National Park Service
U.S. Department of the Interior

Olympic National Park
Washington

Graves Creek and South Shore Road Rehabilitation Biological Assessment

August 2008

Olympic National Park

Biological Assessment

for

Graves Creek and South Shore Road Rehabilitation
Quinault Rain Forest
Olympic National Park

August 14, 2008

US Department of the Interior, National Park Service

Contents

Tables and Figures

BIOLOGICAL ASSESSMENT

GRAVES CREEK AND SOUTH SHORE ROAD REHABILITATION
QUINAULT RAIN FOREST
OLYMPIC NATIONAL PARK

Introduction

The National Park Service (NPS) prepared an Environmental Assessment (EA) for the Graves Creek and South Shore roads (hereafter referred to as the Proposed Project). In compliance with Section 7 of the Endangered Species Act (ESA), this Biological Assessment (BA) has been prepared to address potential effects on federally listed threatened, endangered, and candidate species from the Proposed Project.

Included in this BA is a description of the Proposed Project, a description of the existing conditions in the project area, an analysis of potential impacts from the Proposed Project on federally listed species, and a description of proposed conservation measures.

Because this project involves construction during the late breeding season for marbled murrelets and northern spotted owls, and includes the placement of streambank armoring (bank barbs) and culvert or bridge replacement in perennial streams in a bull trout watershed, it is our determination that the proposed project requires an individual project evaluation and tiered consultation under the Biological Opinion for Olympic National Park Programmatic Park Management Activities, 2008-2012 (reference 13410-2007-F-0644). We have included the project evaluation forms as Attachment 1 and have developed this biological assessment to provide detailed information to assist with the evaluation of the proposed project.

Purpose and Need for Action

The NPS is proposing repairs to the South Shore and Graves Creek roads at Olympic National Park (ONP or park), in Grays Harbor County, Washington (Figures 1 and 2). This action is needed to repair the damage to these roads by the December 3, 2007 flood event. Restoration of access to the Quinault Rain Forest roads and facilities is of vital concern to the NPS, local and regional communities, and park visitors.

The purpose of the Proposed Project is to restore permanent vehicular access on the South Shore and Graves Creek roads while protecting and restoring natural resource functions; and preserving for the benefit, use, and enjoyment of the people, convenient access to the Quinault Rain Forest. The Proposed Project has several objectives:

- Reestablish sustainable two-lane access for park visitors and staff to the Quinault Loop Drive, and to Graves Creek facilities, including the Graves Creek Ranger Station, campground, picnic area, and trails.

- Protect the roads from future damage by developing more sustainable protective measures.
- Restore the roads in such a manner as to protect and minimize adverse impacts to native fish and fisheries habitat in the Quinault River and tributaries.
- Protect park natural and cultural resources and values.

Federal Action

The ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (Service) on actions that have the potential to affect federally listed species or their designated critical habitat. The federal action that necessitated consultation with the Service is the repair and rehabilitation of portions of Graves Creek and South Shore roads and other related actions. The NPS is the lead federal agency for the Proposed Project and Section 7 consultation with the Service is required.

Agency Consultation

Informal consultation with the Service was initiated on May 21, 2008 when ONP conducted a site visit with the Service. Additional informal consultation occurred on June 16, 2008 during a conference call between representatives from the ONP, the Service, and ERO Resources Corporation (ERO).

Background

The Quinault Rain Forest provides a unique opportunity for visitors to explore the southernmost temperate rain forest in the United States. Several roads access the rain forest, including South Shore, North Shore, North Fork, and Graves Creek. South Shore Road extends from U.S. 101 and follows the south side of Lake Quinault and the Quinault River (Figure 2). It is paved as far as the Jefferson County-Grays Harbor County line. Most of the South Shore Road is outside the park boundary. The South Shore Road crosses the park boundary just before its junction with North Shore Road at the Quinault River Bridge. Facilities along the South Shore Road include the Olympic National Forest Ranger Station, campgrounds, trails, and tribal and private facilities. Once the South Shore Road enters the park, visitors can choose to drive to the Graves Creek area or continue around to the north side of the lake. A loop driving experience between the North Shore and South Shore roads has historically been provided. However, road access and bridge connections have been endangered by periodic high flow events, flooding, and the meandering nature of the Quinault River and its tributaries.

From the junction point at the Quinault River Bridge, Graves Creek Road extends for 6 miles along the East Fork of the Quinault River. Graves Creek Road is a two-lane, unpaved road that leads to a seasonal ranger station and campground, and the East Fork Quinault and Graves Creek trailheads. Access points to trails from this location lead to the Enchanted Valley and on to Staircase and Dosewallips. The Graves Creek area has had various facilities that have served the public since at least 1928.

Both the South Shore and North Shore roads provide access to the North Fork area. The North Fork area is accessed by the two-lane unpaved North Fork Road that runs for 4 miles from just north of the junction of North Shore and South Shore roads, along the North Fork of the Quinault River. The North Fork area includes a seasonal ranger station, a campground, the Irely Lake Trail, and the North Fork Trailhead. The North Fork Trail is the cross-park trail from the Quinault Rain Forest to the Elwha area.

On December 3, 2007, heavy rains fell throughout the Pacific Northwest, causing flooding and damage east and west of Seattle, including portions of the Olympic Peninsula. ONP sustained damage at the Hurricane Ridge, Elwha, Sol Duc, Lake Crescent, Hoh, Queets, and Quinault areas. The most extensive damage occurred in the Quinault area. More than 7 inches of rain fell in the Quinault River Valley in less than 24 hours, with nearly 10 inches of rain falling in 4 days (December 1 through December 4). High winds resulted in extensive damage and downed hundreds of trees in the North Fork and Graves Creek areas in Quinault. Extremely elevated flows in the mainstem of the Quinault River (about 42,000 cfs measured below Lake Quinault) and its tributaries caused damage to the Graves Creek and South Shore roads within the park. The upper Quinault River migrates within the floodplain, directing substantial erosive forces to the banks of the river, especially at outside bends. For this reason, seasonal washouts have occurred periodically in recent history along at-risk portions of both the South Shore and Graves Creek roads, and there have been several attempts to stabilize these roads.

The South Shore Road was damaged near the park boundary. High flows on the Quinault River eroded the road prism at milepost (MP) 0.7. Most of the road subgrade, base, and top course were washed out. Emergency repairs occurred in February and March 2008 to restore the road grade to the standards necessary to allow vehicular travel. The road was reopened to the public on April 1, 2008 to allow access to the Quinault Loop drive. The emergency repairs to restore access on South Shore Road, as defined in the Council on Environmental Quality (CEQ) regulations and under 23 U.S.C. Sec. 125, were categorically excluded (23 CFR 771.117 C) from preparation of an EA (Section 3.4A.(9)) of the NPS NEPA regulations), and were included in an emergency consultation package submitted to the Service on February 5, 2008.

The December 3, 2007 storm also resulted in heavy damage to the Graves Creek Road along the East Fork of the Quinault River. The road was damaged at three locations from extremely high flows in the East Fork of the Quinault River (East Quinault River). The road was also damaged in five additional locations because of plugged or washed-out culverts, debris flows, and erosion on small tributaries to the East Quinault River. Numerous windblown trees fell into the roadway as a result of the storm. The road remains closed to vehicles near MP 1.0, but was opened to pedestrians, stock, and bicycle use in May 2008.

Table 1 summarizes the damages on the South Shore and Graves Creek roads by MP that would be addressed by the Proposed Project.

Table 1. Road damage summary by location and milepost

Location/Milepost	Description of Damage
South Shore Road MP 0.7 to 0.9	Extremely high flows on the Quinault River eroded the road prism over a length of 600 feet starting at MP 0.7. Most of the road subgrade, base, and top course were washed out to a depth of approximately 4 feet to 6 feet. At MP 0.9, a debris flow blocked an existing 24-inch culvert, which resulted in the deposition of rock debris over 80 feet of the road to a depth of about 6 feet.
Graves Creek Road MP 1.2	Extremely high flows on the East Quinault River washed out the riprap bank hardening and the road over an approximate length of 200 feet.
Graves Creek Road MP 1.7	Extremely high flows in the East Quinault River eroded the road surface and the riverbank over approximately 200 feet. High flows on an intermittent tributary to the river plugged a 24-inch culvert with debris.
Graves Creek Road MP 2.3 – 2.5	Extremely high flows in an ephemeral tributary to the East Quinault River plugged the 48-inch culvert with debris and eventually washed out both the road and the culvert. Approximately 100 feet of the road base and subgrade to a depth of 13 feet were washed out by the debris flow. Extremely heavy debris flows (e.g., gravel, logs, and rock) from the mountainside at this location, referred to as cobblestone alley, covered the road over approximately 600 feet x 25 feet to an average depth of 3 feet.
Graves Creek Road MP 3.1	Extremely high flows in a tributary to the East Quinault River plugged three culverts (two 24-inch culverts and one 36-inch culvert) with debris and covered both sides of the road with debris. The debris flow washed out and scoured approximately 1,050 feet of the road. A new channel was cut across the road and the depth of erosion into the base and subgrade is approximately 3 feet.
Graves Creek Road MP 3.4	Extremely high flows with debris in a tributary to the East Quinault River plugged the three culverts (two 24-inch culverts and one 36-inch culvert) and eroded the road surface over a length of 30 feet. Rock debris was washed west down the road over a length of approximately 600 feet and to a depth of 2 feet.
Graves Creek Road MP 3.8	Extremely high flows with debris plugged the 4 foot x 6 foot culvert and washed out both the road and the culvert on this tributary to the East Quinault River. The debris flow washed out approximately 10 feet on both sides of the road prism and the depth of erosion into the base and subgrade is approximately 4 feet. A 5-foot-wide section of the road in the center remains.
Graves Creek Road MP 4.0	Extremely high flows on the East Quinault River eroded the bank/road prism over a length of approximately 200 feet. The height of the road surface above the river channel bottom at the base of the eroded bank varies from approximately 15 to 18 feet. The road subgrade has been destabilized and there is longitudinal cracking in some locations. Another high water event will extend the bank erosion further into the road prism.
Graves Creek Road MP 4.5	Extremely high flows with debris plugged and buried the 48-inch culvert, and washed out the road on this tributary to the East Quinault River. The debris flow washed out and eroded a 300 foot x 12 foot x 4-foot section of roadway.

Project Description

ONP of the National Park Service (NPS), in cooperation with Western Federal Lands Highway Division (WFLHD) of the Federal Highway Administration (FHWA), is proposing to rehabilitate and repair the South Shore and Graves Creek roads in the Quinault Rain Forest area of the park. On December 3, 2007, extreme flooding around the Olympic Peninsula damaged several roads and facilities on both the east and west sides of ONP. Major damage occurred in the Quinault Rain Forest area of the park.

The Preferred Alternative includes site-specific repairs and improvements at each of the damaged sections of road (Figure 2) to restore vehicle access to the Quinault Rain Forest and facilities. The intent of the proposed improvements is to provide additional road protective measures that reduce the potential for damage from future storm events, and to restore and improve the quality of habitat for fish and aquatic life in the Quinault River and tributaries. The proposed rehabilitation and improvement activities are described for each of the damaged road sections by MP.

South Shore Road—MP 0.7 to 0.9 (Figures 3-6)

To protect the road from future washouts at this location, the installation of bank barbs and a wood reinforced floodplain (WRF) structure is proposed along the Quinault River. Three bank barbs would be placed at about 150-foot intervals along a 600-foot section of the road that was damaged by the storm. The barbs would extend into the river about 40 feet at an angle with the upstream bank. The face and sides of the barbs would be constructed at an approximately 3:1 slope. The barbs would be about 40 feet wide and 4 to 5 feet high at the streambank, and about 30 feet wide and 3 to 4 feet high at the tip. Much of the barb would be below the ordinary low water level of the river and would not be visible at higher flows. Installation of the barbs would occur when the river is near the ordinary low water level. The barbs would be constructed by machine placement of large riprap rock without excavation in the stream channel. The streambank would be excavated first and the rock placed in the excavated area to form a working platform. The platform would then be expanded into the channel as the barb is constructed. No equipment would need to operate directly in the river channel. The barb would be anchored into the road bank riprap installed during emergency repairs about 10 feet, which may require excavation of about 10 feet into the road prism. Upon completion of the barb installation, the road would be repaired.

As high flows pass over the barbs they leave the barb in a direction perpendicular to the barb, which diverts the flow away from the stream bank. At the same time, the rate of flow (energy) is slightly slowed, and as a result, suspended bedload materials are deposited upstream of the barbs. The captured sediment would eventually support riparian vegetation, further protecting the roadway. The bank barbs would not necessarily be permanent structures. They would be monitored over time to determine their effectiveness and could be removed or modified if they do not function as anticipated, or if future planning determines them to be unnecessary.

A WRF would be installed just upstream of the bank barbs above a large rock outcrop at a bend in the Quinault River where flows are fast during high flows, but are typically low during normal flow conditions. The WRF structure is an interconnected log structure ballasted with approximately 30-inch-diameter rock, and stabilized further with log pilings and riverbed material excavated to countersink the structure into the riverbed. The structure would extend into the river from the bank from 30 to 60 feet and would be about 250 feet in length. The top of the structure would be planted with trees such that over the long term, the structure would replicate a natural floodplain where trees would become established and further serve to both protect the road and form a more natural interface with the river, as compared to riprap bank armor.

The WRF would be installed in the late summer/early fall when there is no streamflow at the construction site. Typically, there is little to no water present at the proposed site during low flows, but a small diversion structure or berm using riverbed material may need to be created with an excavator and bulldozer to prevent streamflow from entering the area during construction. Following construction, the diversion would be removed. Construction of the WRF would require excavation with a tracked excavator and bulldozer to a depth of approximately 5 feet. Log piles, using trees of about 12 inches in diameter, would be driven into the stream channel. Salvaged windfall trees would then be placed with an excavator to form an interconnected stacked structure. Rock ballast would then be placed within the stacked logs and piling to form the basic structure. Quarry spalls would be placed over the rock and log structure to form a filter blanket. Pit run rock material and the excavated riverbed material would then be placed over the quarry spall filter blanket to form a growing medium for planting trees. The WRF would protect the road bank and road by deflecting flows. The WRF is expected to create fish habitat superior to rock riprap.

No other repair work to the road surface is needed beyond what was completed as part of the emergency work.

Graves Creek Road—MP 1.2 (Figure 7)

Two bank barbs would be installed in the East Quinault River where the road washout occurred to reduce high-flow energy and direct flows away from the road and streambank. The bank barbs would be similar in design and installation as described for MP 0.7 to 0.9. All work would be conducted when the river is flowing near the ordinary low water level in the late summer and early fall. The barbs would protect the streambank and allow deposition of bedload material upstream and downstream of the barbs, which would eventually support riparian vegetation. The purpose of the barbs is to protect the area from the erosive effects of high flows.

The road realignment work conducted during emergency repairs completed the work needed to rehabilitate the road, although additional road repairs may be needed following excavation into the road prism to key-in the bank barbs to the streambank.

Graves Creek Road—MP 1.7 (Figure 8)

Five bank barbs would be installed at intervals of 150 to 200 feet along about 700 feet of the East Quinault River streambank adjacent to the road. The barb design and installation techniques would be similar to those described for MP 0.7 to 0.9. All work would be conducted when the river is flowing near the ordinary low water levels in the late summer and early fall. The bank barbs would deflect flow from the road and streambank and protect the area from the erosive effect of high flows. These improvements occur in the area where the road was realigned away from the stream in 2003 following a previous road washout in 2000.

Graves Creek Road—MP 2.3 to 2.5 (Figure 9)

The 200 feet of washed-out road would be reconstructed with installation of a low water crossing to replace the 4-foot culvert. Installation of the low water crossing would prevent future culvert plugging and reduce the potential for road damage and sediment delivery to the East Quinault River. The approximate 30-foot x 40-foot low water crossing would be constructed using large 6-inch fractured rock to prevent the road prism from being washed out. As an alternative, a concrete foundation or surface could be installed, as determined during final design. Because the low water crossing would be about 8 feet lower than the elevation of the existing road approach to the stream crossing as a result of the storm damage, a bulldozer would be used to lower the road grade on both sides of the low water crossing. The road surface would be capped with crushed rock to create the driving surface following completion of other road repairs.

Graves Creek Road—MP 3.1 (Figure 10)

The existing three culverts that were buried and filled with debris following the storm would be left in place because of the disturbance that would be required to excavate them. Buried culverts would not be visible and would not interfere with road maintenance. A new single-lane bridge would be installed across the new intermittent stream channel created by the flood event about 50 feet east of where the buried culverts are located. Construction of the bridge would require excavation of the channel about 2 feet lower than the existing road surface for a width of about 30 feet across the 15-foot-wide road. The channel would be excavated to a similar depth about 40 feet both upstream and downstream of the bridge location. Additional excavation would be needed for construction of the bridge abutments. The abutments would be constructed of interlocking precast concrete on which the prefabricated approximately 12-foot by 28-foot galvanized steel truss bridge would be placed. The abutments would be protected by the placement of riprap rock. The bridge would be at an elevation about 6 feet above the bottom of the stream channel and would extend beyond the current 19-foot bankfull width of the channel, which would accommodate water flow and fish passage requirements.

Material excavated from on-site plus additional imports of pit run rock would be used to construct the 100-foot-long approaches to the bridge from each side of the drainage. The road approaches would need to be elevated about 6 feet above the existing road surface. The road surface would be capped with crushed rock to create the driving surface, and 50 feet of road on each side of the bridge would be paved with 3 inches of asphalt to protect the road during maintenance operations and reduce the potential for erosion and stream sedimentation.

Graves Creek Road—MP 3.4 (Figure 10)

The three damaged culverts would be removed with a tracked excavator and hauled to an approved landfill outside of ONP. A prefabricated steel truss bridge, as described for MP 3.1, would be installed across the stream channel. Construction techniques would be the same as described for MP 3.1. Rock debris flow material deposited by the storm would be excavated and used for constructing the approach to the bridge.

Graves Creek Road—MP 3.8 (Figure 11)

The damaged road subgrade would be repaired with suitable borrow material. The culvert inlet and outlet would be protected by placement of riprap rock material. The road surface would be capped with crushed rock to create the driving surface.

Graves Creek Road—MP 4.0 (Figure 12 and 13)

About 100 feet of riprap streambank armoring along the East Quinault River adjacent to the road would be installed. Installation of the riprap would be placed with an excavator below the ordinary low water level without excavating the channel to prevent undercutting, and would be composed of large rock. The riprap bank armor would extend into the river about 18 to 22 feet, and the face of the armoring would be at a 1.5:1 slope. Quarry spalls would be placed between the armoring and the eroded bank to serve as a filter blanket. Pit run rock material would be placed in the voids of the rock to serve as a growing medium for willow plantings. Construction would occur in the late summer and fall when the river is flowing near the ordinary low water level.

Upstream of the riprap installation, up to about 275 feet of WRF may be installed in the East Quinault River to protect the streambank and road, and to provide improved aquatic life habitat. Currently the river is flowing through the proposed WRF installation site, making installation at this time infeasible because the river would have to be directed away from the site due to nearby high quality fish habitat. Installation of the WRF at this location would not occur until the river naturally changes course away from the streambank and Proposed Project location. The WRF would be constructed in a similar manner as described for MP 0.7 to 0.9, but may be modified during final design.

Graves Creek Road MP 4.5 (Figure 14)

The damaged 4-foot-diameter culvert would be removed with a tracked excavator and hauled to an approved landfill outside of ONP. A new culvert would be installed in the channel to meet hydrologic flows. This channel does not provide fish habitat; therefore, fish passage does not need to be considered. The culvert inlet and outlet would be protected with riprap. Some of the downstream debris in the channel would be excavated to improve flow. A drivable waterbar would be constructed in the subgrade west of the culvert to divert flows and prevent scouring of the road prism. The road surface would be capped with crushed rock to create the driving surface.

Federally Threatened, Endangered, Proposed, and Candidate Species Potentially Affected by the Proposed Project

This section describes habitat requirements, distribution, and other relevant background information; potential habitat in the project area; and temporary and permanent, direct and indirect effects that might occur to federally listed species because of the project. Federally listed threatened, endangered, and candidate species potentially affected by the Proposed Project are presented in Table 2.

Table 2. Federally listed endangered and threatened species potentially affected by the Proposed Project

Species	Status
Northern spotted owl (*Strix occidentalis caurina*)	Threatened
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened
Bull trout (*Salvelinus confluentus*)	Threatened

Source: Service 2008.

Conservation Measures

The NPS includes conservation measures that will be taken to avoid, minimize, and compensate for impacts to federally listed species.

Northern Spotted Owl

To avoid adverse impacts to northern spotted owl or their habitat, the following mitigation measures would be implemented:

- Project activities that do not affect flows in the Quinault or the East Quinault River would begin after July 15, during the late breeding season when breeding owls and their young would be less vulnerable to disturbance.
- Existing vegetation would not be disturbed during project construction. No trees large enough to contain suitable habitat for spotted owls would be cut.

Marbled Murrelet

To avoid adverse impacts to breeding murrelets, the following mitigation measures would be implemented:

- To avoid adverse impacts to breeding murrelets, any noise-producing construction activities above ambient noise levels within 35 yards of murrelet habitat would not begin until after August 6, during the murrelet late breeding season (August 6 to September 15).
- During the project work period between August 6 and September 15 within 35 yards of marbled murrelet habitat, no work that generates above-ambient noise levels would take place at night or within 2 hours of sunrise and sunset, when murrelets are known to be most active.
- The park would maintain strict garbage control to prevent scavengers (e.g., jays and crows), which are predators on murrelet nests, from being attracted to the project area. No food scraps would be discarded or fed to wildlife.
- Existing vegetation would not be disturbed during project construction. No trees large enough to contain suitable habitat for murrelets would be cut.

Bull Trout

To avoid adverse impacts to bull trout or their habitat, the following conservation measures would be implemented:

- Snorkel surveys would occur at the project sites before work begins and periodically during construction. If spawning is found, work would be delayed at that particular area.
- In accordance with Washington Department of Fish and Wildlife work windows, in-stream work would be scheduled from July 15 through August 30, during periods of low flow and before spawning, to minimize impacts to bull trout. In-stream construction should be completed before any bull trout fry hatchings.

Work could be extended into the first week of September should snorkel surveys show no fish or spawning in the project area.

- Large woody material removed from a culvert inlet would be returned to the stream, downstream of the culvert. This measure would preserve large woody debris already in the stream channel.
- Large woody debris and plants would be incorporated into the design of bank protection projects whenever possible, and in consultation with park biologists.
- At a minimum, all culverts would be designed to accommodate hydrologic flows of the drainage areas.
- Erosion-control measures, such as the installation of silt fences, sediment traps, stream diversions, and spill-protection controls, would be implemented to minimize potential effects of sedimentation on bull trout.
- Erosion-control measures would be left in place, where appropriate, until the site is revegetated. Construction erosion-control measures would be inspected weekly or after a major storm. Repairs and maintenance would be performed, where necessary.
- WRFs would be installed in the late summer/early fall when there is typically no streamflow at the construction site. If streamflows are encountered, a small diversion structure or berm using riverbed material would be created with an excavator and bulldozer to prevent streamflow from entering the area during construction. Diversions would be conducted in a manner to minimize disturbance and sedimentation. Following construction, the diversion would be removed and natural flow would be unimpeded after construction is completed.
- During and following construction, disturbed areas would be stabilized, contoured to fit existing natural conditions, and revegetated with native soil and plant species, as approved by NPS biologists.
- Construction equipment would be checked daily and maintained to reduce the likelihood of hazardous fluid leaks. Hazardous spill containment measures would be located on-site.

Existing Conditions in Project Area

The project area includes areas potentially directly or indirectly affected by the Proposed Project. For purposes of this BA, the project area for indirect and direct effects is the Quinault River basin for aquatic species, and the area of effect for terrestrial species is the South Shore Road and Graves Creek Road corridors and adjacent areas, to a distance of 35 yards for any noise-producing work.

The temperate climate and high levels of precipitation in the Quinault River Valley supports riparian forest and old-growth temperate rain forest unique to the Pacific Northwest coast. Large conifers, including Douglas fir, Sitka spruce, and western hemlock, dominate the forest near the project area. Shrubs include salmonberry, trailing blackberry, huckleberry species, Scouler willow, and red elderberry. Mosses, lichens, and fungus species abound on trees and the forest floor. Low-growing plants include vanilla leaf, oxalis, queen's cup, and numerous species of fern. Willow and alder, with understories of ferns, blackberry, salmonberry, and various forbs, dominate areas close to the Quinault River. No wetland vegetation is present at the project sites because the river has avulsed the roadbed. Large conifers grow near the river in the vicinity of the project sites although many were toppled in the 2007 storm.

Mammals commonly seen in the Quinault area include Roosevelt elk, black-tailed deer, black bear, raccoon, spotted skunk, Douglas squirrel, beaver, and snowshoe hare. Less common, but regularly present, are coyote, mountain lion, and bobcat. Fishers were recently reintroduced into ONP and some have been tracked in the Quinault River basin. Smaller, less conspicuous or nocturnal mammals are numerous. Conspicuous birds in the area include great blue heron, osprey, Stellar jay, kingfisher, water ouzel (dipper), crow, raven, varied thrush, robin, winter wren, woodpeckers, kinglets, sparrows, and several warblers. Due to the wet, cold, and cloudy climate of ONP, only a few reptile species are found. The most common reptiles are a few species of garter snake. Amphibians are slightly more common and include the northwestern salamander, long-toed salamander, rough-skinned newt, western red-backed salamander, red-legged frog, Pacific treefrog, and tailed frog. Numerous invertebrate species such as slugs and snails are found in the project vicinity. Some of these species are widespread within the Quinault River watershed, while others may be uncommon or locally rare, have restricted and discrete distributions, and may be represented by small isolated populations. Conservation concerns may be increasing for some of these species in the Pacific Northwest. Systematic surveys for invertebrate species have not been conducted at the project area.

Species richness for fish fauna in the Quinault drainage is relatively high, consisting of summer and winter steelhead trout, rainbow trout, cutthroat trout, bull trout, Dolly Varden, sockeye salmon, pink salmon, coho salmon, spring/summer and fall Chinook salmon, chum salmon, longnose dace, kokanee, mountain whitefish, largescale sucker, peamouth, Olympic mudminnow, redside shiner, and several species of sulpins and lamprey (ONP files).

Threatened and Endangered Species Accounts and Effects of the Proposed Project

Potential habitats for the federally listed species listed in Table 2 were identified within the project area based on site visits conducted by ONP, Service, and Tribal biologists, information available in ONP files, and research documents. Potential effects on habitat, population viability, distribution, travel, and reproduction were evaluated for each species based on approved thresholds and operating periods as listed in Tables 3 and 4. The following subsections describe life history characteristics, habitat requirements, distribution, and potential habitat in the project area for the species listed in Table 2, as well as potential effects of the Proposed Project.

Table 3. Effects Determinations by Type of Disturbance and Operating Period for Northern Spotted Owl when Occupied Sites and/or Unsurveyed Suitable Habitat Occurs in the Vicinity of the Proposed Work

	Operating Period for Project Activities and Associated Effects Determinations for Northern Spotted Owl					
	NE		**NLAA**		**LAA**	
Type of Disturbance	**Date**	**Distance from Suitable Habitat**	**Date**	**Distance from Suitable Habitat**	**Date**	**Distance from Suitable Habitat**
Heavy equipment, motorized tools	10/1-2/28	any	3/1-7/15	> 35 yards	3/1-7/15	< 35 yards
	7/16-9/30	> 35 yards	7/16-9/30	< 35 yards		

Table 4. Effects Determinations by Type of Disturbance and Operating Period for Marbled Murrelet when Occupied Sites and/or Unsurveyed Suitable Habitat Occurs in the Vicinity of the Proposed Work

	Operating Period for Project Activities and Associated Effects Determinations for Marbled Murrelet					
	NE		**NLAA**		**LAA**	
Type of Disturbance	**Date**	**Distance from Suitable Habitat**	**Date**	**Distance from Suitable Habitat**	**Date**	**Distance from Suitable Habitat**
Heavy equipment, motorized tools	9/16-3/30	any	4/1-8/5	> 35 yards	4/1-8/5	< 35 yards
	8/6-9/15	> 35 yards	8/6-9/15	< 35 yards		

Northern Spotted Owl

Species Background, Habitat Requirements, and Distribution

The northern spotted owl was federally listed as a threatened species in July 1990 due to extensive loss of habitat in old-growth and late-successional forest. The survival of the northern spotted owl in the Pacific Northwest depends on maintaining adequate, well-distributed nesting, roosting, and foraging habitat. The listing is a result of reductions in northern spotted owl populations, habitat loss, and adverse modification of old-growth and late-successional forests due to timber harvest activities, fire, and human development in much of its range.

Northern spotted owls generally require large areas of land containing semicontinuous expanses of old-growth forest to meet their biological needs for nesting, roosting, foraging, and dispersal. Nesting and roosting habitat typically includes a multilayered, multispecies, moderate to high closure canopy with large trees. Preferred nesting and roosting habitat also contains open space below the canopy for protected flight, large trees with deformities to provide nesting locations, and numerous fallen trees and other ground debris (Thomas et al. 1990). Foraging habitat used by northern spotted owls is often fragmented and includes open forest. In much of the species' northern range, large dense forests are also chosen as foraging habitat. Foraging habitat in the southern lower-elevation locations includes the edges of dense forests and open forests. Dispersal habitat is important for owl movement between nesting habitat, both locally and over the range of the northern spotted owl, and provides critical links between owl populations. Northern spotted owls require forest stands with adequate tree size and moderate canopy closure to provide refuge from predators and for occasional foraging.

Northern spotted owl breeding season in ONP is broken into two periods: early breeding season from March 1 through July 15, and late breeding season from July 16 to September 30. Chicks on the Olympic Peninsula usually fledge by July 15. After fledging, they stay near the nest and are fed by parents.

Critical Habitat

No critical habitat has been formally designated within ONP for northern spotted owls, although much of the park contains high quality habitat that is considered important for the recovery of the species. Critical habitat was not designated because habitat in the park does not require special management consideration or protection by virtue of its national park status.

Potential Habitat in the Project Area

Habitat in the project area is physically suitable for northern spotted owl nesting and roosting, and may have been used for these functions years ago; however, the project area is likely no longer used by northern spotted owl for nesting. The one known nest site found within ½ mile of the project locations at Howe Creek (1992) is most likely unoccupied because of the increase of barred owls in the area (Gremel 2008). A total of 15 known owl nest territories occur within the Quinault Valley, although surveys have not been conducted in most of the drainages. Forests in the immediate vicinity of the road projects are composed of spruce, hemlock, and hardwoods at approximately 400 feet elevation. Mixed forests at this elevation on the west side of the park are unlikely to be used for nesting or roosting by northern spotted owls due to competition with barred owls, but these areas may be used for foraging and dispersal.

Effects of the Proposed Project

No suitable nesting or critical northern spotted owl habitat would be modified or removed under the Proposed Project. Foraging owls may be disturbed by machinery noise during construction, causing owls to temporarily avoid the project area. The mobilization and use of heavy equipment beginning after July 15 would create noise above ambient levels and visual disturbance in the project area during the late breeding season. However, cliff faces, mature trees and thick foliage at the project area provide a high degree of natural screening, which would reduce the intensity of noise and visual impacts. There would also be some increased noise and activity at the staging areas along the roadway between the project sites, and construction traffic on the South Shore and Graves Creek roads. The northern spotted owl is unlikely to occur near the project area and no suitable habitat would be modified or removed. No known nest sites occur within a mile of the project area. The project would start after July 15, during the late breeding season, when breeding owls and their young would be less vulnerable to disturbance. In addition, northern spotted owls forage primarily at night when there would be no construction activity. Thus, the Proposed Project may affect, but is not likely to adversely affect northern spotted owls.

Marbled Murrelet

Species Background, Habitat Requirements, and Distribution

On October 1, 1992, the marbled murrelet was designated as threatened under the ESA. The listing is largely due to the loss of nesting habitat from timber harvest and fires. The species is particularly vulnerable to the loss of nesting habitat as evidenced by low breeding success rates and sensitive habitat requirements. The marbled murrelet uses old-growth forests for nesting, and the time span for habitat recovery exceeds 100 years. Declining numbers are documented or suspected throughout most of the species' range. The species also is affected by ocean feeding conditions and direct mortality from net fishery and oil spills.

Marbled murrelets inhabit the Pacific Coast of North America from the Bering Sea to central California, just south of San Francisco Bay. In contrast to other seabirds, murrelets do not form dense colonies, and may fly as far as 43 miles inland to nest, generally in older coniferous forests with a high canopy closure. This habitat requires trees with large branches and deformities found in old-growth forests for nesting platforms. Murrelets are more commonly found inland during the summer breeding season, but make daily trips to the ocean to gather food, and have been detected in forests throughout the year. Murrelet detections inland begin in the spring and peak in midsummer before decreasing rapidly after midsummer, presumably because they are undergoing a flightless molt at sea. Daily trips to gather food at sea are observed most frequently in the hours near dawn and dusk. When not nesting, the birds live at sea, spending their days feeding close to shore and then moving several kilometers offshore at night (Service 1997).

Marbled murrelet breeding season is broken into two periods: April 1 through August 5 is the early season, and August 6 through September 15 is the late season. Surveys conducted by NPS and USFS on the Olympic Peninsula using the PSG protocol indicate murrelet detections generally peak in July and taper off at the beginning of August. Updated nest information for California and Oregon indicates that up to 20% of nests are active in August, while 8 to 10% are still active in September (NPS 2008). Nelson estimates that approximately 90% of nests have fledged by August 20. Half of the murrelet chicks in Washington for which a fledging date is known fledged by August 5, with a mean fledge date of August 2 (NPS 2008). Downy chicks have been located on the ground in the park in late July (1991) and late August (1997); and a fledgling was found on the ground in the park on September 19, 2003. Obviously, the later potentially disturbing activities are carried out, the less likelihood there is for impacts to reproduction.

Critical Habitat

No critical habitat has been formally designated within ONP for marbled murrelets, although much of the park contains high quality habitat that is considered important for the recovery of the species. Critical habitat was not designated because habitat in the park does not require special management consideration or protection by virtue of its national park status.

Potential Habitat in the Project Area

Portions of this project would take place in suitable habitat for marbled murrelets. In the lower reaches of the project area, along South Shore Road and in the first two miles of Graves Creek Road, the road is greater than 35 yards from suitable habitat. The road is adjacent to the river and riparian habitat to the north, and the south side of the road has steep slopes with bedrock, and is not considered suitable murrelet habitat. However, to the east (above mile 2 on Graves Creek Road), the habitat improves south of the roadway and is considered suitable habitat for murrelets. Murrelet surveys have not been conducted in the immediate vicinity of the project; however, in recent years, occupied detections were recorded during protocol surveys at four locations upriver from the project, including the Graves Creek campground at the eastern terminus of the Graves Creek Road. Live chicks have been discovered on the ground within the Quinault drainage twice since 1986. Since murrelet presence has been documented at 100 percent of survey areas throughout the park in recent years, and occupancy has been documented at 80 percent of those areas, it is reasonable to assume that suitable habitat in the vicinity of the project is also occupied.

Effects of the Proposed Project

Activities associated with the Proposed Project would occur near suitable habitat for marbled murrelets, but would not result in a loss of identified habitat because no trees large enough to contain suitable habitat for murrelets would be cut. The use of heavy equipment beginning in mid-July would create noise above ambient levels and visual disturbance. However, this work would be restricted to areas outside the distance threshold for marbled murrelets (35 yards or greater from suitable habitat). In addition, the noise of the river, plus the buffer of trees, cliffs, and thick foliage at the project areas provides a high degree of natural screening, which would reduce the intensity of noise and visual impacts.

To avoid adverse impacts to breeding murrelets, construction activities within 35 yards of suitable murrelet habitat would not begin until August 6, during the murrelet late breeding season (August 6 to September 15). Any work that generates noise above ambient levels prior to September 15 would not take place at night or within 2 hours of sunrise and sunset during the periods when murrelets are known to be most active. The noise of construction could temporarily affect murrelets in the area in the form of aversion responses. However, construction timing restrictions to avoid disturbances during murrelet high-activity periods would minimize effects to the species. Therefore, the Proposed Project may affect, but is not likely to adversely affect marbled murrelets.

Bull Trout

Species Background, Habitat Requirements, and Distribution

All populations of bull trout are designated as threatened in the coterminous United States under the ESA (64 Fed. Reg. 58910 (November 1, 1999)). The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fishery management practices, and the introduction of nonnative species. Habitat degradation is largely due to logging, road construction, mining, and overgrazing, all of which have severely affected sensitive breeding habitat. In the Quinault River basin, habitat degradation is primarily associated with past timber harvest and road construction.

Bull trout appear to have more specific habitat requirements than other salmonids and generally need cold water, complex cover, stable substrate with a low percentage of fine sediments, high channel stability, and stream/population connectivity (Rieman and McIntyre 1993). Adults inhabit cold rivers and large tributary streams with moderate to fast currents. Spawning occurs in small cold tributary streams. These habitat components along with the valley form, spawning and rearing substrates, and migratory corridors, influence bull trout distribution and abundance (Pratt 1992; Service 2004).

Bull trout exhibit four diverse life history strategies that include: 1) the stream-resident form that inhabits small headwater streams and may reach sexual maturity at a small size; 2) the fluvial form that inhabits large rivers, attains a large size, and typically spawns in tributary streams; 3) the adfluvial form that matures in lakes or reservoirs and migrates into tributaries to spawn; and 4) the anadromous form that spawns in freshwater and live most of their lives in saltwater (Leary et al. 1991; NOAA Fishery 2007). Anadromous bull trout likely occur in rivers in western Washington, including the Queets, Hoh, and Quinault rivers (Service 2004).

Critical Habitat

Most of the Quinault River and East and North Forks above Lake Quinault have been designated as critical habitat for the Coastal-Puget Sound population (70 Fed. Reg. 56212 (September 26, 2005)). A reach of the Quinault River above Lake Quinault and below the confluence of the North Fork and the mainstem fork is not included as critical habitat because this reach is managed under the Northwest Forest Plan, which provides sufficient protection for bull trout habitat. The project area occurs within the area encompassed by the North and East Fork Quinault River local populations of the Coastal-Puget Sound distinct population segment of bull trout. In accordance with section 3(5)(A)(I) and 4(b) of the ESA and regulations 50 CFR 424.12, primary constituent elements (PCEs) essential to the conservation of the species have been identified (70 Fed. Reg. 56266 (September 26, 2005)). All lands designated as bull trout critical habitat contain one or more of the following:

- Water temperatures ranging from 36 to 59 °F (2 to 15 °C), with adequate thermal refugia available for temperatures at the upper end of this range;
- Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures;

- Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. This should include a minimal amount of fine substrate and minimal substrate embeddedness;
- A natural hydrograph, including peak, high, low, and base flows within historic ranges;
- Springs, seeps, groundwater sources, and subsurface water to contribute to water quality and quantity;
- Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats,;
- An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish;
- Few or no nonnative predatory, interbreeding, or competitive species present; and
- Permanent water of sufficient quantity and quality such that normal reproduction, growth and survival are not inhibited.

Potential Habitat in the Project Area

Bull trout, a char resembling Dolly Varden, occur year-round in the Quinault River basin. The mainstem Quinault River, as well as numerous side channels and tributaries, provide excellent spawning and rearing areas for salmonids and other native fishes. Even though bull trout life histories are complex and remain undescribed in Washington coastal rivers, ONP surveys have documented bull trout use of both the North and East Forks of the Quinault River. Bull trout have been documented in the East Fork from just below O'Neil Creek downstream to the park boundary (which includes the project sites), and in the North Fork from just below Kimta Creek downstream to the confluence with the East Fork.

Olympic National Park staff conducted snorkel surveys during the summer in the North Fork Quinault River and East Fork Quinault River from 2005 to 2007. Surveys were conducted from the confluence of the two rivers, upstream 5 kilometers. In both rivers, mountain whitefish were found to be the most abundant species, followed by resident trout (not identified to species), and then bull trout. During the period of the surveys, the presence of adult salmon was found to be minimal. Large-scale sucker were present in the East Fork Quinault only during the 2007 surveys. However, they were observed to be abundant in the East Fork Quinault in 2004.

Bull trout spawning occurs in late fall through early winter as water temperatures decline. After hatching and emergence from the substrate, juvenile bull trout generally rear in rivers and streams year-round, although an analysis of otolith chemistry from bull trout collected in the nearby Queets River indicated that some migrate to the ocean after rearing for several years (Volk 2000). Bull trout spawning locations are unknown in the Quinault River basin but may occur anywhere that appropriate conditions (e.g., temperature, depth, velocity, and substrate) are found.

Table 5. Documented bull trout presence in the Quinault River basin

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bull Trout	Adult	X	X	X	X	X	X	X	X	X	X	X	X
	Young-of-Year and Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
	Eggs	X	X	X	X						X	X	X

Source: ONP 2002.

Effects of the Proposed Project

Ten bank barbs are proposed for three locations (MP 0.7 to 0.9, 1.2, and 1.7), and WRFs are proposed for two locations (MP 0.7 to 0.9 and 4.0) in the Quinault and East Quinault rivers. Construction of the bank barbs would require the placement of large riprap into the active channel with no excavation required. The construction of the bank barbs is planned during ordinary low flow, which is typically mid-July to early September. Placement of material into the active channel for construction of the bank barbs would generate short-term sediment transport downstream. Increases in suspended sediments potentially affect juvenile fish by damaging gills, reducing feeding, increasing avoidance of construction areas, reducing reactive distance, suppressing production, increasing mortality, and reducing habitat capacity (Reiser and Bjornn 1979). Elevated levels of suspended sediments may also degrade nearby spawning habitat and reduce survival from egg to fry emergence. The increase in sediment near the construction sites would have short-term minor adverse effects on bull trout and bull trout critical habitat near these activities.

It is assumed that suitable bull trout spawning habitat is present at the location of the bank barbs. Direct adverse impacts to individual spawning bull trout or their eggs would largely be avoided by scheduling in-stream construction from July 15 to September 5, before the bull trout spawning period. However, some individual bull trout, as well as bull trout spawning habitat, could be directly adversely impacted during the placement of fill material for construction of the bank barbs. The 10 bank barbs would collectively cover about 400 linear feet of habitat near the banks. The adverse effects to bull trout habitat would occur at less than 1% of the total linear feet (about 359,040) of bull trout critical habitat available in the Quinault and East Quinault rivers from the outlet of Lake Quinault upstream. Because the effects on spawning habitat are less than 1% of the total available habitat (as determined for an adfluvial life history), construction of the bank barbs would have short-term moderate and long-term minor adverse impacts to bull trout and short-term minor and long-term negligible impacts to bull trout critical habitat within the Upper Quinault River basin. Construction of the bank barbs would result in long-term beneficial effects on bull trout habitat as the banks are stabilized and vegetation increases, reducing erosion and subsequent sediment transport.

Construction of the two WRFs would require placement of material into the dry stream channel with some excavation. No water typically occurs at the proposed location of the WRF between MP 0.7 and 0.9 at low flows, but a small diversion structure of riverbed material would be constructed if needed to prevent streamflow from entering the area during construction. Because construction of the WRF would occur in dry conditions, there would be no short-term transport of sediment, but there would be a loss of potential spawning habitat when flows are high. These impacts would result in short-term moderate and long-term minor adverse impacts to bull trout and short-term minor and long-term negligible impacts to bull trout critical habitat within the Upper Quinault River Basin. Currently, the main channel is flowing through the proposed location of the WRF at MP 4.0. Because of the potential damage to bull trout critical habitat from construction within the main channel, this WRF would be constructed only if the river changes course; the timing of which is unknown. Once the main flow is away from this area, the WRF would be constructed in a similar manner and with similar impacts as the WRF at MP 0.9 on the South Shore Road. Additionally, about 100 feet of riprap would also be installed along the streambank at MP 4.0 regardless of whether the WRF is constructed. In general, protecting banks with riprap and large rock can be detrimental to aquatic and riparian habitats and salmonid fish (Chadd 1997) if there is a decrease in woody debris and spawning gravel, and increased stream velocities. Because the area of riprap is relatively small, the adverse effect on adult and juvenile bull trout and bull trout critical habitat would be long-term and minor.

Although construction of the bank barbs and WRFs, and installation of the riprap would have short- and long-term localized adverse effects on bull trout and their habitat, impacts on bull trout would be minimized through implementation of the conservation measures and BMPs described on page 9.

While construction of the bank barbs and WRF would result in short-term, moderate, adverse effects on bull trout, the adverse effects on bull trout habitat would be a small proportion of the overall habitat in the Quinault River basin (less than 1%). Additionally, the WRF is proposed to enhance fish habitat and would result in long-term beneficial effects on bull trout, which, over time, would offset the initial adverse effects. Both the bank barbs and WRF would promote the establishment of riparian vegetation, which is needed to increase sources of woody debris that create high quality fish habitat.

Activities planned within tributaries to the Quinault River are removal and installation of new culverts, culvert removal and installation of a low-flow water crossing, culvert removal and construction of bridges, and repair of damaged road sections. Bull trout habitat is not present in the tributaries where these activities would occur. However, these activities could adversely affect bull trout by disturbing the stream channel and increasing suspended sediment downstream in the North and East forks of the Quinault River. Also, construction would occur during the low-flow period, and all of the tributaries are intermittent or ephemeral. Although the project is planned with the tributaries would be dry at the time of culvert removal and installation or construction of new bridges, in the event flows are present, the flows would be diverted around the construction area to move streamflow out of the work area and minimize suspension of sediments in the stream.

Installation of bridges at MP 3.1 and 3.4 would restore normal flows in the stream channel. In the long term, this would allow flows to the East Quinault River to return to more natural conditions.

Considering the project timing and the conservation measures described on page 9 would minimize adverse effects, implementation of the Proposed Project would result in short-term minor and moderate adverse localized effects, long-term minor adverse localized effects, and long-term beneficial effects on bull trout. However, because the Proposed Project would result in direct short-term moderate adverse impacts to bull trout, the Proposed Project would result in a may affect, likely to adversely affect determination for bull trout.

The Proposed Project would result in short-term, minor, adverse, localized effects; long-term, negligible, adverse, localized effects; and long-term beneficial effects on bull trout critical habitat. Given the small proportion of bull trout critical habitat affected, the Proposed Project may affect, but is not likely to adversely modify bull trout critical habitat.

Cumulative Effects

Cumulative effects may result from future state, local, or private actions that are reasonably certain to occur in the project area and that may destroy, degrade, or fragment the habitat of threatened, endangered, and candidate species. Future federal actions that are unrelated to the Proposed Project are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

Reasonably foreseeable future actions considered in the cumulative effects analysis are described as follows:

- The Grays Harbor County Public Works Department is responsible for about 8 miles of the South Shore Road from U.S. Highway 101 east to the Jefferson County line. The County has three potential road projects planned pending available funding (Esses, pers. comm. 2008). From MP 1.4 to 2.0 near Lake Quinault Lodge, the addition of 6 to 8 feet of paved shoulder adjacent to the road for pedestrian use would be installed in about 2 years. At MP 2.8, the County intends to replace the culvert across Gatlin Creek with a bridge to provide fish passage. As a safety measure, the County plans to flatten the angle of the corner on three 90-degree turns in the road between MP 4 and 5.

Northern Spotted Owl. The Proposed Project, in combination with the impacts of other reasonably foreseeable actions, would result in short-term, negligible, adverse, cumulative impacts on the northern spotted owl. The Proposed Project would add a relatively slight increment to the overall cumulative effects on the northern spotted owl.

Marbled Murrelet. The Proposed Project, in combination with the impacts of other reasonably foreseeable actions, would result in short-term, negligible, adverse, cumulative impacts on the marbled murrelet. The Proposed Project would add a relatively slight increment to the overall cumulative effects on the marbled murrelet.

Bull Trout. Reasonably foreseeable actions could result in impacts to bull trout and their habitat in the Quinault River by increasing sediment, introducing pollutants in the river, and removing or degrading bull trout habitat. Overall, cumulative impacts from reasonably foreseeable future actions would be short- and long-term, minor, adverse, and localized. The Proposed Project would add a relatively small increment to overall cumulative impacts on the bull trout and bull trout critical habitat. The impacts of the Proposed Project, in combination with the impacts of other actions described above and under “Current and Future Actions,” would result in short-term, moderate, adverse effects; long-term, minor, adverse effects; and long-term beneficial impacts to bull trout and short-term, minor, adverse effects; long-term, negligible, adverse effects; and long-term, beneficial, cumulative impacts to bull trout critical habitat.

Conclusion and Determination

Noise and visual disturbance associated with the Proposed Project could have temporary impacts on the northern spotted owl and marbled murrelet in the form of aversion responses. Because the noise-producing activities (above-ambient background noise) would not start within 35 yards of suitable habitat until after August 6, during the late breeding season for owls and murrelets, and no habitat trees would be removed, this project would result in a “may affect, but not likely to adversely affect” determination for these species. The temporary disturbance of stream habitat during construction under the Proposed Project may affect, but is likely to adversely affect bull trout, with implementation of conservation measures.

Measures proposed to avoid, minimize, and compensate for effects to northern spotted owl, marbled murrelet, and bull trout are listed in the “Conservation Measures” section of this biological assessment.

The preliminary determination of effects to federally listed species from the Proposed Project is shown in Table 6.

Table 6. Preliminary determination of effects to federally listed species and critical habitat from the Proposed Project

Common Name	Scientific Name	Preliminary Determination of Effect from the Proposed Project
Northern spotted owl	*Strix occidentalis caurina*	May affect, not likely to adversely affect
Marbled murrelet	*Brachyramphus marmoratus*	May affect, not likely to adversely affect
Bull trout	*Salvelinus confluentus*	May affect, likely to adversely affect
Bull trout critical habitat	*NA*	May affect, not likely to adversely modify

References

Chadd, E. 1997. Altered Streambanks in Olympic National Park: Balancing a Dual Mandate. Prepared for Olympic National Park. Environmental Careers Organization, Seattle, WA.

Esses, R. 2008. County Engineer, Grays Harbor County, WA. Personal communication with Mark DeHaven, ERO Resources Corporation. May 23.

Leary, R. F., F. W. Allendorf, and S. H. Forbes. 1991. Conservation genetics of bull trout in the Columbia and Klamath River drainages. Wild Trout and Salmon Genetics Laboratory Report 91/2. Division of Biological Sciences, University of Montana. Missoula, MT. 32 pp.

National Oceanic and Atmospheric Administration (NOAA Fisheries Service). 2007. NOAA Fisheries Office of Habitat Conservation website. Accessed April 16, 2007. Available at: <http://www.nmfs.noaa.gov/habitat/habitatprotection/index.htm>.

National Park Service, Olympic National Park. 2008 Final General Management Plan and Environmental Impact Statement. March 5, 2008.

National Park Service, Olympic National Park. 2002. Replace Culvert, Quinault North Shore Road, EA and BA. September 12. Available at: <http://www.nps.gov/archive/olym/ea/Grandey/grandey_crk3.htm>.

Pratt, L. K. 1992. A review of bull trout life history. In: Howell, P. J. and D. V. Buchanan, eds. Proceedings of the Gearhart Mountain bull trout workshop. Oregon Chapter of AFS Corvallis, OR. 67 pp.

Reiser, D. W. and T. C. Bjornn. 1979. 1. Habitat Requirements of Anadromous Salmonids. In: Meehan, W. R., Technical Editor. Influence of Forest and Rangeland Management on Anadromous Fish Habitat in the Western United States and Canada. USDA Forest Service GTR PNW-96.

Rieman, B. and L. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. Forest Service Gen. Tech Report INT-3302.

Ritchie, W. P. 1996, 2000. Personal communication. Washington Department of Fish and Wildlife, Olympia.

Thomas, J. W., E. D. Forsman, J. B. Lint, E. C. Meslow, B. R. Noon, and J. Verner. 1990. A conservation strategy for the Northern spotted owl: a report to the Interagency Scientific Committee to address the conservation of the Northern spotted owl. U.S. Forest Service, U.S. Fish and Wildlife Service, and National Park Service, Washington, DC.

U.S. Fish and Wildlife Service (Service). 1997. Recovery Plan for the Marbled Murrelet. Region 1. Portland, OR. Available at: <http://ecos.fws.gov/docs/recovery_plans/1997/970924.pdf>.

U.S. Fish and Wildlife Service (Service). 2004. Draft Recovery Plan for the Coastal-Puget Sound Distinct Population Segment of Bull Trout (*Salvelinus confluentus*). Volume II (of II): Olympic Peninsula Management Unit. Portland, OR. 277 + xvi pp.

U.S. Fish and Wildlife Service (Service). 2008. NPS consultation with Kent Livezy.

Volk, E. 2000. Using otolith strontium to infer migratory histories in Bull Trout and Dolly Varden from several Washington State rivers. Washington Department of Fish and Wildlife, Olympia, WA. 28pp.

List of Preparers and Consultations

Preparers:

Karen Baud, ERO Resources Corporation, Wildlife Biologist
Leigh Rouse, ERO Resources Corporation, Ecologist
Mark DeHaven, ERO Resources Corporation, Senior Natural Resource Specialist
Nancy Hendricks, Olympic National Park, Environmental Protection Specialist
Pat Crain, NPS Fisheries Biologist

Project Description and Plans Provided by:
Olympic National Park
Federal Highway Administration — Western Federal Lands Highway Division

Experts Consulted:
Kent Livezy, U.S. Fish and Wildlife Service
James Green, U.S. Army Corps of Engineers
Bill Armstrong, Quinault Indian Nation
Patti Happe, NPS Wildlife Biologist
Sam Brenkman, NPS Fisheries Biologist
Scott Gremel, NPS Wildlife Biologist

Figure 1. Region

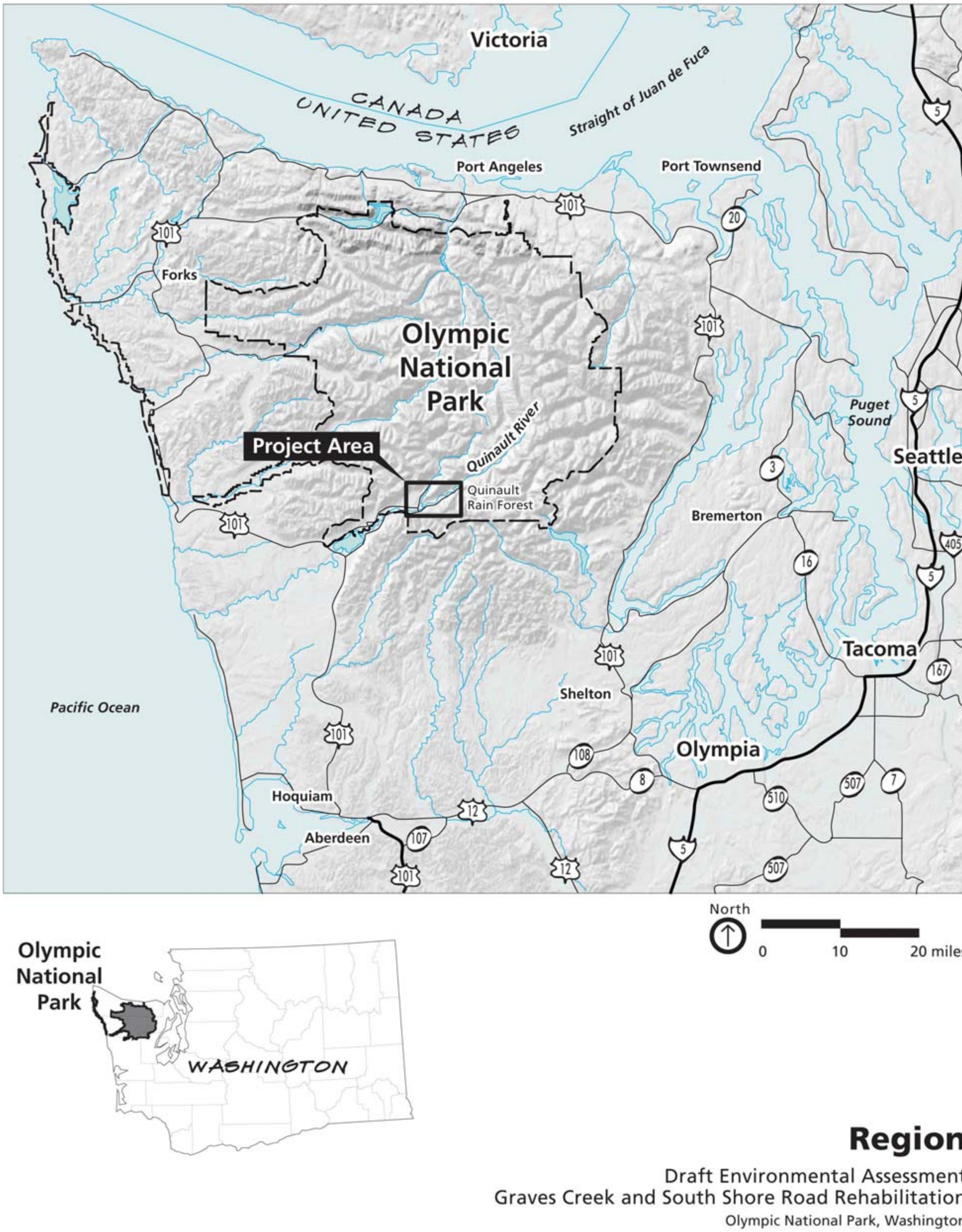


Figure 2. Project Location.

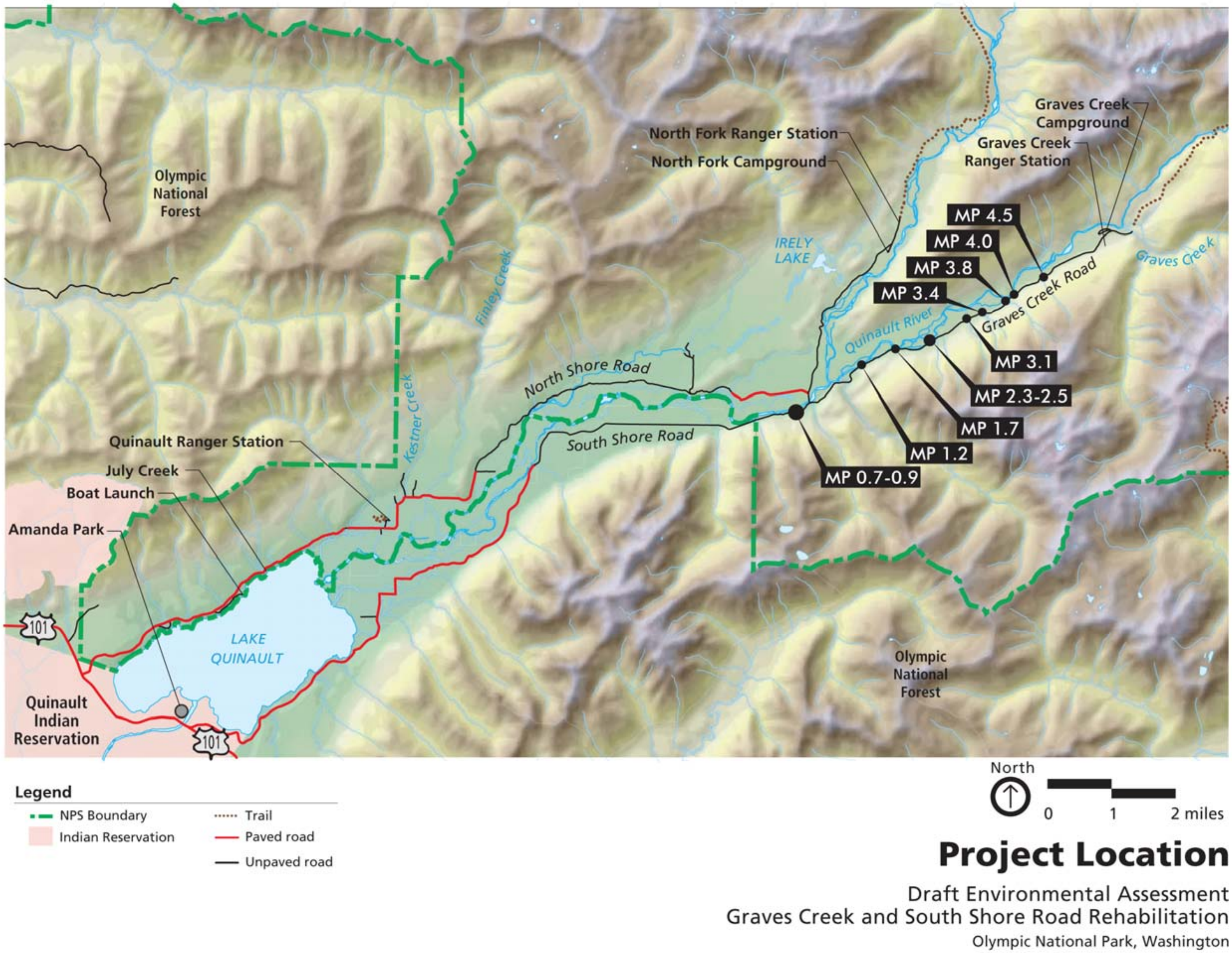


Figure 3. South Shore Road Bank Barbs at MP 0.7.

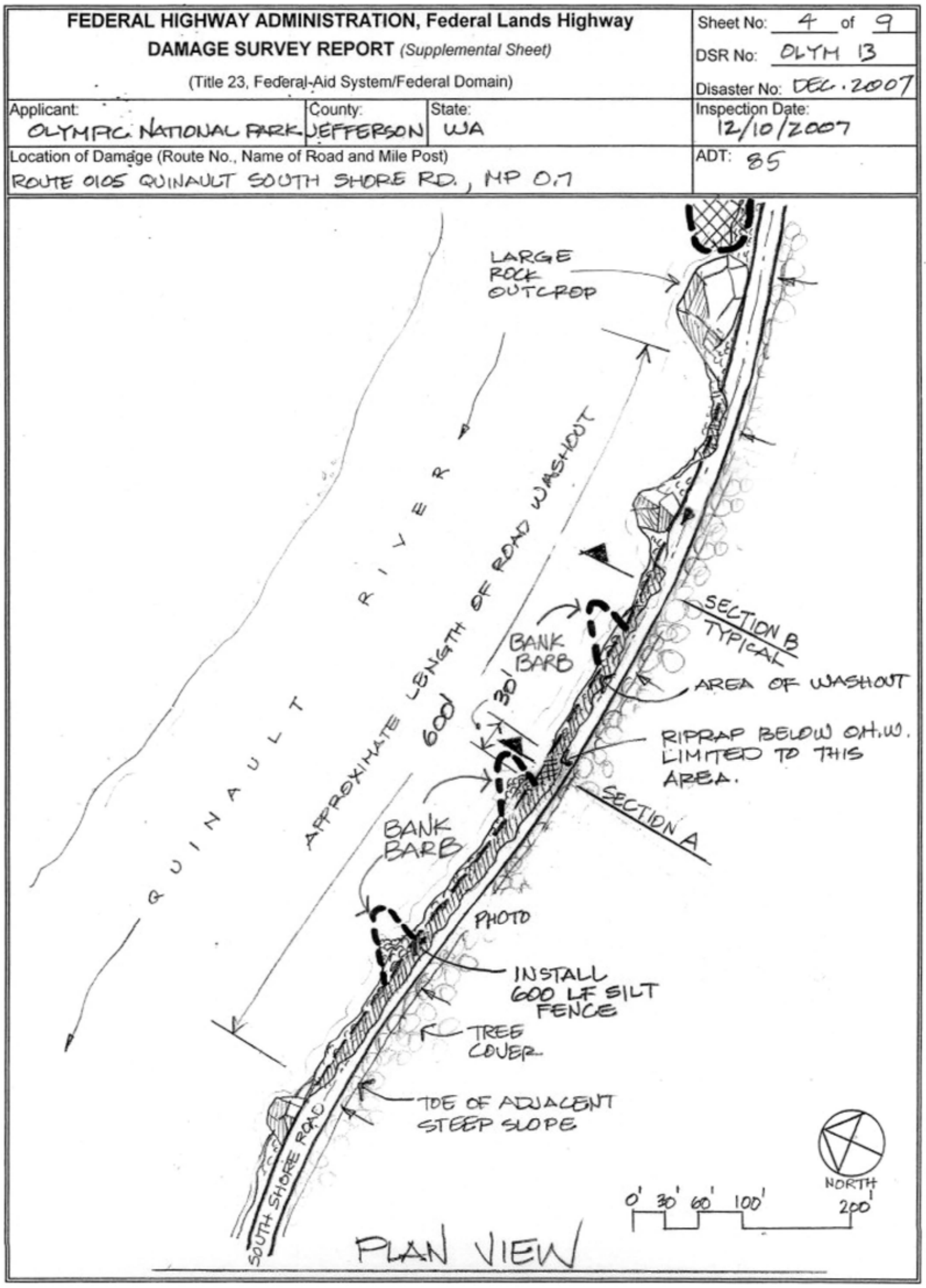


Figure 4. Bank Barb Plan View Details.

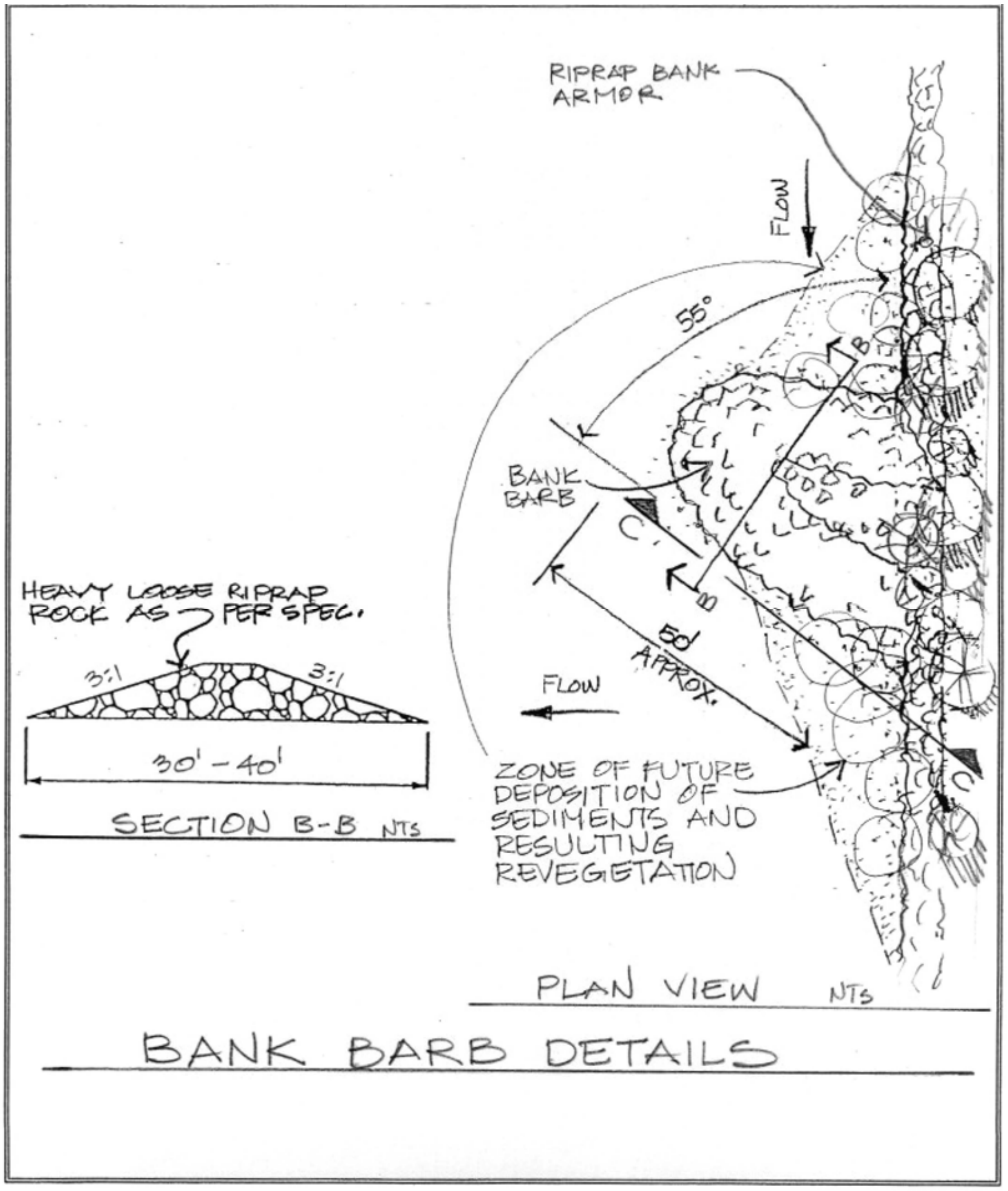


Figure 5. Bank Barb Cross Section Details.

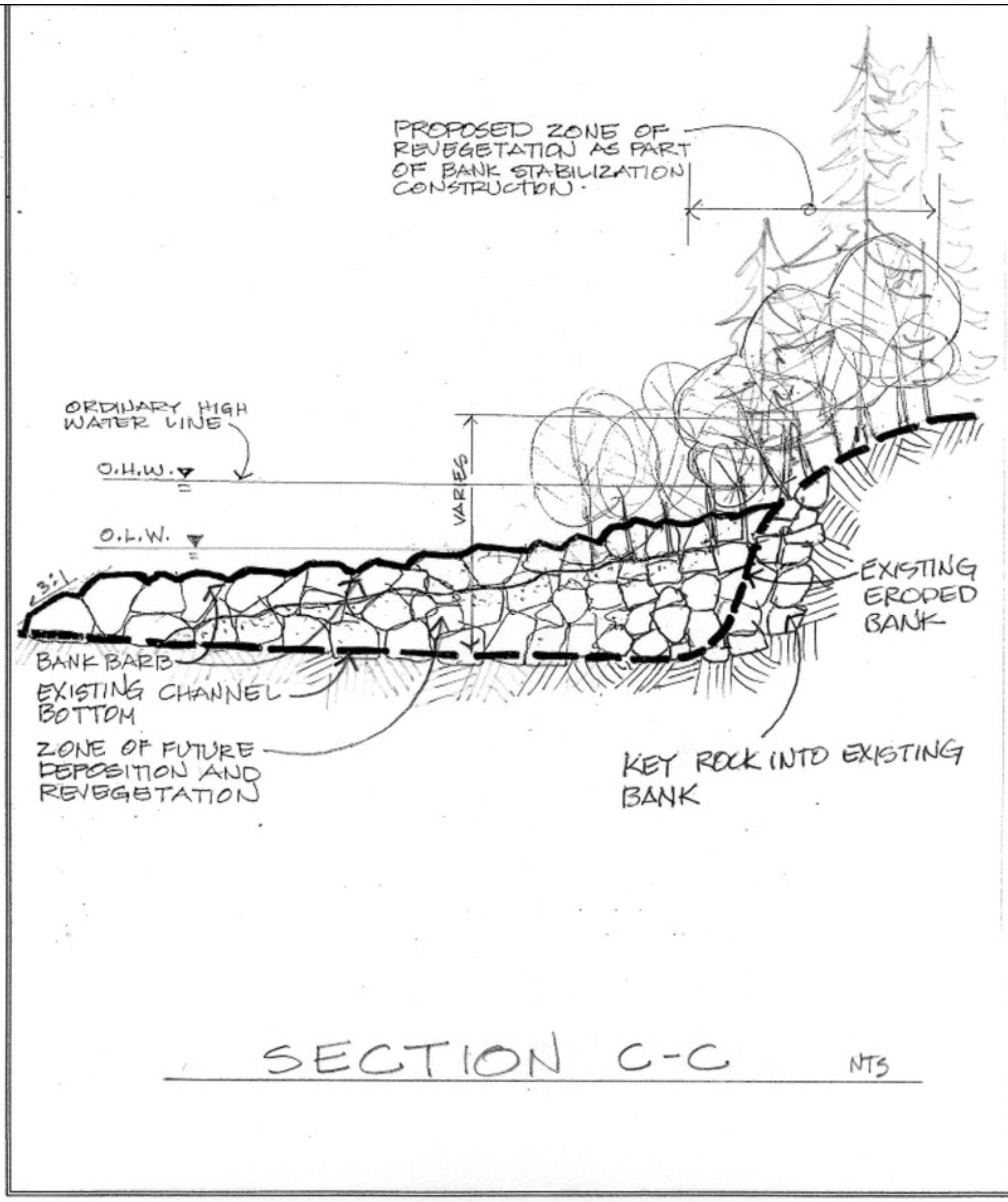


Figure 6. South Shore Road MP 0.7 to 0.9 Wood Reinforced Floodplain.

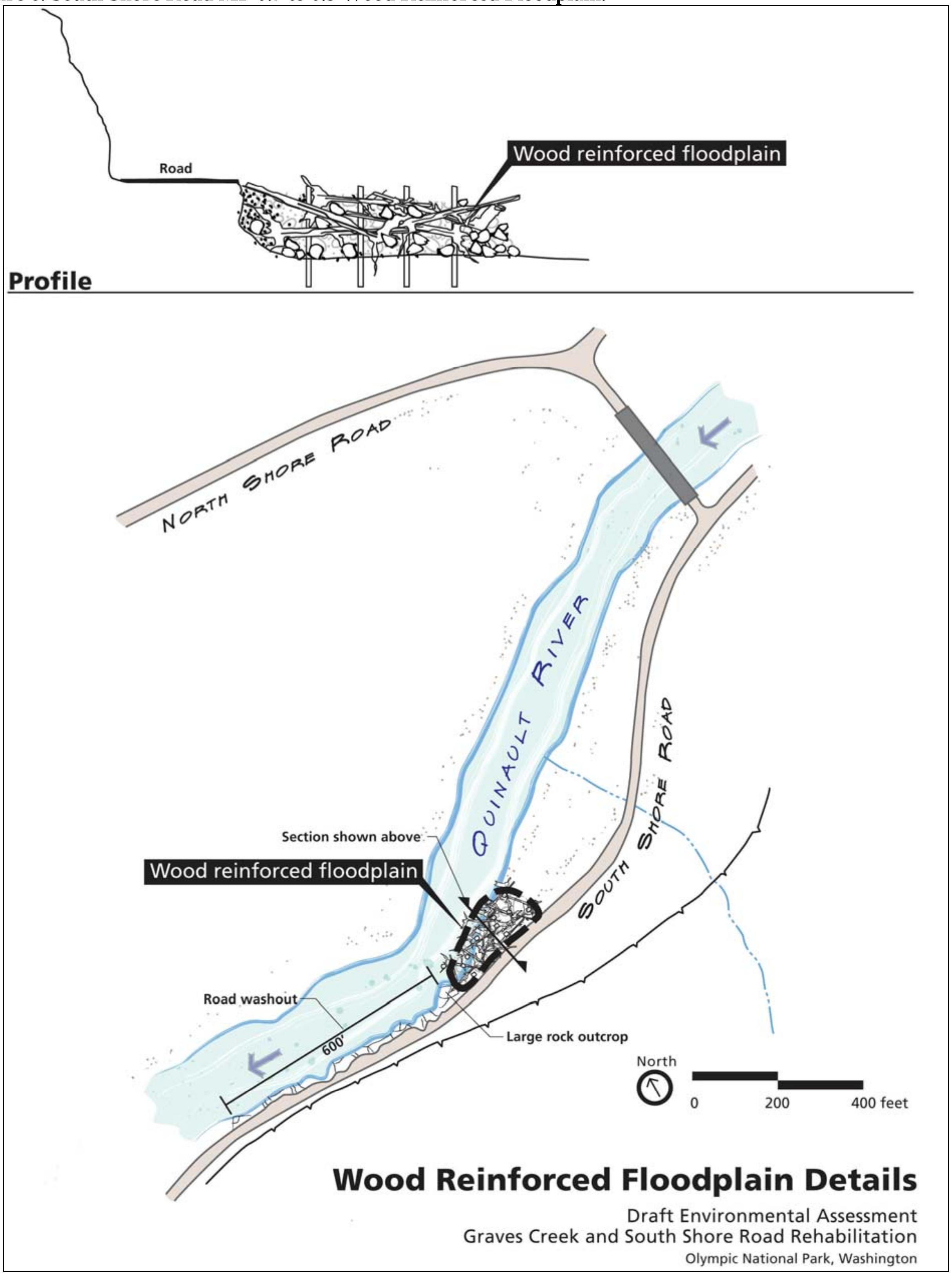


Figure 7. Graves Creek Road Bank Barb at MP 1.2.

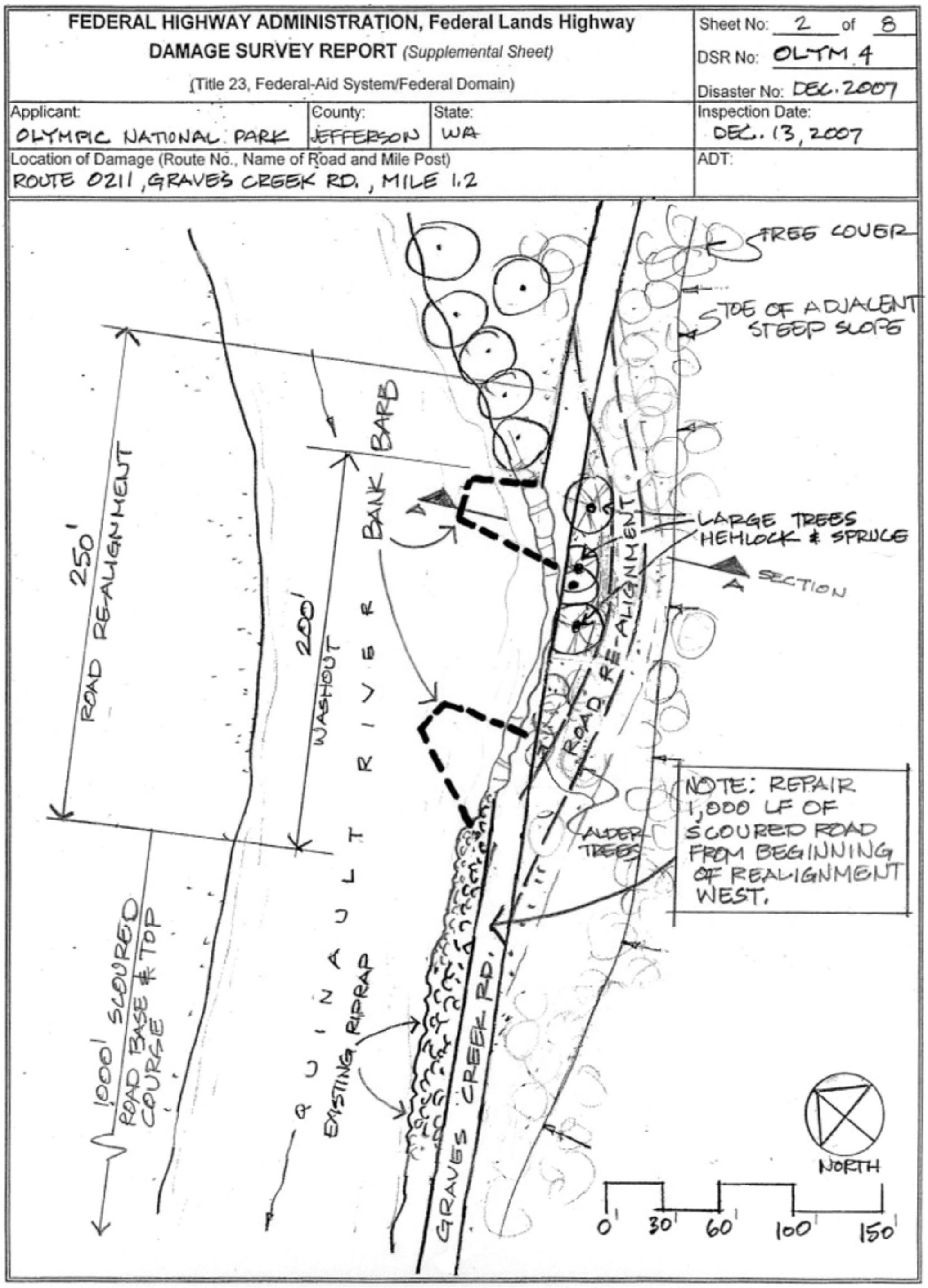


Figure 8. Graves Creek Bank Barbs at MP 1.7.

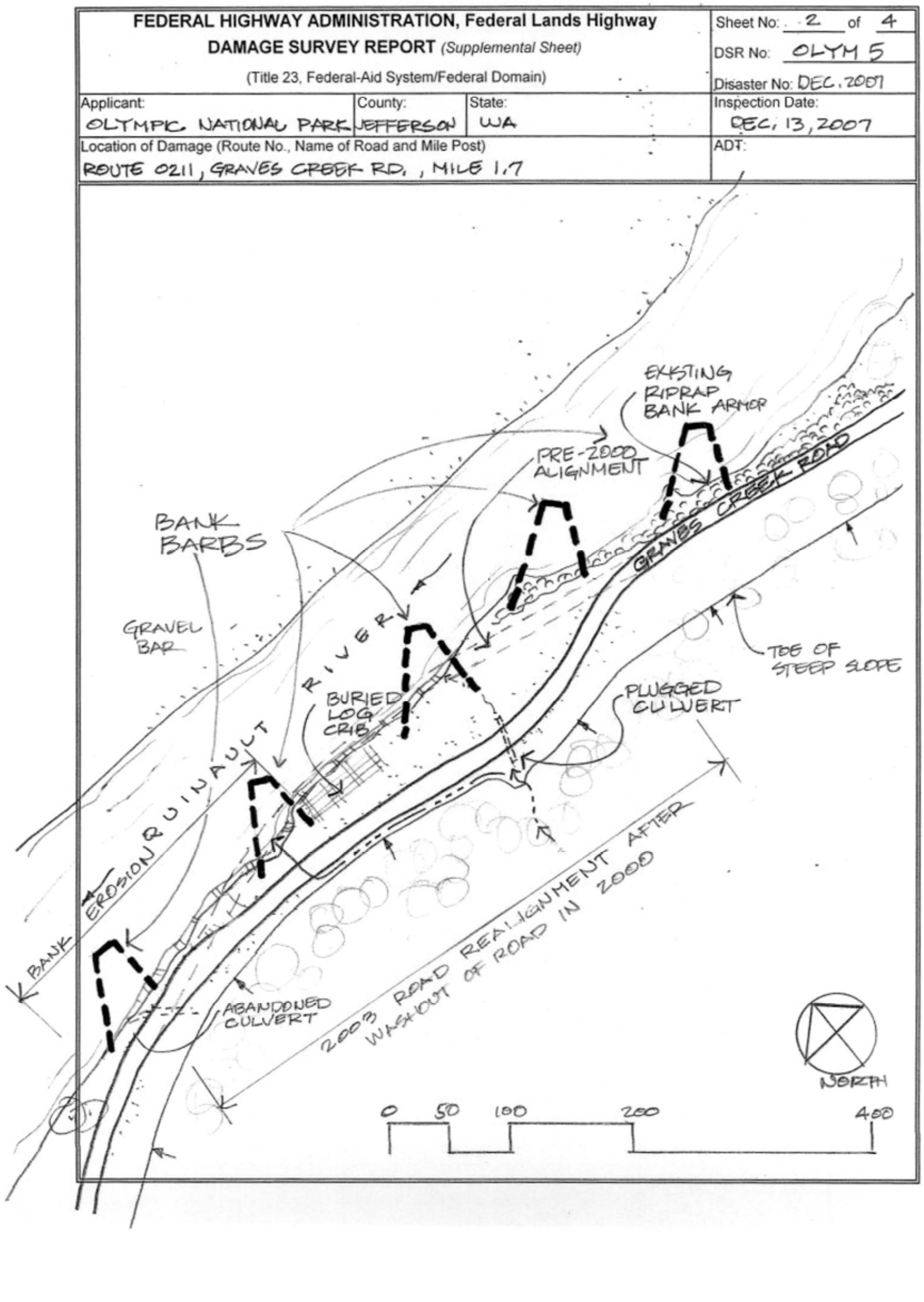


Figure 9. Graves Creek Road Low Water Crossing and Repair at MP 2.3 to 2.5.

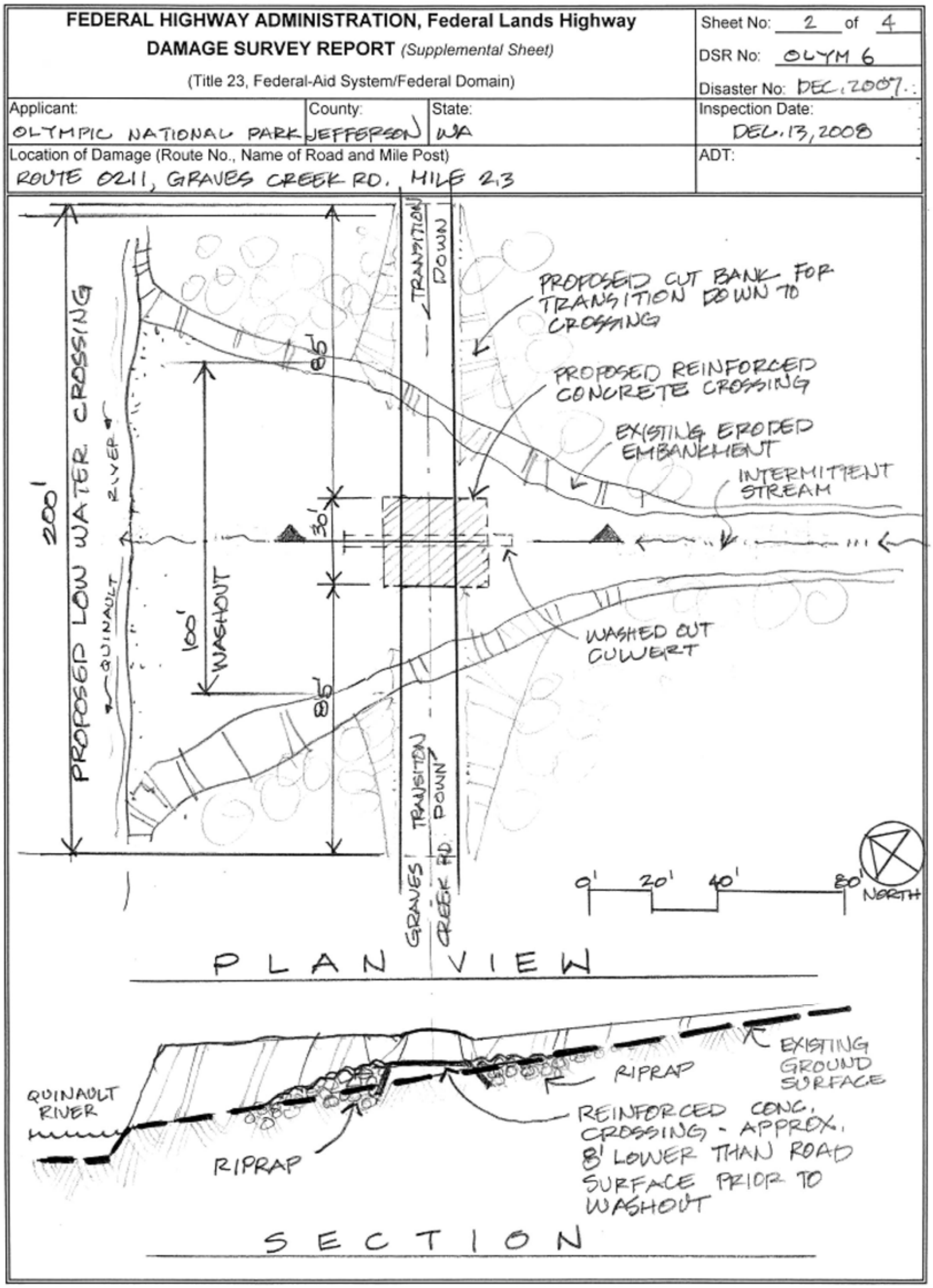


Figure 10. Bridge Design at MP 3.1.

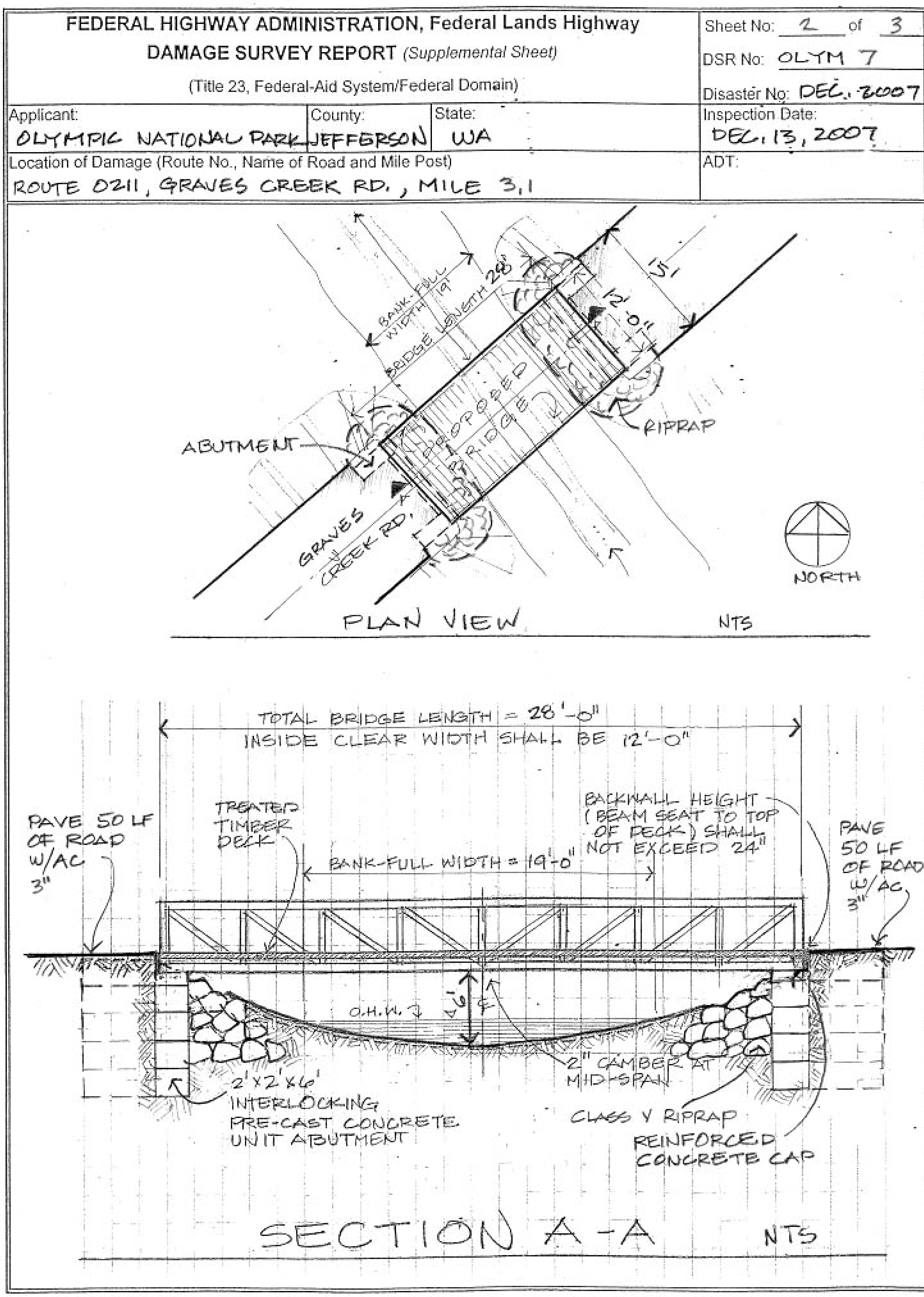


Figure 11. Graves Creek Road Repair Site At MP 3.8.

Figure 12. Graves Creek Road Improvements at MP 4.0.

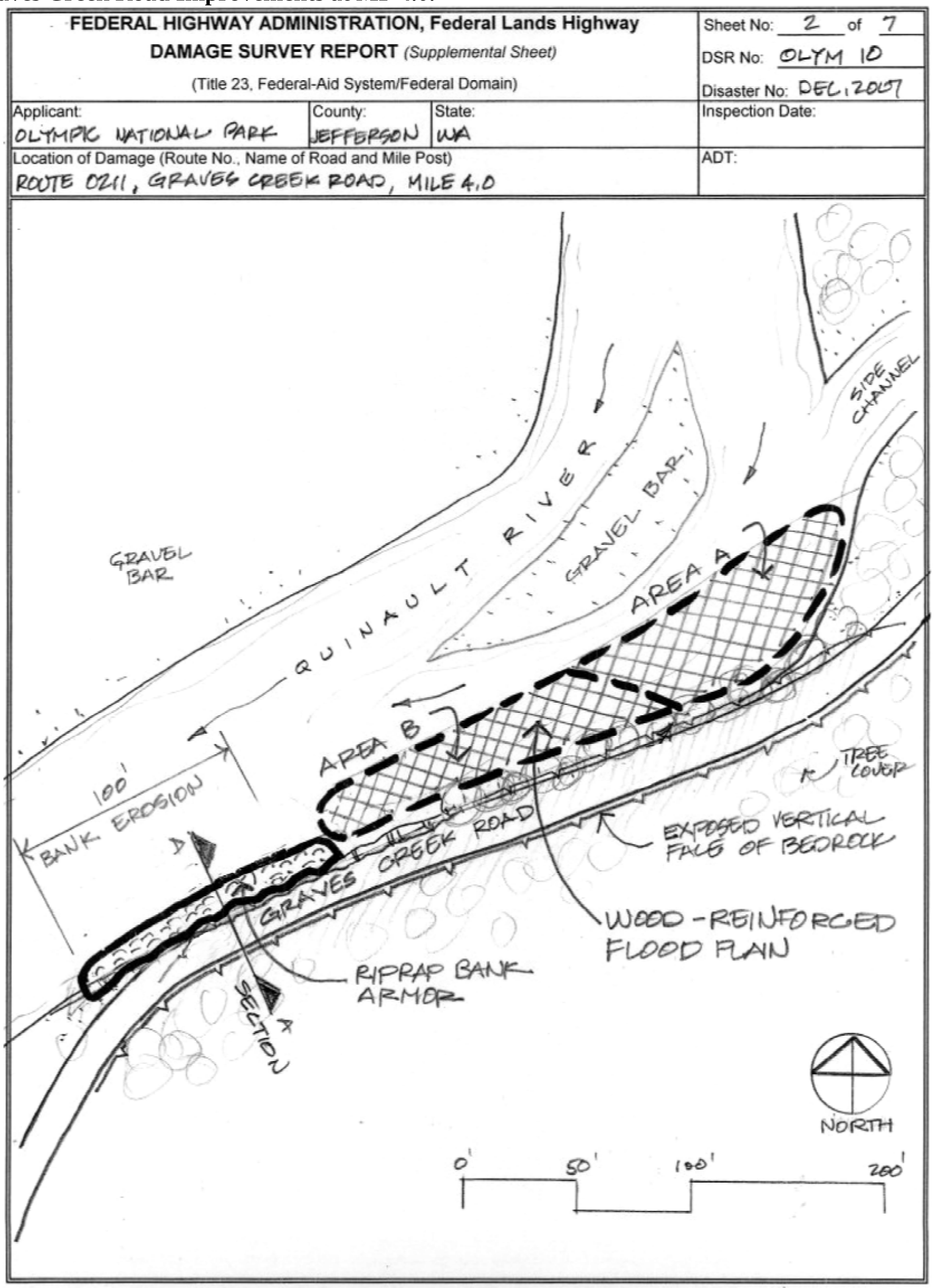


Figure 13. Streambank Riprap Conceptual Drawing at MP 4.0.

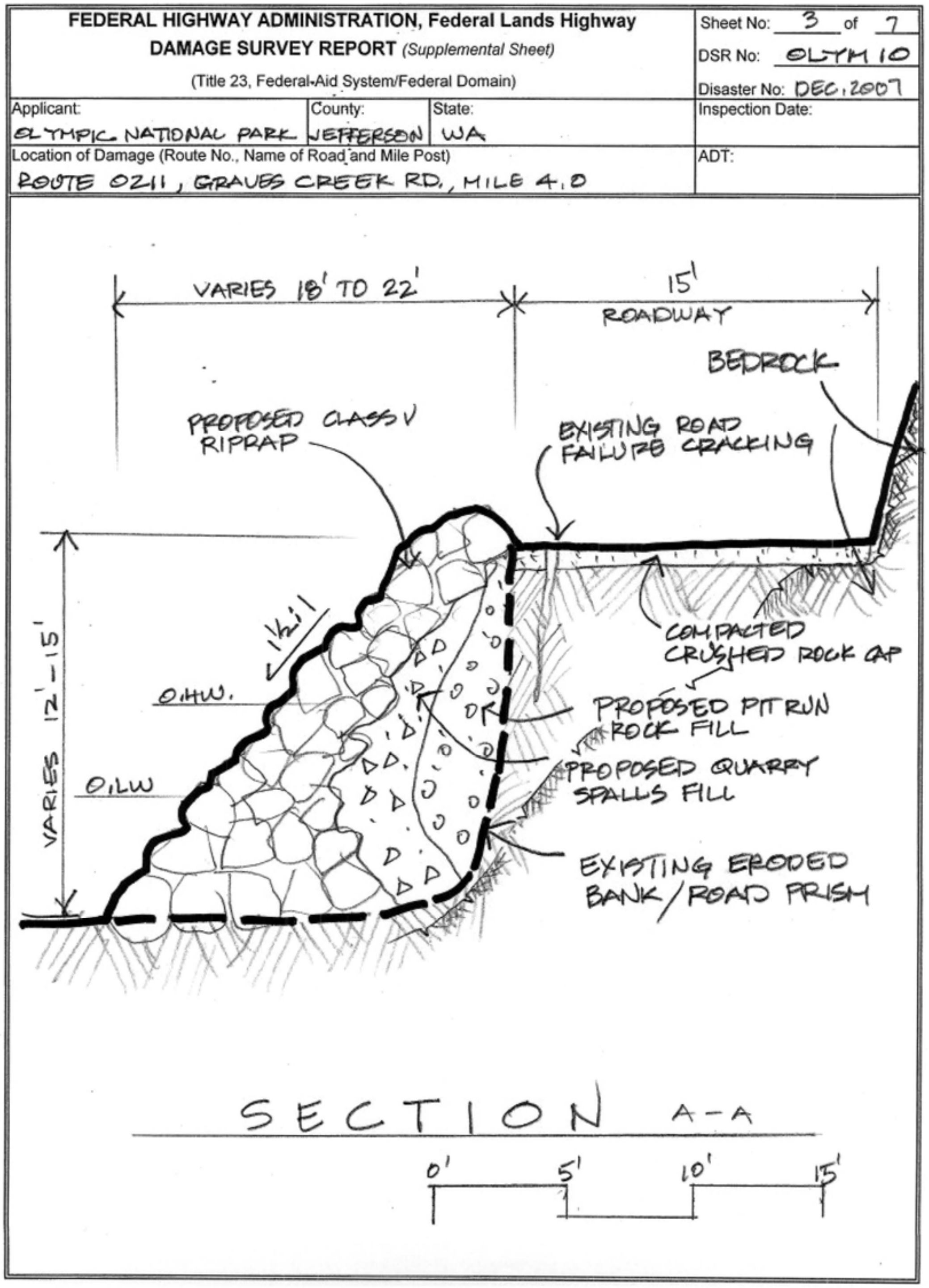
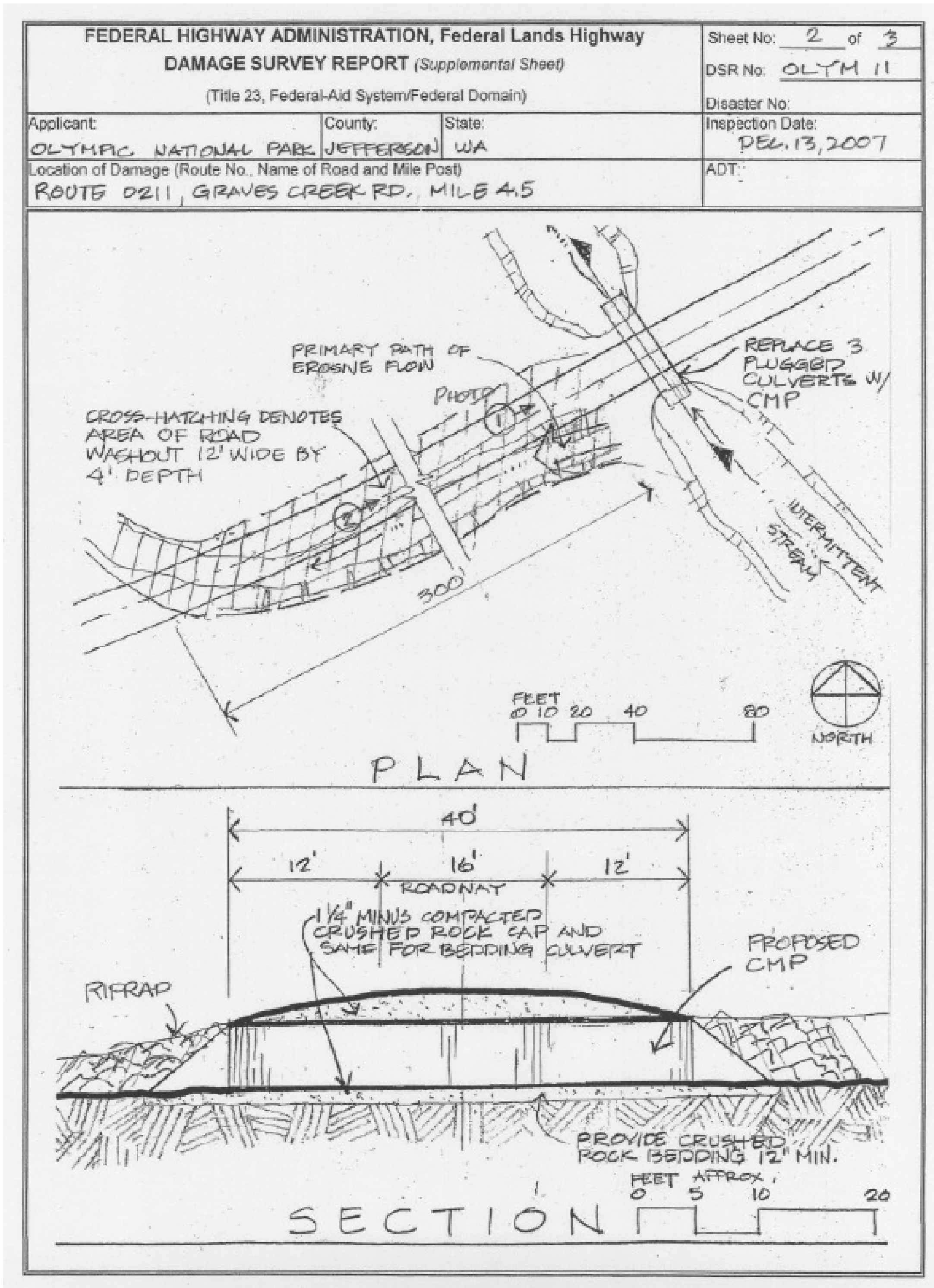


Figure 14. Culvert Replacement at MP 4.5.



FEDERAL HIGHWAY ADMINISTRATION, Federal Lands Highway
DAMAGE SURVEY REPORT (Supplemental Sheet)
(Title 23, Federal-Aid System/Federal Domain)

Sheet No: 2 of 3
DSR No: OLYM 11
Disaster No:

Applicant:	County:	State:	Inspection Date:
OLYMPIC NATIONAL PARK	JEFFERSON	WA	DEC. 13, 2007

Location of Damage (Route No., Name of Road and Mile Post): ROUTE 0211, GRAVES CREEK RD., MILE 4.5

ADT:

PROJECT EVALUATION FORM - Olympic National Park - Programmatic Biological Assessment

Project Name: Graves Creek and South Shore Road Rehabilitation Project

District: Quinault

Project Size (Acres or miles): See figure 2

Watershed(s): Quinault River

Legal Description (T/R/S): Lat/Long: 123 ° 41’47.15”W 47 ° 31’45.718”N T24N Section 33 R8W

Project Coordinator: Reed Robinson, Chief of Maintenance

Program Area (from BA): Roads

Project Type (from program descriptions in BA): Road repairs and maintenance – ERFO Sites

Vegetation type: (acres or % of project area) Forested 0% Road prism 90% Riparian 10% Wetland 0%

****You can have 100% in more than one vegetation type (ERFO may be Road Prism and Riparian)**

Current canopy closure estimate (if trees present): N/A

Will trees be felled/removed/modified? No If yes, number, size, and species:

How many trees greater than or equal to 21" dbh will be felled? None

Number of hazard trees ≥ 21” dbh to be felled? None

Will other vegetation be modified? No Estimate how much and which species? N/A

Will the project be ground disturbing (Y/N)? N If yes, size of area disturbed (acres):

Some excavation at the bridge sites is required but this would occur within the existing road prism. Some instream work is required.

Does project have the potential to affect a waterbody (Y/N)? Y If yes, name: East Fork Quinault River

If yes, have you incorporated the terms of the HPA (Y/N)? N/A (OLYM has exclusive jurisdiction and HPAs are not required for actions within the park.

NEPA Type? EA Expected NEPA Decision Date: December 2008

Scheduled implementation dates (months for operation in each year): Start July 2009 End September 2010

Expected project duration (# days/months): 2 years (work scheduled to occur between July 15, 2009 and September 6, 2010)

Fiscal years in which project will occur: 2009-2010

Repairs would begin July 15, 2009. Each site will require several days to a week for repair work. Instream work would be allowed only through early September. All remaining road repairs, except for the proposed wood reinforced floodplain (WRF) should be completed by March 30, 2010. The WRF at South Shore Road would be constructed in the second year of the project with all instream work occurring between July 15, 2009 and September 5, 2010.

Equipment Use:

Location	Equipment Type (see list below)	Start and End Dates	Frequency of Use
GC Mile 1.2	127,000 lb. excavator	July 15-March 30	30 hours total
	10-yard trucks	July 15-March 30	20 hours total
GC Mile 1.7	127,000 lb. excavator	July 15-March 30	60 hours total
	10-yard trucks	July 15-March 30	10 hours total
GC Mile 3.1, 3.4 and 3.8	127,000 lb. excavator	August 6-March 30	20 hours total
	10-yard dump trucks	August 6-March 30	30 hours total
	Concrete truck	August 6-March 30	5 hours total
	Semi-truck (bridge delivery)	August 6-March 30	5 hours total
	Crane (to set bridges)	August 6-March 30	20 hours

GC Mile 4.0 Rip Rap Placement	127,000 lb. excavator	August 6-September 6	60 hours total
	10-yard trucks	August 6-September 6	20 hours total
GC Mile 4.0 (WRF - only to be constructed if river moves away from project site; all instream work would occur from August 6 through September 6)	127,000 lb. excavator	August 6-October 15	40 hours total
	10-yard trucks	August 6-October 15	30 hours total
	Chainsaw	August 6-October 15	1 hr per day of use through project; 10 hours total
	Log truck	August 6-October 15	15 hours total
	Pile driver	August 6-October 15	15 hours total
GC Mile 4.5	127,000 lb. excavator	August 6-March 30	20 hours total
	10-yard trucks	August 6-March 30	30 hours total
South Shore Mile 0.7-0.9 (Bank Barbs)	127,000 lb. excavator	July 15-September 6	30 hours total
	10-yard trucks	July 15-September 6	30 hours total
South Shore Mile 0.7-0.9 (WRF)	127,000 lb. excavator	July 15-September 6	40 hours total
	10-yard trucks	July 15-September 6	30 hours total
	Chainsaw	July 15-September 6	1 hr per day throughout project;10 hours total
	Log truck	July 15-September 6	15 hours total
	Pile driver	July 15-September 6	15 hours total
Project Area	Small Compactor	July 15-March 30	30 hours total

Brief Project Description: See BA

PROJECT EVALUATION FORM
Olympic National Park - Programmatic Biological Assessment

Species Specific Information - Bull Trout

1. Is the project in a fifth-field watershed that contains or has the potential to contain bull trout (Y/N)? Y

   If No ⇒ What is your basis for this determination?

   Project will have No Effect on bull trout

   If Yes ⇒ go to question 2.

2. Do the stream(s) in which impacts may occur contain suitable habitat for bull trout? Y
3. How far (approx., in river miles) is project from nearest suitable habitat for bull trout? Within bull trout habitat

The 10 bank barbs would collectively cover about 400 linear feet of suitable bull trout habitat near the banks. The loss of habitat from the placement of fill required for construction of the bank barbs would be less than 1 percent of the total linear feet (about 359,040) of streambank habitat available in the Quinault River from the outlet of Lake Quinault upstream.

4. Does the proposed action have the potential to alter or affect the following indicators: subpopulation size, growth and survival, life history diversity and isolation, persistence and genetic integrity, temperature, sediment, chemical contamination/nutrients, physical barriers, substrate embeddedness, large woody debris, pool frequency, pool quality, off-channel habitat, refugia, wetted width/depth ratio, streambank condition, floodplain connectivity, peak/base flows, drainage network, road density and location, disturbance history, function of riparian reserves, disturbance regime, or integration of species and habitat conditions (**use Enclosure A to answer this**)? Yes

   If No ⇒ Project will have No Effect on bull trout

   If Yes ⇒ Use Decision Pathway for Aquatic Effects Determinations to make effects determination, document rationale

Effects Determination: May Affect, Likely to Adversely Affect bull trout

Rationale (based on project info, Enclosure A, and required conservation measures):

Ten bank barbs are proposed for three locations (MP 0.7 to 0.9, 1.2, and 1.7), and WRFs are proposed for two locations (MP 0.7 to 0.9 and 4.0) in the Quinault and East Quinault rivers. Construction of the bank barbs would require the placement of large riprap into the active channel with no excavation required. The construction of the bank barbs is planned during ordinary low flow, which is typically mid-July to early September. Placement of material into the active channel for construction of the bank barbs would generate short-term sediment transport downstream. Increases in suspended sediments potentially affect juvenile fish by damaging gills, reducing feeding, increasing avoidance of construction areas, reducing reactive distance, suppressing production, increasing mortality, and reducing habitat capacity (Reiser and Bjornn 1979). Elevated levels of suspended sediments may also degrade nearby spawning habitat and reduce survival from egg to fry emergence. The increase in sediment near the construction sites would have short-term minor adverse effects on bull trout and bull trout critical habitat near these activities.

It is assumed that suitable bull trout spawning habitat is present at the location of the bank barbs. Direct adverse impacts to individual spawning bull trout or their eggs would largely be avoided by scheduling in-stream construction from July 15 to September 5, before the bull trout spawning period. However, some individual bull trout, as well as bull trout spawning habitat, could be directly adversely impacted during the placement of fill material for construction of the bank barbs. The 10 bank barbs would collectively cover about 400 linear feet of habitat near the banks. The adverse effects to bull trout habitat would occur at less than 1% of the total linear feet (about 359,040) of bull trout critical habitat available in the Quinault and East Quinault rivers from the outlet of Lake Quinault upstream. Because the effects on spawning habitat are less than 1% of the total available habitat (as determined for an adfluvial life history), construction of the bank barbs would have short-term moderate and long-term minor adverse impacts to bull trout and short-term minor and long-term negligible impacts to bull trout critical habitat within the Upper Quinault River basin. Construction of the bank barbs would result in long-term beneficial effects on bull trout habitat as the banks are stabilized and vegetation increases, reducing erosion and subsequent sediment transport.

Construction of the two WRFs would require placement of material into the dry stream channel with some excavation. No water typically occurs at the proposed location of the WRF between MP 0.7 and 0.9 at low flows, but a small diversion structure of riverbed material would be constructed if needed to prevent streamflow from entering the area during construction. Because construction of the WRF would occur in dry conditions, there would be no short-term transport of sediment, but there would be a loss of potential spawning habitat when flows are high. These impacts would result in short-term moderate and long-term minor adverse impacts to bull trout and short-term minor and long-term negligible impacts to bull trout critical habitat within the Upper Quinault River Basin. Currently, the main channel is flowing through the proposed location of the WRF at MP 4.0. Because of the potential damage to bull trout critical habitat from construction within the main channel, this WRF would be constructed only if the river changes course; the timing of which is unknown. Once the main flow is away from this area, the WRF would be constructed in a similar manner and with similar impacts as the WRF at MP 0.9 on the South Shore Road. Additionally, about 100 feet of riprap would also be installed along the streambank at MP 4.0 regardless of whether the WRF is constructed. In general, protecting banks with riprap and large rock can be detrimental to aquatic and riparian habitats and salmonid fish (Chadd 1997) if there is a decrease in woody debris and spawning gravel, and increased stream velocities. Because the area of riprap is relatively small, the adverse effect on adult and juvenile bull trout and bull trout critical habitat would be long-term and minor.

Although construction of the bank barbs and WRFs, and installation of the riprap would have short- and long-term localized adverse effects on bull trout and their habitat, impacts on bull trout would be minimized through implementation of the conservation measures and BMPs described on page 9.

While construction of the bank barbs and WRF would result in short-term, moderate, adverse effects on bull trout, the adverse effects on bull trout habitat would be a small proportion of the overall habitat in the Quinault River basin (less than 1%). Additionally, the WRF is proposed to enhance fish habitat and would result in long-term beneficial effects on bull trout, which, over time, would offset the initial adverse effects. Both the bank barbs and WRF would promote the establishment of riparian vegetation, which is needed to increase sources of woody debris that create high quality fish habitat.

Activities planned within tributaries to the Quinault River are removal and installation of new culverts, culvert removal and installation of a low-flow water crossing, culvert removal and construction of bridges, and repair of damaged road sections. Bull trout habitat is not present in the tributaries where these activities would occur. However, these activities could adversely affect bull trout by disturbing the stream channel and increasing suspended sediment downstream in the North and East forks of the Quinault River. Also, construction would occur during the low-flow period, and all of the tributaries are intermittent or ephemeral. Although the project is planned with the tributaries would be dry at the time of culvert removal and installation or construction of new bridges, in the event flows are present, the flows would be diverted around the construction area to move streamflow out of the work area and minimize suspension of sediments in the stream.

Installation of bridges at MP 3.1 and 3.4 would restore normal flows in the stream channel. In the long term, this would allow flows to the East Quinault River to return to more natural conditions.

Considering the project timing and the conservation measures described on page 9 would minimize adverse effects, implementation of the Proposed Project would result in short-term minor and moderate adverse localized effects, long-term minor adverse localized effects, and long-term beneficial effects on bull trout. However, because the Proposed Project would result in direct short-term moderate adverse impacts to bull trout, the Proposed Project would result in a may affect, likely to adversely affect determination for bull trout.

The Proposed Project would result in short-term, minor, adverse, localized effects; long-term, negligible, adverse, localized effects; and long-term beneficial effects on bull trout critical habitat. Given the small proportion of bull trout critical habitat affected, the Proposed Project may affect, but is not likely to adversely modify bull trout critical habitat.

Project Conservation Measures (see project descriptions, generate additional measures if necessary):

- In accordance with Washington Department of Fish and Wildlife work windows, in-stream work would be scheduled from July 15 through August 30, during periods of low flow and before spawning, to minimize impacts to bull trout. In-stream construction should be completed before any bull trout fry hatchings.

- Large woody material removed from a culvert inlet would be returned to the stream, downstream of the culvert. This measure would preserve large woody debris already in the stream channel.
- Large woody debris and plants would be incorporated into the design of bank protection projects whenever possible, and in consultation with park biologists.
- At a minimum, all culverts would be designed to accommodate hydrologic flows of the drainage areas.
- Erosion-control measures, such as the installation of silt fences, sediment traps, stream diversions, and spill-protection controls, would be implemented to minimize potential effects of sedimentation on bull trout.
- Erosion-control measures would be left in place, where appropriate, until the site is revegetated. Construction erosion-control measures would be inspected weekly or after a major storm. Repairs and maintenance would be performed, where necessary.
- WRFs would be installed in the late summer/early fall when there is typically no streamflow at the construction site. If streamflows are encountered, a small diversion structure or berm using riverbed material would be created with an excavator and bulldozer to prevent streamflow from entering the area during construction. Diversions would be conducted in a manner to minimize disturbance and sedimentation. Following construction, the diversion would be removed and natural flow would be unimpeded after construction is completed.
- During and following construction, disturbed areas would be stabilized, contoured to fit existing natural conditions, and revegetated with native soil and plant species, as approved by NPS biologists.
- Construction equipment would be checked daily and maintained to reduce the likelihood of hazardous fluid leaks. Hazardous spill containment measures would be located on-site.

Reviewed by: Pat Crain Date: 8/14/2008
Fisheries Biologist

Level 1 Approval: ______________________ ______________________
USFWS Representative Park Service Representative

Environmental Baseline and Effects of the Proposed Action on Aquatic Indicators at the 5th Field Watershed and Project Action Area Scales.

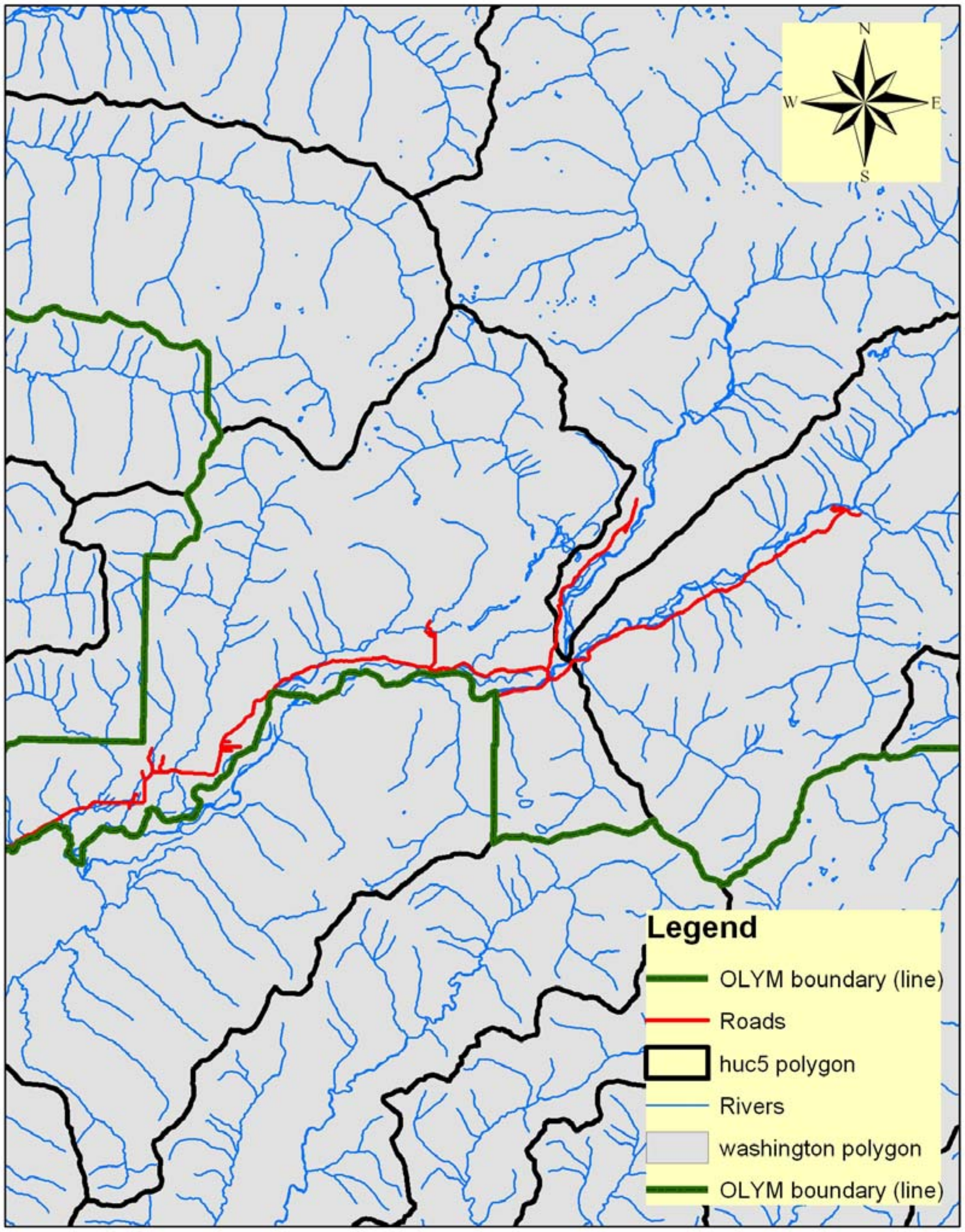
*In the appropriate column(s), mark **S** for short-term impacts (within first year), **L** for long-term impacts (>1 year).*

Indicator	BASELINE 5th Field Watershed Scale			BASELINE Project Action Area Scale			EFFECTS OF ACTION 5th Field Watershed Scale			EFFECTS OF ACTION Project Action Area Scale		
	Proper Function	At Risk	Unacceptable	Proper Function	At Risk	Unacceptable	Restore	Maintain	Degrade	Restore	Maintain	Degrade
Temperature	X			X				SL			SL	
Sediment	X			X			L		S	L		S
Chemical Contaminants	X			X				SL			SL	
Passage Barriers		X			X		SL			SL		
Substrate Embeddedness	X			X				N/A			N/A	
Large Woody Debris	X				X			SL		L	S	
Pool Frequency and Quality	X			X				SL		L	S	
Large Pools	X			X				SL			SL	
Off-channel Habitat	X			X				SL			SL	
Refugia	X			X				SL			SL	
Width/ Depth Ratio	X			X				SL			SL	
Streambank Condition		X			X		L		S	L		S
Floodplain Connectivity		X			X			SL			SL	
Change in Peak/Base Flows	X			X				N/A			N/A	
Drainage Network Increase	X			X				N/A			N/A	
Road Density & Location		X			X			SL			SL	
Disturbance History	X				X			SL			SL	
Riparian Reserves		X			X			SL		L	S	
Disturbance Regime (BT)		X			X		L		S	L		S
Subpopulation Size (BT)		X			X			SL			SL	
Growth and Survival (BT)		X			X			SL			SL	
Life History Diversity and Isolation (BT)	X			X				N/A			N/A	
Persistence and Genetic Integrity (BT)	X			X				SL			SL	
Integration of Species and Habitat Conditions (BT)	X			X				SL			SL	

Restore = project is likely to have a beneficial impact on habitat indicator
Maintain = project may affect indicator, but impact in neutral
Degrade = project is likely to have a negative impact on the habitat indicator

N/A = project does not have the potential to impact the habitat indicator
(BT) = indicator only to be evaluated for bull trout

Quinault Basin
5th Field Watersheds



Terrestrial Species Specific Information

Will project produce above ambient noise for setting?:	Y	If yes, when?	July 15-March 30

Northern Spotted Owl:

Nearest known activity center (<0.25 mi./0.25-1.0 mi./>1.0 mi.) ½ mile
Nearest suitable habitat (adjacent/<0.25 mi./0.25-1.0 mi./>1.0 mi.) Adjacent
Habitat surveyed? Yes To protocol? Yes If surveyed, year of surveys and results:
Habitat in the project area is physically suitable for northern spotted owl nesting and roosting, and may have been used for these functions years ago; however, the project area is likely no longer used by northern spotted owl for nesting. The one known nest site found within ½ mile of the project locations at Howe Creek (1992) is most likely unoccupied because of the increase of barred owls in the area (Gremel 2008). A total of 15 known owl nest territories occur within the Quinault Valley, although surveys have not been conducted in most of the drainages. Forests in the immediate vicinity of the road projects are composed of spruce, hemlock, and hardwoods at approximately 400 feet elevation. Mixed forests at this elevation on the west side of the park are unlikely to be used for nesting or roosting by northern spotted owls due to competition with barred owls, but these areas may be used for foraging and dispersal.

Will project occur during early breeding season?	Y (March)	during late season?	Y
How much suitable habitat will be modified?	None	dispersal habitat?	None
Will this suitable habitat be degraded or downgraded?	No	dispersal habitat?	No
Will this suitable habitat be adversely impacted (removed)?	No	dispersal habitat?	No
How much suitable habitat will be adversely disturbed by noise within the distance threshold?			None

Marbled Murrelet:

Nearest known site (<0.25 mi./0.25-1.0 mi./>1.0 mi) Not known
Nearest suitable habitat (adjacent/<0.25 mi./0.25-1.0 mi./>1.0 mi.) Suitable habitat occurs above Mile 2.0 adjacent to Graves Creek Road
Habitat surveyed? No To protocol? No If surveyed, year of surveys and results: N/A
Portions of this project would take place in suitable habitat for marbled murrelets. In the lower reaches of the project area, along South Shore Road and in the first two miles of Graves Creek Road, the road is greater than 35 yards from suitable habitat. The road is adjacent to the river and riparian habitat to the north, and the south side of the road has steep slopes with bedrock, and is not considered by NPS biologists (with FWS concurrence at on-site meeting) to be suitable murrelet habitat. However, to the east (above mile 2 on Graves Creek Road), the habitat improves south of the roadway and is considered suitable habitat for murrelets. Murrelet surveys have not been conducted in the immediate vicinity of the project; however, in recent years, occupied detections were recorded during protocol surveys at four locations upriver from the project, including the Graves Creek campground at the eastern terminus of the Graves Creek Road. Live chicks have been discovered on the ground within the Quinault drainage twice since 1986. Since murrelet presence has been documented at 100 percent of survey areas throughout the park in recent years, and occupancy has been documented at 80 percent of those areas, it is reasonable to assume that suitable habitat in the vicinity of the project is also occupied.

Will project occur during early breeding season?	Yes, but only in those locations where habitat is greater than 35 yards from project locations	during late season?	Yes
How much habitat will be modified?	None	Will it be degraded/downgraded?	No

How much suitable habitat will be adversely disturbed by noise within the distance threshold? None

Additional Information/Explanations (If suitable habitat for the spotted owl or marbled murrelet will be removed or degraded, but the determination is that this removal/degradation will not have an adverse effect on spotted owl/ murrelet habitat in the long-term, explain the reason for this determination):

EFFECTS DETERMINATIONS:

Is the proposed project consistent with the Programmatic BA? Yes
Is Level 1 Team approval required for project to be consistent? Yes

If consistent, enter effects determination from BA for species or critical habitat below:
Northern Spotted Owl: No suitable nesting or critical northern spotted owl habitat would be modified or removed under the Proposed Project. Foraging owls may be disturbed by machinery noise during construction, causing owls to temporarily avoid the project area. The mobilization and use of heavy equipment beginning after July 15 would create noise above ambient levels and visual disturbance in the project area during the late breeding season. However, cliff faces, mature trees and thick foliage at the project area provide a high degree of natural screening, which would reduce the intensity of noise and visual impacts. There would also be some increased noise and activity at the staging areas along the roadway between the project sites, and construction traffic on the South Shore and Graves Creek roads. The northern spotted owl is unlikely to occur near the project area and no suitable habitat would be modified or removed. No known nest sites occur within a mile of the project area. The project would start after after July 15, when breeding owls and their young would be less vulnerable to disturbance. In addition, northern spotted owls forage primarily at night when there would be no construction activity. Thus, the Proposed Project may affect, but is not likely to adversely affect northern spotted owls.
Marbled Murrelet: Activities associated with the Proposed Project would occur near suitable habitat for marbled murrelets, but would not result in a loss of identified habitat because no trees large enough to contain suitable habitat for murrelets would be cut. The use of heavy equipment beginning in mid-July would create noise above ambient levels and visual disturbance. However, this work would be restricted to areas outside the distance threshold for marbled murrelets (35 yards or greater from suitable habitat). In addition, the noise of the river, plus the buffer of trees, cliffs, and thick foliage at the project areas provides a high degree of natural screening, which would reduce the intensity of noise and visual impacts.

To avoid adverse impacts to breeding murrelets, construction activities within 35 yards of suitable murrelet habitat would not begin until August 6, during the murrelet late breeding season (August 6 to September 15). Any work that generates noise above ambient levels prior to September 15 would not take place at night or within 2 hours of sunrise and sunset during the periods when murrelets are known to be most active. The noise of construction could temporarily affect murrelets in the area in the form of aversion responses. However, construction timing restrictions to avoid disturbances during murrelet high-activity periods would minimize effects to the species. Therefore, the Proposed Project may affect, but is not likely to adversely affect marbled murrelets.

Project Conservation Measures:
To avoid adverse impacts to northern spotted owl or their habitat, the following mitigation measures would be implemented:

- Project activities that do not affect flows in the Quinault or the East Quinault River would begin after July 15, during the late breeding season when breeding owls and their young would be less vulnerable to disturbance.

- Existing vegetation would not be disturbed during project construction. No trees large enough to contain suitable habitat for spotted owls would be cut.

To avoid adverse impacts to breeding murrelets, the following mitigation measures would be implemented:

- To avoid adverse impacts to breeding murrelets, any noise-producing construction activities above ambient noise levels within 35 yards of murrelet habitat would not begin until after August 6, during the murrelet late breeding season (August 6 to September 15).
- During the project work period between August 6 and September 15 within 35 yards of marbled murrelet habitat, no work that generates above-ambient noise levels would take place at night or within 2 hours of sunrise and sunset, when murrelets are known to be most active.
- The park would maintain strict garbage control to prevent scavengers (e.g., jays and crows), which are predators on murrelet nests, from being attracted to the project area. No food scraps would be discarded or fed to wildlife.
- Existing vegetation would not be disturbed during project construction. No trees large enough to contain suitable habitat for murrelets would be cut.

Reviewed by: Dr. Patti Happe 8/14/2008

Wildlife Biologist Date

Level 1 Approval:

USFWS Representative and Date NPS Representative and Date

(Distribution: one copy to project file, copies to USFWS)