since the road closure the park has utilized a location outside of the park, at the Bailey ranch, for the base of operations for aerial activities. This location adds about 3 to 5 minutes of travel time (loaded v. unloaded helicopter) for aerial activities. With the road closure park staff would be required to hike an additional five miles (one-way) for search and rescue operations that do not warrant the use of an aircraft. If a search was determined to meet the criteria for an aircraft it would be possible to transport park staff into the park by helicopter so they could carry out their mission. Flying out of private land could further delay missions until permission is received and a land use agreement is finalized.

Flying outside the park, above private and Forest Service lands, shifts the impacts related to aerial operations (noise and harassment of listed bird species) to additional areas. Flying above private lands could disturb residents and would result in increased safety concerns and more flight restrictions.

In addition to the guiding regulations and policies described in the “Visitor Experience and Recreational Resources” section the NPS Management Policies also state that the NPS is committed to providing appropriate and high quality opportunities for visitors to enjoy the parks. The policies also state that although there are limitations on the NPS ability to totally eliminate all hazards, the NPS will strive to provide a safe and healthful environment for visitors and employees, to protect human life, and to provide for injury-free visits.

Park operations for the purposes of this analysis refers to the quality and effectiveness of the Dosewallips Road and the park's ability to maintain the road in order to adequately protect and preserve vital resources, maintain existing facilities and trails in the Dosewallips area, and provide for a successful visitor experience. Park staff members knowledgeable of these issues were members of the planning team that evaluated the impacts of each alternative.

Impact intensity	Impact Description
Negligible	Park operations would not be affected.
Minor	The effect would be detectable, but short-term and would not have an appreciable effect on park operations. If mitigation were needed, it would be relatively simple and would likely be successful.
Moderate	The effects would be readily apparent, short-or long-term, and would result in a substantial change in park operations in a manner noticeable to park staff and the public. Mitigation measures would probably be necessary and would likely be successful.
Major	The effects would be readily apparent, would result in a substantial change in park operations in a manner noticeable to park staff and the public, and be markedly different from existing operations. Extensive mitigation measures would be needed, and success would not be guaranteed.

Environmental Consequences

Alternative A - No Action

Direct/Indirect Effects

Under this alternative the Dosewallips Road would not be reopened or maintained. The campground and restrooms would remain closed to public use. Trail management activities would no longer be based out of Dosewallips and additional helicopter use would be required to provide support and transport equipment for the park trail crews. Because the park trail crew would be unable to respond quickly to trail damage because of no road access and the required planning necessary to utilize helicopters, trail conditions could deteriorate on the trails out of the Dosewallips area.

The ranger station and quarters would likely be closed to use or converted to a backcountry site. Park facilities in the Dosewallips would deteriorate to unusable conditions, resulting in a loss of one of the two areas with park facilities on the eastern side of the park. Eventually these facilities would have to be removed. Any removal activities would have to be addressed in a subsequent planning document. The closure of the facilities in Dosewallips would result in minor to moderate adverse effects on park operations and facilities.

With the reopening of the Staircase area it is likely that its use would continue to increase with the permanent closure of the Dosewallips area. This could increase the maintenance needs in this area resulting in increased pressure on park operations and a need to expand the facilities at Staircase.

Aerial operations at the Dosewallips would continue to be based outside the park at Bailey Ranch if the private landowner agrees to these activities. This adversely affects trail operations and backcountry privy management by adding more flight time and coordination for these activities. This could also adversely affect search and rescue operations. Park aerial search and rescue operations would no longer be based at Dosewallips since refueling would not be possible at that location. Park employees could hike into the trailheads at Dosewallips, or be transported to the trailhead area by helicopter for search and rescues out of Dosewallips. This could result in more time needed for search and rescue operations, resulting in major adverse impacts to those visitors who need assistance and could result in more severe injuries or fatalities. Flying above private lands could disturb residents.

Overall the effects to park operations from the no action alternative would be long-term, adverse, and moderate to major as they would be readily apparent, would result in a substantial change in park operations as existed prior to the washout in 2002, and would be noticeable to park staff and the public.

Cumulative Effects

If future planning determines that the facilities in the Dosewallips area would be modified or removed because of the lack of road access this would change the park operations. As stated above more helicopter use would occur in this area to provide support for project work. The closure of the facilities could result in more maintenance staff availability in other areas, primarily Staircase, and would likely reduce the presence of rangers in the Dosewallips area. More visitor use would be directed to the Staircase area, putting more stress on those facilities and park operations in that area. Because the no action alternative would result in long-term, adverse, and moderate to major impacts on park operations, and potential future planned projects and actions would add to these impacts, the cumulative effects on park operations would be long-term, adverse, and major.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

Under the action alternative the park would resume its annual maintenance activities on the Dosewallips Road and at the campground, ranger station, and trail head. At least one seasonal ranger would be staffed at Dosewallips during the summer. The road would be utilized by rangers and trail maintenance staff and Dosewallips would again be used as a base of operations on the eastern side of the park. This would improve maintenance of area trails, reducing the time and funding required for trail projects by reducing the use of helicopters. Visitation at Staircase should remain steady.

Park search and rescue operations again could be based at Dosewallips which could lead to improved search and rescue time for park visitors in need. Lives could be saved by reducing the time needed for emergency response.

The impact to park operations from reopening the road to Dosewallips would be beneficial, moderate to major, and long-term.

Table 27 Work to open NPS facilities

Work Item	Estimated Cost
Hazard tree survey and abatement of the developed area, including debris clean up	90 person hours = $2,500 Materials and equipment $1,500
Site maintenance (includes tables, grills and pads)	80 hours = $2,000 Materials $4,000
General building maintenance (all structures)	30 hours = $800 Materials $1,500
Utilities systems start up (inspection, monitoring and testing 10-15 days; 3 hrs per day)	45 hours = $1,200 Materials $500
Totals	Personal services: $ 6,500 Materials and equipment: $ 8,500

Cumulative Effects

The action alternatives would restore park operations to pre-existing levels at Dosewallips. Future project work in the area includes yearly maintenance activities to open the road and facilities and day-to-day maintenance and ranger activities. No change is expected in park operations in the future, therefore, there would be no cumulative effects.

Note: No "impairment" conclusion is required for park operations and recreation and visitor use

Compliance with Other Laws, Regulations, and Policies

National Historic Preservation Act

Olympic National Forest
Cultural resource reconnaissance was completed on the project area and no cultural resources were identified. The Forest Archaeologist prepared a report to the State Historic Preservation Office (SHPO) with a finding of No Potential to Effect Cultural Resources. In March 2006 the SHPO concurred with the report's finding.

Olympic National Park
No cultural resources exist in the project site therefore no resources would be impacted by reopening the Dosewallips Road. The park's cultural resource staff has determined that the project would be covered under the NPS/Advisory Council on Historic Preservation (ACHP) Memorandum of Understanding.

Endangered Species Act and Regional Forester's Sensitive Species

The Endangered Species Act requires protection of all species listed as threatened or endangered by federal regulating agencies (US Fish and Wildlife Service and National Marine Fisheries Service). There are also species recognized by the Forest Service Regional Forester as needing special management to prevent their being placed on Federal or State lists. Surveys and/or evaluations were completed for ESA and Regional Forester Sensitive species which are found in the project area. These results are discussed in detail in the resource sections of this chapter.

Informal consultation with the federal regulatory agencies has been on-going throughout the life of this project. Representatives of the regulating agencies have participated in field visits and attended many of the IDT meetings. There have been regular contacts between ONF and ONP resource specialists and regulatory agency specialists to share information. Formal ESA Section 7 consultation with the regulatory agencies will be initiated once a preferred alternative has been identified by the Responsible Officials. At that time the appropriate consultation documentation will be submitted to the regulatory agencies for their review and consideration. Formal consultation will be completed prior to the Responsible Officials signing Records of Decision.

Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat

Essential Fish Habitat (EFH) has been designated by the National Marine Fisheries Service within the Dosewallips watershed under the Magnuson-Stevens Fishery Conservation and Management Act. EFH includes all Chinook, coho, and pink salmon habitat, which is the entire anadromous zone in the Dosewallips up to the barrier falls at RM 15.4. Effects to EFH are displayed in the aquatics habitat section of this chapter. Consultation with the National Marine Fisheries Service for EFH will run concurrently with ESA fish consultation.

Clean Air Act

This project would not appreciably affect air quality. No burning is planned during implementation of any of the alternatives. Road construction and future use of the road could create a limited amount of dust, but this would be minimal and localized to the project area. The Dosewallips River watershed is not on the list of currently designated nonattainment areas for criteria pollutants (December 20, 2007 Environmental Protection Agency (EPA) Greenbook). Nonattainment areas as defined in the Clean Air Act are those areas that don't meet (or that contribute to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for criteria pollutants.

Clean Water Act

Olympic National Forest

State Water Quality Standards

Surface water quality standards of the State of Washington are described in Chapter 173-201A of the Washington Administrative Code (WAC) under water quality standards for surface waters of the State of Washington. Waters on National Forest System lands within the Dosewallips watershed are categorized as Class AA or extraordinary waters.

Characteristic uses for Class AA waters include but are not limited to: water supply, stock watering, fish and shellfish, wildlife habitat, recreation, and commerce and navigation. The characteristic use of primary concern for this analysis is fish migration, rearing, and spawning.

Water quality criteria for Class AA waters include: fecal coliform organisms; dissolved oxygen; total dissolved gas; temperature; pH; turbidity; toxic radioactive or deleterious material concentrations, and; aesthetic values. The water quality parameters which could be impacted by the proposed alternatives include temperature, turbidity and sediment.

Temperature

Potential direct, indirect, and cumulative effects to stream temperature for the various alternatives are described in detail under Chapter 3, Aquatic Habitat Conditions, Environmental Consequences.

Alternatives A and F would have no effect on stream temperatures. Alternatives B and C would remove some riparian trees on first and second order streams but increases in stream temperature due to removal of shade would not be measurable. All of the alternatives would meet water quality standards for temperature.

Turbidity

Potential direct, indirect, and cumulative effects to turbidity for the various alternatives are described in detail under Chapter 3, Soil Productivity, Environmental Consequences and Chapter 3, Aquatic Species and Habitat Conditions, Environmental Consequences.

Alternative A could result in exceedance of turbidity standards due to road failures within the road system upstream from the washout site as the result of no maintenance to the abandoned roads. Alternatives B and C could result in short-term exceedance of turbidity standards due to construction activities. There is also some risk of increased long-term turbidity due to increased sediment from the new road construction but the effects would be localized to the small tributaries. Alternative F would result in severe short-term exceedance to turbidity standards as the result of instream bridge construction activities. Elevated turbidity would likely continue intermittently for at least one year due to channel adjustments during periods of high streamflow. For Alternative F turbidity created during instream construction activities would likely remain in suspension for long distances potentially resulting in short-term increases in turbidity in the lower watershed.

All of the alternatives would likely result in some exceedance of turbidity standards at least in the short-term. Short-term turbidity exceedances would likely be substantial for instream construction activities associated with Alternative F. All action alternatives will include mitigation measures to minimize turbidity levels resulting from construction activities. Mitigation measures are described in detail in Chapter 2, Alternatives Considered in Detail. Overall the effects of project related turbidity would be short-term and would not adversely affect characteristic uses at the watershed scale. A waiver from the Washington State Department of Ecology for the short-term exceedances of standards would need to be requested and received prior to implementing any of the action alternatives.

Fine Sediment

Potential direct, indirect, and cumulative effects to fine sediment production for the various alternatives are described in detail under Chapter 3, Soil Productivity, Environmental Consequences and Chapter 3, Aquatic Species and Habitat Conditions, Environmental Consequences.

All of the alternatives would likely result in increases in fine sediment levels at least in the short-term. Short-term increases would likely be substantial for instream construction activities associated with Alternative F. All action alternatives will include mitigation measures to minimize fine sediment levels resulting from construction activities. Mitigation measures are described in detail in Chapter 2, Alternatives Considered in Detail. Overall the effects of project related fine sediment would be short-term and would not adversely affect

characteristic uses at the watershed scale. A waiver from the Washington State Department of Ecology for the short-term exceedances of standards would need to be requested and received prior to implementing any of the action alternatives.

Antidegradation Policy
WAC 173-201A-300 outlines the anti-degradation policy of the State of Washington. It states that beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurous to existing beneficial uses shall be allowed.

Potential direct, indirect, and cumulative effects to fish habitat and aquatic species for the various alternatives are described in detail under Chapter 3, Aquatic Species and Habitat Conditions, Environmental Consequences.

Alternatives A, B, and C would have little or no effect on fish spawning or rearing habitat within the Dosewallips River watershed. By constructing a bridge across the eroding bank rather than hardening the streambank Alternative F would avoid substantial long-term impacts to fish and fish habitat associated with complete hardening of the streambank. Actions under all alternatives would not become injurous to existing beneficial uses.

2004 Clean Water Act 303(d) List
There is one degraded water body listed on the 2004 Clean Water Act 303(d) List within the Dosewallips River Watershed. The water body, listing identification 21929, is located near the mouth of the river at River Mile (RM) 0.7. It is listed for stream temperature. None of the alternatives would affect the 303(d) listed reach.

Olympic National Park
The park's rivers including the Dosewallips River are relatively pristine.

Watershed	Length in Miles	Linear Creek Miles (total miles of tributaries and rivers)	Glacial (G) or Nonglacial (NG)	Percent of Watershed in the Park
Dosewallips	28.3	170	G	79 percent

In order to assess the magnitude of water quality impacts to park waters under the various alternatives State water quality standards governing the waters of the park were examined and compared to baseline water quality data (if available). The thresholds of change for the intensity of an impact to water quality are defined as follows:

Impact Intensity	Intensity Description
Negligible	Impacts (chemical, physical, or biological effects) that would not be detectable, would be well below water quality standards or criteria, and would be within historical or desired water quality conditions.
Minor	Impacts (chemical, physical, or biological effects) would be detectable, short-term, but would be well below water quality standards or criteria and within historical or desired water quality conditions.
Moderate	Impacts (chemical, physical, or biological effects) would be detectable but would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be

	temporally altered.
Major	Impacts (chemical, physical, or biological effects) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria would temporarily be slightly and singularly exceeded.

Alternative A – No Action

Direct/Indirect Effects

There could be some run off occurring that might temporarily increase turbidity downstream of the project site during periods of heavy rains, creating negligible to minor, temporary, adverse impacts to water quality at the slide site and downstream of the site.

Cumulative Effects

Past road and facility construction has modified the amount of impervious or hard packed surface in the developed area and likely changed the area drainage patterns slightly creating negligible to minor adverse impacts to the area water resources through run off and erosion. If road maintenance does not occur there is the potential for increased run-off and erosion due to filled ditchlines and plugged culverts. This could result in adverse, temporary to long-term impacts to water resources from decreased water quality, resulting in minor adverse impacts. By doing nothing, run off from the road is expected to continue, but it would be small and of little consequence to the overall water quality of the Dosewallips River unless a major slide occurred. Therefore there would be negligible cumulative effects to water quality from the no action alternative.

Conclusion

Since there would be negligible to minor, temporary effects from the current runoff associated with poor road drainage there would be no impairment to water resources.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

Under the action alternatives with best management practices, a sediment control plan, timing to avoid the rainy season, and designing the road reconstruction to improve stormwater runoff and retention there would be negligible to minor, short-term adverse impacts to water resources and long-term negligible beneficial effects to water resources from NPS actions.

Cumulative Effects

Past road and facility construction has modified the amount of impervious or hard packed surface in the developed area and likely changed the area drainage patterns slightly creating negligible to minor adverse impacts to water resources through run-off and erosion. Under this alternative with the reopening of the road park operations would be reinstituted. These activities would be confined to the existing road and developed area and could create negligible adverse impacts to

water resources from road maintenance activities such as grading and facility operation and use. However these activities (such as cleaning culverts and clearing ditchlines) could improve run-off and drainage and reduce sedimentation resulting in beneficial, indirect effects to water resources. Overall the cumulative effects to water resources would be minor, short-term, beneficial and adverse.

Conclusion

This alternative would implement best management practices to avoid adverse effects to water resources. There could be minor, short-term, adverse impacts to water resources during construction if the best management practices are not effective. However the road reconstruction would improve the drainage from current conditions and could slightly improve water quality at the project site during high rain events, resulting in beneficial effects. Thus there would be no impairment to water resources.

Wetlands and Other Waters of the U.S.

Wetland Requirements

Road and bridge construction activities for the proposed alternatives would involve the discharge of fill material or excavation in wetlands or waters of the U.S. The U.S. Army Corps of Engineers (Corps) regulates these activities under Section 404 of the Clean Water Act. Federal agencies also have responsibilities to avoid, minimize, and mitigate unavoidable impacts on wetlands under Executive Order (EO) 11990. The Forest Service is also responsible for managing wetlands, riparian areas, and waters on the Olympic National Forest under the Olympic Land and Resource Management Plan (LRMP). Therefore project activities that may affect wetlands need to comply with Section 404, EO 11990, and for activities on National Forest System Lands they must also comply with the LRMP. The NPS is responsible for managing wetlands within the ONP.

The Corps defines wetlands (33 CFR 323.2[c]) as:

> "…those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

Waters tributary to navigable waters are considered waters of the U.S. and are subject to the Corps' jurisdiction. The Dosewallips River and its unnamed tributaries in the project area are considered jurisdictional because of their tributary nature to the Hood Canal. The wetlands in the project area are also considered jurisdictional because they are adjacent to or have a surface tributary connection to navigable waters of the U.S.

EO 11990 requires federal agencies to "consider factors relevant to a proposal's effect on the survival and quality of the wetlands." EO 11990 requires that adverse effects on wetlands and other waters of the U.S. be avoided where possible in implementing federal actions.

The Olympic LRMP manages wetlands as part of the riparian/wetland ecosystem under management allocations Riparian Reserves and F2 – Riparian Areas. These areas are intended to

maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed.

Affected Environment

Introduction

Wetland delineation in the project areas was performed under contract by WFLHD. The delineation was performed in accordance with the *Washington State Wetlands Identification and Delineation Manual,* which is consistent with the 1987 *Corps of Engineers Wetlands Delineation Manual*, and included field investigations conducted in February 2007. Results of the delineation work are documented in a March 2007 Wetland and Stream Delineation Report (WFLHD 2007) (Wetland Report). Table 28 summarizes the results of field data collection and analysis. Included in the table are project area, wetland size, USFWS classification, hydrogeomorphic wetland classification, and Washington state rating. Wetland classification and rating systems are described in the Wetland and Steam Delineation Report.

Table 28: Wetland areas identified in the project areas

Wetland	Project Area	Size (acres)	USFWS Class *	HGM Class **	State Rating***
A	ONF	0.199	PFO	Riverine flow-through	I
B	ONF	0.421	PFO	Depressional outflow	II/I
C	ONF	0.046	PFO	Riverine flow-through	II
D	ONF	0.070	PFO	Slope	III
E	ONF	0.383	PFO	Slope	II
F	ONF	0.134	PFO	Slope	II
G	ONF	0.227	PFO	Depressional outflow	II
H	ONF	0.237	PFO	Slope	III
I	ONF	0.007	PSS	Slope	III
J	ONF	0.019	PFO	Slope	III
K	ONF	0.194	PFO	Slope	III
L	ONF	0.017	PFO	Slope	III
M	ONF	0.042	PSS	Slope	III
N	ONF	0.068	PSS	Depressional outflow	III
Z	ONP	Not mapped	PFO/PSS	Riverine flow-through	III

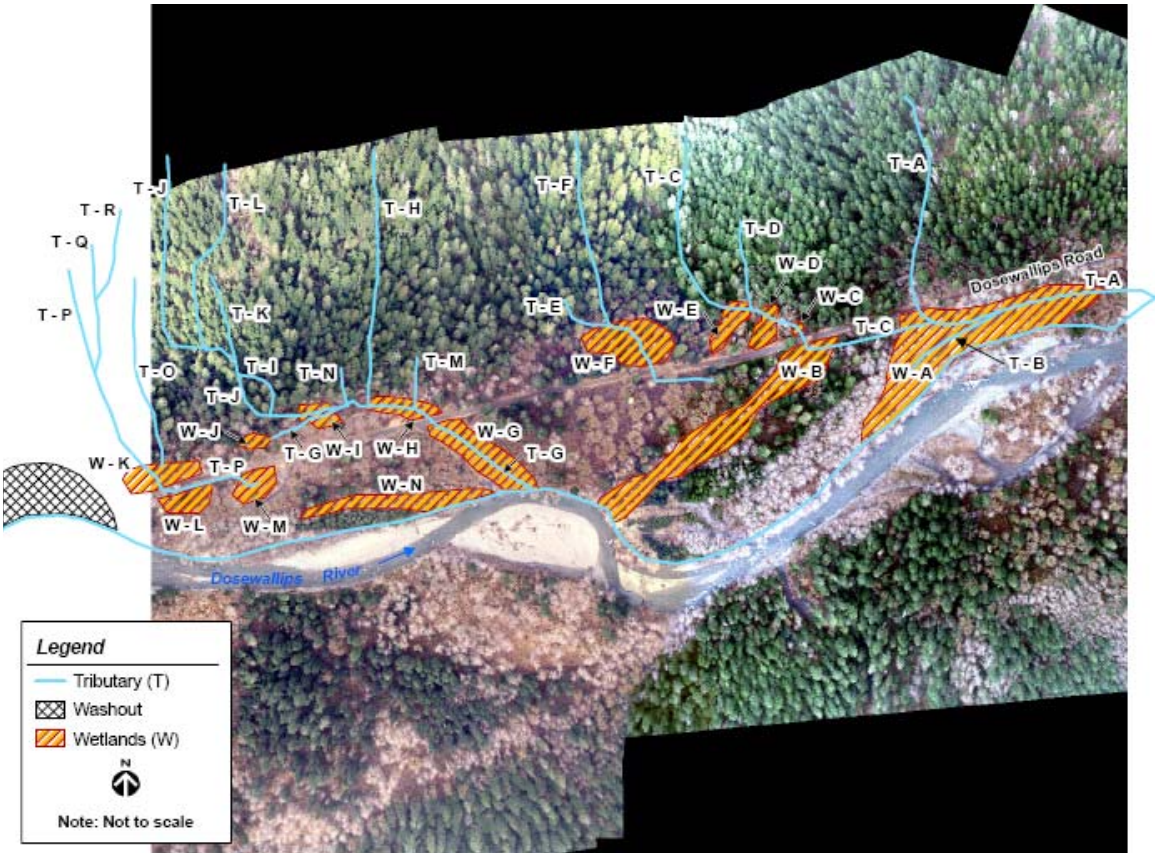
* U.S. Fish and Wildlife Service classification, based on Cowardin et al. (1979): palustrine forested (PFO) and palustrine scrub-shrub (PSS).
** Hydrogeomorphic class is based on Brinson (1993).
*** Washington state classification is based on Hruby et al. (2004)

Olympic National Forest

A total of 14 wetlands were delineated on the National Forest, amounting to about 2.1 acres. Approximate locations are shown on Figure 28. These wetlands are associated with the Dosewallips River and its floodplain, or with the numerous springs and small streams that flow out of the hillslope to the north. More detailed information about each wetland, such as classification and rating, can be found in the Wetland Report (WFLHD 2007).

Sixteen tributaries to the Dosewallips River were identifed in the project area. Two additional fish bearing tributaries, Tributary A (Gamm Creek) and Tributary B, are located just outside of the project area to the east. Locations of streams are shown on Figure 28. Two of the tributaries in the project area, tributaries C and G, are fish bearing; the remainder are non-fish bearing. As with the wetlands, more detailed information about each stream can be found in the Wetland Report (ibid).

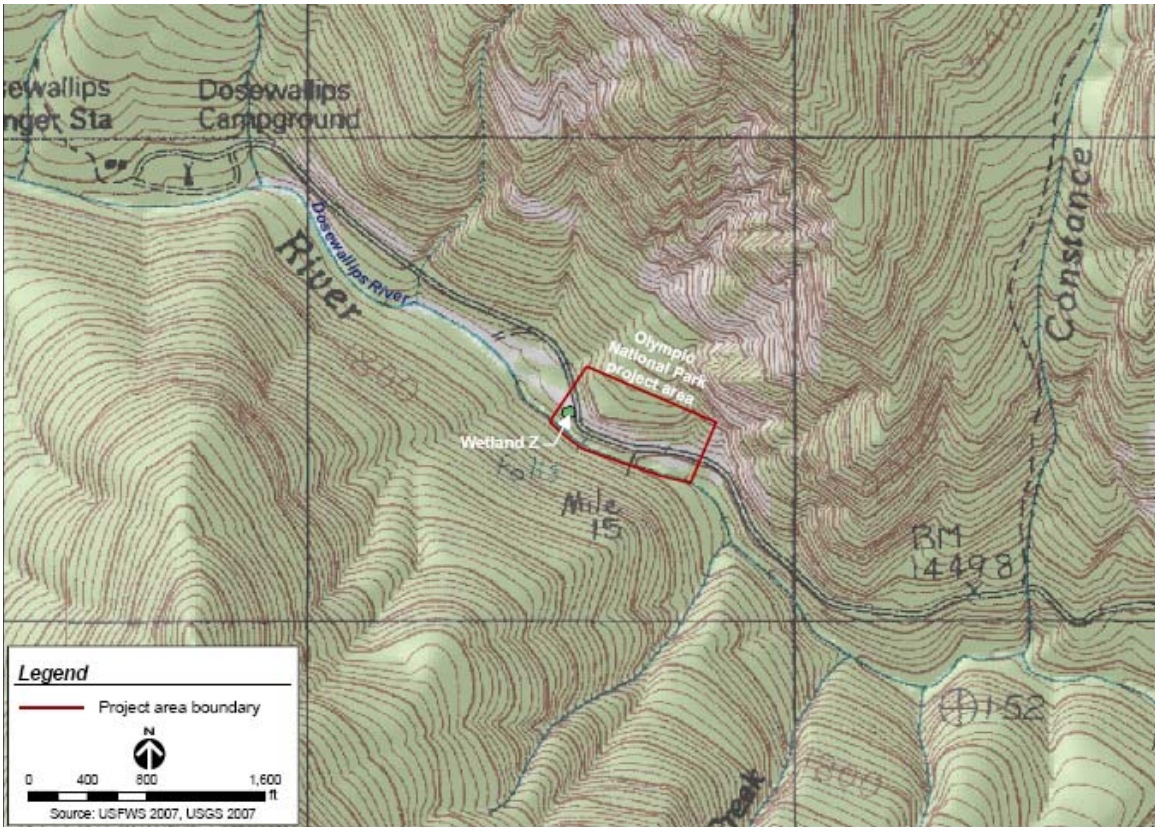
Figure 28: Wetlands and streams in the ONF project area



Olympic National Park

One wetland was identified to the west of the park's project area (Figure 29). This wetland (wetland Z) was not mapped so its size has not been determined. The source of water for this wetland is the Dosewallips River. This wetland would not be impacted by any of the proposed activities and as such there are no environmental effects to disclose. No tributaries to the Dosewallips River were identified in the project area. All proposed activities would occur above the high water mark of the Dosewallips River. Due to the lack of impacts on wetlands or waters of the U.S. related to any proposed park activities there will be no further discussion in this section related to the park.

Figure 29: Wetland in the ONP project area



Environmental Consequences

Alternative A – No Action

Direct, Indirect, and Cumulative Effects

Because no construction would occur there would be no impacts on wetlands or other waters of the U.S. Periodic road maintenance likely would occur at a similar rate and in a similar manner as it has in the past and would not affect wetlands or other waters of the U.S.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

Direct impacts on wetlands would range from an estimated 0.016 to 0.020 acre in the action alternatives. Alternative F (bridge) would affect the least amount of wetlands (0.016 acre), with Alternatives B (bench emphasis) and C (retaining wall emphasis) affecting slightly more area, 0.019 acre and 0.020 acre respectively. The total acreages impacted by the alternatives are a combination of impacts to small pieces of wetlands that are adjacent to the existing road (FSR 2610). Only a small percentage of any wetland would be impacted. Alternative F would impact 8 percent of wetland K, Alternative B would impact 7 percent of wetland D and 4 percent of wetland E, and Alterntative B would impact 9 percent of wetland D and 4 percent of wetland E. The adverse impacts to these wetlands would be minor. All action alternatives would result in an irreversible commitment of resources, as functions and values provided by impacted wetlands would be lost for the foreseeable future. However these impacts would be mitigated with compensatory mitigation as described below.

Indirect effects to wetlands under all the action alternatives include loss of shading and loss of vegetative buffers. Alternatives B and C could also potentially alter shallow groundwater flows to some of the wetlands by interception of the road ditchline and culverts. This could potentially result in altering wetland function by reducing the late season water supply and reducing soil moisture. These impacts would be mitigated by frequent ditch relief culvert spacing and road outsloping. Other mitigations that would reduce indirect impacts to wetlands include use of straw bales and filter fences. It is expected that the majority of the wetlands would not be substantially altered hydroogically.

Cumulative Effects

A number of watershed restoration activities have been completed in the Dosewallips River watershed in the last 10 years, including road decommissioning and bank stabilization. Also there are proposed restoration activities such as placement of large woody debris, additional road decommissioning, and rehabilitation of dispersed camping areas in riparian areas along the Dosewallips River. These past and future activities result in an improving trend in the overall condition of the watershed. Wetland impacts associated with the action alternatives would have a negative effect on watershed conditions but are relatively minor and would not significantly change the overall trend of the improving watershed conditions.

Forest Plan Amendment

The action alternatives would not meet the Riparian Reserves roads management standards and guidelines requirement of avoiding wetlands entirely when constructing new roads. The proposed Forest Plan amendent to the Olympic Forest Plan would allow these alternatives to be consistent with the Forest Plan. The adverse impacts of not meeting this standard and guideline, including mitigation measures to minimize impacts, are described in the preceeding environmental consequences section.

Proposed Mitigation

A conceptual wetland mitigation plan has been prepared for this project. The overall wetland mitigation goal is to protect existing wetlands and provide compensation for wetland areas and functions lost as a result of project activities. To the greatest extent possible, impacts on wetlands in the project area have been avoided and minimized. In developing the preliminary designs, resource information and mapping of wetland and waters of the U.S. features were considered to modify as much as possible the roadway or bridge design to avoid and minimize impacts. Coordination and field reviews would occur as the design of the selected alternative progresses to ensure new impacts to wetlands would not occur.

Temporary impacts to wetlands would be mitigated through the use of best management practices (BMP), such as silt fences to help prevent erosion and siltation from construction activities. Unavoidable permanent impacts would be mitigated through the use of both on- and off-site mitigation. This could include on-site wetland restoration (decommissioning of about 0.5 mile of FSR 2610 west of the proposed reroute take-off point, including culvert removal and removal of road prism), on-site wetland creation (within the dispersed camping area located south of FSR 2610 adjacent to the east end of the washout), and off-site riparian area restoration (rehabilitation of dispersed camping area along the Dosewallips River east of the project area). Mitigations would provide functions, values, and areas similar to the impacted wetlands.

Only Practicable Alternative Finding

EO 11990 requires that adverse effects on wetlands and other waters of the U.S. be avoided where possible. The action alternatives involve the reestablishment of vehicle access in the washout area, and as a result opportunities to avoid wetlands in the project area are limited, especially due to the proximity of Wilderness boundaries to the north and south of the project area. Project alternatives and design concepts that involved other route corridors were considered but eliminated earlier in the NEPA process due to greater environmental impacts with limited added benefit. As described in Chapter 2, alternatives that would have avoided some of the wetlands along FSR 2610 were considered but dropped from detailed study. Several proposed a different road alignment above the washout but were dropped as the reroute would have been longer (greater impact on late-successional reserve habitat), more of the route would have been on steep and potentially unstable slopes, there still would have been impacts to wetlands along the upper slope, and one encroached on the Buckhorn Wilderness. A southern road alignment was also considered but dropped for reasons detailed in Chapter 2. No impacts would occur under the No Action alternative but it would not meet the purpose and need of the project.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that all of the action alternatives would include all practicable measures to minimize harm to wetlands that may result from such use.

Shoreline Management Act and Federal Coastal Zone Management Act

The State’s Shoreline Management Act and the Federal Coastal Zone Management Act provide direction to protect, restore, and manage shoreline and coastal resources through ecosystem

based management. Rivers over a certain flow rate are classified as shorelines of statewide significance and fall under the requirements of these Acts, and the Dosewallips River is included in this classification. However the state shoreline point on the Dosewallips River begins at the Forest boundary between T26N, R3W, Section 25 and T26N, R2W, Section 30; and activities proposed under any of the alternatives are at least 3 miles upstream from this point. Consequently the requirements of these two Acts do not apply to this project.

Wild and Scenic Rivers (River Management Report, February 2006)

Olympic National Forest

Introduction

Management of the Dosewallips River on the ONF is governed by the 1990 Forest Plan as amended by the 1994 Northwest Forest Plan Record of Decision. While it was considered for inclusion into the National Wild and Scenic Rivers System along with other Olympic Peninsula rivers during the forest planning process it was not recommended for inclusion. Instead the River Corridors management prescription (A4B) was assigned as a means of protecting many of the values which are unique to the rivers of the Olympic Peninsula. The Wild and Scenic Rivers analysis process, in general and as applied to the Dosewallips River, is described below to provide information on the important values of the river.

Olympic Forest Plan Wild and Scenic River Analysis

As part of the forest planning process for the 1990 Olympic NF Land and Resource Management Plan and as required in the Wild and Scenic Rivers Act of October 1, 1982, and USDA-USDI Guidelines for Eligibility, Classification and Management of River Areas (September 7, 1982), seventeen rivers that originate in or flow through or have a portion of the river corridor within the Olympic National Forest were evaluated for their potential for inclusion in the National Wild and Scenic Rivers System.

Each river was evaluated to determine its eligibility, that is if the river is free flowing and its adjacent land area possesses an “outstandingly remarkable” value. Those rivers which were determined to be eligible were then evaluated to determine the appropriate classification for each river segment. A suitability analysis was then conducted on these eligible rivers and based on this analysis certain rivers were recommended for addition to the Wild and Scenic Rivers System.

Dosewallips Wild and Scenic Rivers Analysis

The Dosewallips River is about 28.3 miles long. Slightly over half of its distance (14.3 miles) is within Olympic National Park. Of the remaining 14 miles, 8 are within the Olympic National Forest, with the majority of the last 5.9 miles flowing through a number of private ownerships. The final stretch (about 0.3 miles) before reaching the Hood Canal is within the Dosewallips State Park.

The eligibility determination process for the Dosewallips River resulted in the identification of two “outstandingly remarkable” values, scenic and fish. Noted scenic values were mountain meadows, lakes, snowfields, mountain peaks, tumbling water, river canyons, and dense forests. Fish values included four salmon species, steelhead, and cutthroat trout; and were noted as regionally significant. River segments were classified as follows:

Classification	Length	Description
Wild	12.5	Source to Station Creek
Scenic *	9.9	Station Creek to Olympic NF boundary
Recreational	5.9	Olympic NF boundary to mouth

* The washout is located within this classification, approximately at RM 10.75.

In the Forest Plan planning process the determination was made that suitability analysis should proceed.

Suitability analysis was based on seven criteria. These criteria included items such as representation of river conditions and major ecosystems found on the Olympic Peninsula, compatibility with existing uses, and support or opposition. The Dosewallips River was rated as high suitability on five of the criteria and medium suitability on the remaining two. It was not included in the group of three rivers which were ultimately recommended for addition in the Wild and Scenic Rivers System in the Forest Plan.

Forest Plan Management Direction
Rivers that meet Wild and Scenic River eligibility but are not recommended for designation will be managed as River Corridors, a management prescription in the Forest Plan. River Corridor management provides management flexibility and retains options for the future. The Dosewallips River corridor is assigned the management intensity of Natural (A4BN). The desired future condition for this management intensity is that the forest along the riverbanks generally appears natural when viewed from the river. The river is accessed in places by roads and roads may reach and occasionally bridge the river.

Forest Plan Consistency
All of the alternatives analyzed for the Dosewallips Road Washout project are consistent with the standards and guidelines for Natural Management Rivers. Consideration of the important river values (recreation, scenic, and fish) are described elsewhere in this document.

Olympic National Park
The project would not alter its Wild and Scenic River eligibility. When the Dosewallips River was initially evaluated the road and erosion control features along the river were in place. In the evaluation process the river was identified to have outstandingly remarkable values of scenic, recreation, geological, and fish and wildlife; and was classified as scenic and recreational. Roads can exist under both the scenic and recreational determinations.

Ecologically Critical Areas, Other Unique Natural Resources (ONP only)

The project would have no effect on any ecologically critical areas. Unique natural resources are identified in previous sections of this document and include vegetation and wildlife.

Native American Treaty Rights

Olympic National Forest
The Forest Service has an obligation to consult, cooperate, and coordinate with Indian Tribes in developing and planning management decisions regarding resources on National Forest System lands that may affect tribal rights. The Forest Service and Tribes should work on a government to government basis to accomplish a reasonable accommodation of tribal needs. The Olympic National Forest has endeavored to solicit comments of the potentially affected tribes by letters sent to tribal councils, phone calls from the Hood Canal District Ranger, and attendance at interdisciplinary team meetings by tribal resource specialists. Comments were received from the Port Gamble S'Klallam, Jamestown S'Klallam, and Lower Elwah Klallam Tribes. Effects to areas of concern raised by these tribes are discussed in the environmental consequences section of this chapter.

Olympic National Park
Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the Unites States to protect tribal lands, assets, resources, and treaty rights; and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. The National Park Service does not manage or administer Indian trust assets (the term "trust assets" means all tangible property including land, minerals, coal, oil and gas, forest resources, agricultural resources, water and water sources, and fish and wildlife held by the secretary for the benefit of an Indian tribe or an individual member) including trust lands and trust resources; however activities carried out on park lands may sometimes affect tribal trust resources. Trust resources are those natural resources reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders that are protected by a fiduciary obligation on the part of the United States. While the overriding mandate for the National Park Service is to manage the park units in the national park system consistent with park laws and regulations, the federal government, including the National Park Service, has a trust responsibility to protect Indian's rights and advance their interests.

No lands comprising Olympic National Park are held in trust by the secretary of the interior solely for the benefit of American Indians due to their status as American Indians. Therefore, this topic was dismissed from further analysis.

Executive Order 11988 Floodplains

In 1977 the National Environmental Policy Act of 1969 (NEPA) was amended (42 U.S.C. 4321 et seq.) in order to avoid short and long-term adverse impacts associated with the destruction or modification of flood plains. An Executive Order was issued as a result of this amendment.

Affected Environment

Olympic National Forest
Floodplains on National Forest System land within the project area were identified in a hydraulic study, the Reach Analysis (Cenderelli et al. 2003). The floodplain area is delineated in Figure 30 as area f.lt (T1).

Olympic National Park

The project is above the river in an incised canyon and there are no floodplains in this area. Due to the lack of floodplains near any of the park proposed activities there will be no further discussion in this section related to the park.

Environmental Consequences

Alternative A – No Action

Direct/Indirect/Cumulative Effects

Because no construction would occur there would be no impacts on floodplains. Periodic road maintenance likely would occur at a similar rate in a similar manner as it has in the past and would not affect floodplains.

Figure 30: Washout area floodplain

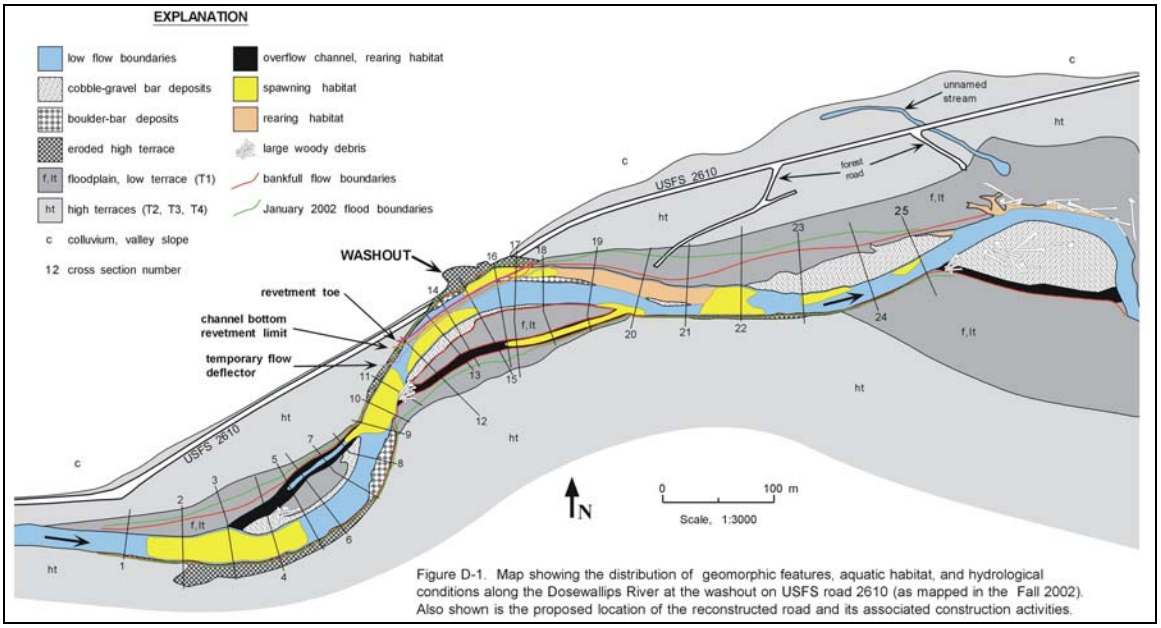


Figure D-1. Map showing the distribution of geomorphic features, aquatic habitat, and hydrological conditions along the Dosewallips River at the washout on USFS road 2610 (as mapped in the Fall 2002). Also shown is the proposed location of the reconstructed road and its associated construction activities.

Alternatives B, C, and F – All Action Alternatives

Direct/Indirect Effects

There would be no direct impacts to floodplains from Alternatives B and C as all proposed activities occur well outside of the floodplain area. Additionally there would be no direct impacts to floodplains from Alternative F as the bridge construction would not occur within the river's floodplain.

There would be indirect effects to floodplains under all the action alternatives. Alternatives B and C could potentially alter shallow groundwater flows through the interception of flow by road ditchline and culverts. This could reduce late season water supply to the floodplain but the effect is expected to be very minor due to project design features (frequent ditch relief culverts and

road outsloping). Indirect effects of Alternative F would be from bridge piers altering the natural flow of the river and how this flow impacts the floodplain area near the washout on the south side of the river. Again this effect is expected to be very minor as the bridge is designed and mitigation measures developed to allow as near a natural flow pattern as possible. These effects are discussed in more detail in this chapter under the Geotechnical Hazards and Geomorphic Processes, Soil Productivity, and Aquatic Species and Habitat Conditions sections.

Cumulative Effects

A number of watershed restoration activities that have had a positive effect on the floodplain resource have been completed in the Dosewalllips River watershed in the last 10 years. These past and activities planned for the future result in an improving trend in the overall condition of the floodplain in the watershed. Impacts to floodplains associated with the action alternatives would have an immeasurable effect on watershed conditions and would not change the overall trend of improving floodplain conditions.

Only Practicable Alternative Finding

EO 11988 and 23 CFR 650, Subpart A require that adverse effects on floodplains be avoided where possible. The action alternatives involve the reestablishment of vehicle access in the washout area, which is in the vicinity of a floodplain. Opportunities to avoid all impacts to floodplains are limited due to the location of the existing road and the proximity of Wilderness boundaries to the north and south of the project area. Project alternatives and design concepts (as described in Chapter 2 of this document) were considered but eliminated early in the NEPA process due to greater environmental impacts with limited added benefits.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction that would have minor indirect effects to floodplains and that all of the action alternatives would include all practicable measures to minimize harm to floodplains that may result from such construction.

Executive Order 12898: Environmental Justice

Olympic National Forest
Executive Order (EO) 12898 requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations. None of the environmental impacts identified for the proposed ONF activities would result in disproportionately high and adverse human health or environmental effects on minority (including Native American tribes) or low-income populations.

Olympic National Park
None of the proposed ONP activities would affect the populations described in Executive Order 12898. No proposed activities would have health or environmental effects on minorities (including Native American tribes) or low-income populations or communities as defined in the Environmental Protection Agency's (EPA) Environmental Justice Guidance (1998). Therefore, this topic will not be analyzed further in this document.

Executive Order 13186: Migratory Bird Treaty Act

Executive Order 13186 requires that environmental analyses of Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds with emphasis on species of concern. Effects of the alternatives on migratory birds are discussed in the Terrestrial Species and Habitat section of this chapter.

National Forest Management Act Compliance (Olympic National Forest only)

Compliance with the National Forest Management Act (NFMA) can be demonstrated by finding that a project is consistent with the following applicable requirements of 16 USC 1604(g)(3).

(g)(3)(A) *insure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish*

This EIS considered the effects of implementing the alternatives on the economic and environmental aspects of the project area. This consideration as documented in this chapter included the forest resources of recreation (including Wilderness), watershed, wildlife, and fish.

(g)(3)(B) *provide for diversity of plant and animal communities based on the sustainability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the plan*

Actions proposed under the alternatives provide for diversity of plant and animal communities within the project area as described within the multiple-use objectives of the Forest Plan as non-significantly amended for this project. The effects to plant and animal communities are described in the resource sections of this chapter.

(g)(3)(C) *insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land*

Implementation and effectiveness monitoring proposed in chapter 2 of this document would provide an evaluation of the effects of implementing an alternative.

Forest Plan Consistency (Olympic National Forest only)

The analysis performed by the interdisciplinary team found that the actions proposed under Alternative A are consistent with the Forest Plan. The team further found that the actions proposed under Alternatives B, C, and F would be consistent with the Forest Plan as long as proposed non-significant amendments are approved as part of the project's decision. The project's purpose and need is consistent with Forest Plan goals and impacts to resources as evaluated in this EIS have been found to be consistent with Forest Plan direction and standards and guidelines as non-significantly amended for this project. Descriptions of the effects of implementing the various alternatives and Forest Plan consistency rationale can be found in the individual resource sections in this chapter.

Aquatic Conservation Strategy (ACS) Consistency (Olympic National Forest only)

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

All action alternatives would contribute to maintaining Objective 1.

Alternatives B and C – Both alternatives reroute the road away from the mainstem of the Dosewallips River thus allowing for the natural stream channel migration and erosional processes to continue at the washout.

Alternative F – The bridge alternative would for the most part allow the high terrace to erode and supply spawning gravels to the channel. Large wood would be allowed to rack up along the piers of the bridge (unless it was inhibiting gravel recruitment from the high bank or affecting bridge performance), creating deep pools and complex fish habitat.

The scope of all action alternatives is not large enough to affect the distribution, diversity, and complexity of watershed or landscape-scale features.

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

All action alternatives would contribute to maintaining Objective 2.

Alternatives B and C – Several new culverts would be installed in the proposed reroute to allow existing stream channels to pass water through the newly constructed road prism. All but one of the culverts would be installed in small headwater channels, well above the upstream limit of fish habitat. The only fish bearing stream crossing constructed as part of the new road construction would be on a small unnamed coho tributary. The crossing would be designed to pass all fish species and all life stages found in the stream.

Alternative F - Spanning the river at the washout site with a bridge would maintain almost all of the existing stream channel features and processes in the mainstem Dosewallips. Habitat connectivity within the mainstem river would be assured. None of the instream components of pilings and riprap would affect habitat connectivity.

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

All action alternatives would contribute to maintaining Objective 3.

Alternatives B and C would contribute to maintaining Objective 3 by relocating the road away from the mainstem Dosewallips River. The resulting buffer strip would maintain the integrity of the streambanks and floodplain along the mainstem Dosewallips River. Several culverts would be installed in the new road segment to pass small streams through the road prism. The small number and relatively short length of small stream channels converted to culverts would be more

than offset by the benefits of creating a buffer and protecting the stream channel and streambanks along the mainstem Dosewallips River.

Alternative F would contribute to maintaining Objective 3 by spanning the washout section with a bridge. The bridge would allow the stream bottom and stream banks along the mainstem Dosewallips within the project area to remain more-or-less undisturbed. There would be short-term impacts to the stream bottom during the instream construction phase as pilings are placed in the river channel, however the area of disturbance would be relatively small. Pile driving activities would be short-lived, occurring at most over a 3.5 month period primarily during the summer low flow period. There would likely be some adjustment of the stream bottom during high flows the first winter but substantial changes to the existing streambed are unlikely.

Streambanks and channels are anticipated to stabilize after instream implementation of all of the action alternatives.

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

All action alternatives would contribute to maintaining Objective 4. There would be short-term impacts to water quality associated with instream implementation of all action alternatives. The current water quality conditions on National Forest lands within the project area are considered high quality for aquatic communities as described in the Reach Analysis (Cenderelli et. al. 2003) and the Dosewallips Watershed Analysis (USFS 1999)

Alternative B and C – There would be some unavoidable short-term turbidity in the small streams and the small perennial fish-bearing stream coming off the hillslope during the construction of the new road. Constructing the road during the summer and following standard de-watering and erosion control mitigation measures would minimize the amount of fine sediment and turbidity entering streamcourses. Adverse impacts related to increased fine sediments during road construction are anticipated to be minor. Many of the small stream channels would be almost dry during the summer construction period. Increased turbidity due to construction activities would likely be limited to a few hours as the individual culvert sites are prepared and placed. Potential impacts would be limited to the non-fish bearing streams and to a small unnamed coho rearing tributary. Substantial turbidity impacts from road construction, if any, would be unobservable within a couple of hours after construction was completed at an individual culvert site. Elevated turbidity levels, if any, would be diluted rapidly as the tributaries entered the mainstem Dosewallips River. Elevated turbidity levels would not likely be observable outside of the immediate project area and no cumulative impacts are anticipated. Potential sediment impacts from road construction are anticipated to be unobservable after 1-2 years, when the fill and cutslopes stabilize and revegetate.

Alternative F – Constructing the bridge would create some substantial local inputs of fine sediment and turbidity into the Dosewallips River. Water quality in the upper watershed is in good condition due to intact riparian areas and minimal development (USFS 1999). Most of the fine sediment inputs associated with the project would occur during the instream water diversion activities, pile driving for the bridge piers, and placement of riprap along bridge approaches.

Turbidity and fine sediment inputs would be locally severe during these activities. These inputs would generally occur only during specific construction activities and would disappear quickly once those construction activities ended which would be a few days and no cumulative impacts are anticipated. While the inputs of fine sediment into the stream would be unavoidable, required mitigation measures (see Mitigation Measures and Management Requirements section of this document) would minimize impacts. Some additional streambed disturbance and generation of fine sediment and turbidity would be anticipated for at least one year as the streambed changes in response to the channel alterations during high flow events. Any increases in turbidity during these periods would be unobservable because of the high natural sediment loads carried by the Dosewallips during storm events.

Most of this turbidity and fine sediment would simply be remobilizing stream sediments within the river channel. Much of this would occur during the construction of water diversion/ work isolation facilities. Fish are anticipated to move out of the area for short periods, during the construction phase.

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

All action alternatives would contribute to maintaining Objective 5. The reactivation of the high terrace at the washout as a source of spawning gravels has contributed to the high quality of fish habitat below the washout, as the high glacial terrace sources of spawning gravel sediment are limited above the washout (Cenderelli et. al. 2003).

Alternative B and C – By relocating the road away from the mainstem Dosewallips River these alternatives would allow natural channel migration processes to continue in the vicinity of the washout. Continued channel migration and continued erosion of the high glacial terrace at the washout would provide necessary inputs of coarse sediment to the river over time. Refer to sediment section of this EIS for more detail.

Alternative F – By spanning the washout site with a bridge most of the stream channel migration and erosional processes would be allowed to continue at the washout site. Although riprap would be placed along the upstream and downstream bridges approaches, 80 to 90 percent of the high glacial terrace would still be allowed to erode and contribute coarse sediments to the Dosewallips River. The high quality spawning and rearing habitat immediately downstream of the washout would be maintained. Refer to sediment section of this EIS for more detail.

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

All action alternatives would contribute to maintaining Objective 6.

Alternative B and C – Both alternatives have the potential to affect hillslope hydrology by intercepting groundwater from cutslopes and drainage ditches associated with road building. Transport efficiency of the groundwater in the hillslope would likely increase some what – meaning the water would likely run off faster, thus affecting water storage capacity. However

impacts are not anticipated to be substantial. Potential adverse impacts to groundwater and hillslope hydrology would be minimized by the utilizing permeable road fill materials where possible and installing frequent ditch relief pipes. Magnitude and extent of impacts are anticipated to small and would not be observable beyond the immediate project area. Refer to off-channel habitat section of this EIS for more detail.

Alternative F – This alternative would have no effect on instream flows. No new road construction with cutslopes and drainage ditches would be built that would have the potential to intercept groundwater.

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

All action alternatives would contribute to maintaining Objective 7.

Alternative B and C - Both alternatives have the potential to affect hillslope hydrology by intercepting groundwater from cutslopes and drainage ditches associated with road building. These changes may potentially dry up some springs and seeps that feed the small tributary or cause some to go intermittent during the dryer summer season. However impacts to wetlands are anticipated to be minimal. Decommissioning a portion of FSR 2610 would improve riparian function in this area and partially restore natural hydrologic flow. Potential adverse impacts to groundwater and hillslope hydrology would be reduced by the utilizing permeable road fill materials where possible and installing frequent ditch relief pipes. Magnitude and extent of impacts are anticipated to be small due to above mentioned mitigation measures and management requirements. Refer to off-channel habitat section of this EIS for more detail.

Alternative F - This alternative would have no effect on floodplain inundation or water table elevation in meadows and wetlands.

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

All action alternatives would contribute to maintaining Objective 8.

Alternative B and C – Alternative B and C would contribute to maintaining Objective 8 by relocating the road away from the mainstem of the Dosewallips River. The resulting buffer strip would maintain the riparian vegetation along the streambanks and the floodplain along the mainstem of the Dosewallips River. Some riparian vegetation would be lost where the new road crosses small headwater streams but the small number and relatively short length of small stream channels affected would be more than offset by the benefits of creating a buffer and protecting the riparian vegetation along the mainstem of the Dosewallips River. Both alternatives would impact riparian vegetation as new road construction crosses streams. However impacts would not have a measurable effect on thermal regulation, nutrient filtering, bank erosion, channel migration, and coarse wood.

Alternative F - Project activities would only remove a small portion of the riparian area within

the project area and would be a negligible from a watershed perspective. Because a bridge will be used to span the washout section the species composition and structural diversity of riparian plant communities along the vast majority of the Dosewallips mainstem within the project area would be maintained.

There would be unavoidable minor amounts of wetlands impacted connected with all action alternatives, however required mitigations established by the Army Corp of Engineers that prevent no net loss of wetlands would be incorporated into all action alternatives. Mitigations would replace lost wetland function and/or improve existing functions by enhancing wetlands.

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

All action alternatives would contribute to maintaining Objective 9.

Alternative B and C – Alternative B and C would contribute to maintaining Objective 9 by relocating the road away from the mainstem of the Dosewallips River. The resulting buffer strip would maintain the riparian habitat along the streambanks and the floodplain along the mainstem of the Dosewallips River. Some riparian habitat would be lost where the new road crosses small headwater streams but the small number and relatively short length of small stream channels affected would be more than offset by the benefits of creating a buffer and protecting the riparian habitat along the mainstem of the Dosewallips River. Both alternatives would impact riparian habitat as new road construction crosses streams. However impacts would not have a measurable effect on populations of native plant, invertebrate and vertebrate riparian-dependent species.

Alternative F - Project activities would only remove a small portion of the riparian area within the project area and would be a negligible from a watershed perspective. Because a bridge will be used to span the washout section the species composition and structural diversity of riparian dependent species along the vast majority of the Dosewallips River mainstem within the project area would be maintained.

Summary

There would be short term project scale impacts, primarily associated with turbidity and sediment production during construction phases. However changes in turbidity and sediment production would not be detectable at the watershed scale. Additionally, there would be minor amounts of wetlands impacted, which would be mitigated. In order to achieve no net loss of wetlands, the mitigations would replace lost wetland function or improve existing functions by enhancing wetlands, within the watershed.

Alternative B and C – Magnitude and extent of turbidity and fine sediment impacts would be minimal and would last only during the construction phase and a few years after as fill and cutslopes revegetate. Both alternatives reroute the road away from the mainstem of the Dosewallips River thus allowing for the natural stream channel migration and erosion processes to continue at the washout which would maintain the high quality fish habitat below the washout. Additionally a vegetated buffer strip along the mainstem Dosewallips would result.

Alternative F – Constructing the bridge would create some substantial local inputs of fine sediment and turbidity into the Dosewallips River. However impacts would last only during the

instream construction phase. By spanning the washout site with a bridge most of the stream channel migration and erosional processes would be allowed to continue at the washout site. The high quality spawning and rearing habitat immediately downstream of the washout would be maintained

Other Jurisdictions

The USDI Fish and Wildlife Service and National Marine Fisheries Service are responsible for the recovery of species listed under the Endangered Species Act. Any Forest Service and park activities that have the potential to affect such species must be approved by the responsible agency. Consultation with those agencies regarding the Dosewallips Road Washout project activities is ongoing and will be completed before any activities related to this EIS can be implemented.

The Washington State Department of Fish and Wildlife (WDFW) is responsible for the protection, perpetuation, and management of fish life in the State of Washington. The Forest Service will coordinate and collaborate with the WDFW on any hydraulic project activities associated with the selected alternative for the Dosewallips Road Washout project, as per conditions in the March 2005 MOU.

Energy Requirements

Olympic National Forest
Some form of energy would be necessary for the proposed activities which require the use of mechanized equipment, such as road construction, instream work, road decommissioning, and area rehabilitation. No adverse effects on energy requirements would be expected from implementation of any alternative.

Olympic National Park
Resource, Including Energy, Conservation Potential: Maintaining access is not expected to impact resource conservation potential in the park

Prime Farmland, Rangeland, and Forestland

Olympic National Forest and Olympic National Park

No prime farmland, rangeland, or forestland occurs within the project area.

Consumers, Minority Groups, and Women

No adverse effects on consumers, minority groups, and women not already identified in the FEIS for the Forest Plan would be expected to result from implementation of any alternative. Actions associated with implementing any of the alternatives would be governed by Forest Service, park, or Federal Highways contracts, which are awarded to qualified contractors regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements.

Unavoidable Adverse Effects

Implementation of any of the alternatives including the No Action alternative would inevitably result in some adverse environmental effects. Adherence to Forest Plan direction and the mitigation measures and management requirements proposed in Chapter 2 of this document would help reduce the severity of the effects. Adverse environmental effects are discussed in this document under each resource section.

Short-Term Use and Long-Term Productivity

Olympic National Forest
NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Short-term uses are generally those that determine the present quality of life for the public. Long-term productivity refers to the land's capability to support sound ecosystems producing a continuous supply of resources and values for future generations.

The alternatives to reestablish road access at the washout on FSR 2610 would improve accessibility to the recreational opportunities provided by Forest Service and park facilities and other resources in the upper Dosewallips River area in the short-term. Alternatives B and C would have effects on long-term soil and late-successional habitat dependent species productivity, and Alternative F would have an effect on long-term aquatic species productivity; which are described in the environmental consequences section of this chapter.

Olympic National Park
Long-term Management of Resources or Land/Resource Productivity: No impact to the long-term management of resources or land/resource productivity should result from maintaining road access in the Dosewallips.

Irreversible and Irretrievable Commitment of Resources

Irreversible commitment of resources refers to a loss of future options with nonrenewable resources or resources that are only renewable over a long period of time. There would be an irreversible reduction in soil productivity and the amount of old growth habitat associated with the road construction proposed in Alternatives B and C. However the reduction is only about seven acres at most and is very small in comparison to the available acres in the Dosewallips Watershed. There would be an irreversible commitment of mineral resources due to the rock used to surface roads and provide bank protection under all action alternatives. The amount involved would not substantially deplete the overall supply of rock suitable for these purposes. An additional irreversible commitment of fuel would occur due to the fuel required to build and maintain the road, but this amount would not substantially deplete the overall supply of this resource. There would also be an irreversible commitment of resources associated with wetlands as the functions and values provided by impacted wetlands would be lost for the foreseeable future. As previously disclosed wetland impacts would be minor due to the small acreage impacted and mitigation measures.

Irretrievable commitment of resources refers to a loss of production of renewable resources. Resources that would be irretrievably lost as a result of the road construction in Alternatives B and C are loss of tree growth and wildlife habitat where vegetation is removed. Again this reduction is a very small percentage of the available acres in the Dosewallips Watershed. There would also be an irretrievable loss of some fish habitat under Alternative F as described in the aquatics environmental consequences section of this chapter.

Olympic National Park Specific Disclosures

The following impact topics or issues were eliminated from the list of potential impacts by the NPS because they would not be affected by reestablishing access to recreation facilities and ranger station.

- Unique Ecosystems, Biosphere Reserves, or World Heritage Sites: No unique ecosystems, biosphere reserves, or world heritage sites would be affected by the proposed project.
- Streamflow Characteristics: No impacts to streamflow characteristics are anticipated as a result of reestablishing access to the Dosewallips facilities in ONP.
- Marine or Estuarine Resources: No marine or estuarine resources are located within the project area.
- Urban Quality: Because this area is not located in an urban setting, no impacts to urban quality are anticipated.
- Other Important Environmental Resources: No additional important to environmental resources have been identified that could be impacted by maintaining access to the Dosewallips.