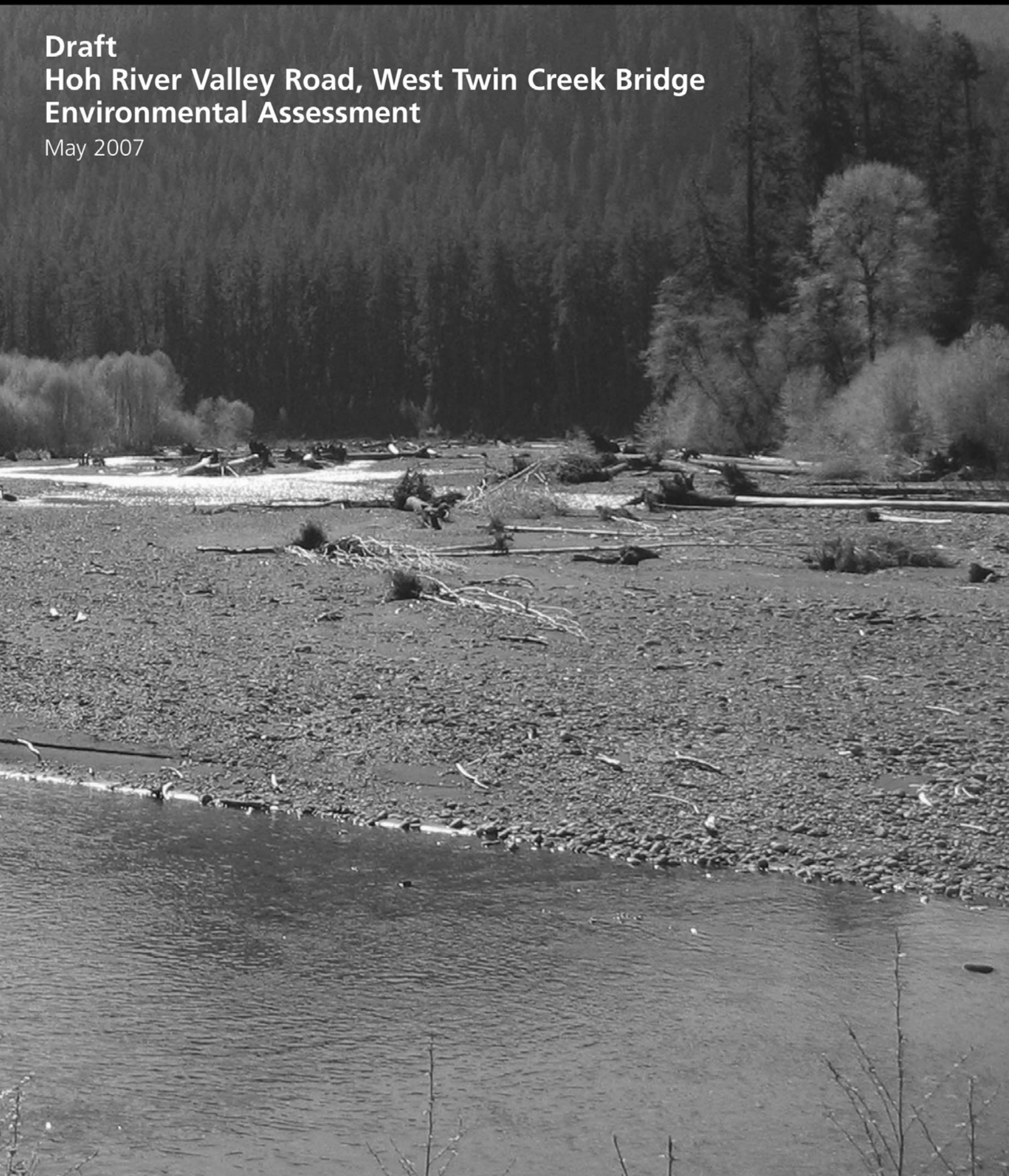
National Park Service
U.S. Department of the Interior

Olympic National Park
Washington

Draft
Hoh River Valley Road, West Twin Creek Bridge Environmental Assessment

May 2007



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HOH RIVER VALLEY ROAD, WEST TWIN CREEK BRIDGE

PURPOSE AND NEED

INTRODUCTION

Olympic National Park (ONP or park) of the National Park Service (NPS), in cooperation with Western Federal Lands Highway Division (WFLHD) of the Federal Highway Administration (FHWA), is proposing to construct a two-lane vehicular bridge across West Twin Creek on the Upper Hoh Road to replace culverts that were washed out during a major storm in November 2006 (project area). In addition, this proposed project includes removal of a temporary one-lane bridge that was installed following the November 2006 storm and removal of two culverts that were washed downstream (washed-out culverts). The purpose of this proposed project is to restore permanent access to the Hoh Rain Forest Visitor Center (visitor center), campground, park facilities, picnic areas, and trailheads, and to improve fish passage along West Twin Creek. This Environmental Assessment (EA) describes alternatives and evaluates the effects for this proposed project. The EA has been prepared in compliance with the National Environmental Policy Act (NEPA) to determine whether significant impacts would occur as a result of this proposed project and if an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI) would be required.

The Upper Hoh Road—West Twin Creek crossing is located on the western side of ONP in the State of Washington (Figure 1). Upper Hoh Road extends 12 miles off U.S. Highway 101 (U.S. 101) to the park boundary and another 6 miles to the visitor center. The Upper Hoh Road—West Twin Creek crossing is located at milepost 2.5, as measured from the park boundary.

BACKGROUND

On Monday, November 6, 2006, heavy rain fell throughout the Pacific Northwest and ONP received almost 11 inches of rain in less than 24 hours in some areas. The Bogachiel, Hoh, Quinault, and Queets Rivers all reached flood stage and crested their banks, causing road damage in several locations in the park. High winds and elevated streamflow resulted in extensive damage throughout the park, in Clallam, Jefferson, and Grays Harbor counties. During the November 2006 storm, elevated flows in the mainstem of the Hoh River (approaching 60,000 cfs) and its tributaries caused damage to the Hoh Road, both inside and outside ONP. The November 2006 storm washed out a 75-foot section of the Upper Hoh Road—West Twin Creek crossing, including a 9-foot culvert and an 8-foot culvert that were washed downstream (Figure 2). A temporary footbridge was constructed across West Twin Creek within 24 hours of the washout to rescue the stranded park visitors, park ranger/resident, and park volunteer/resident from the area.

FIGURE 1. PROJECT LOCATION

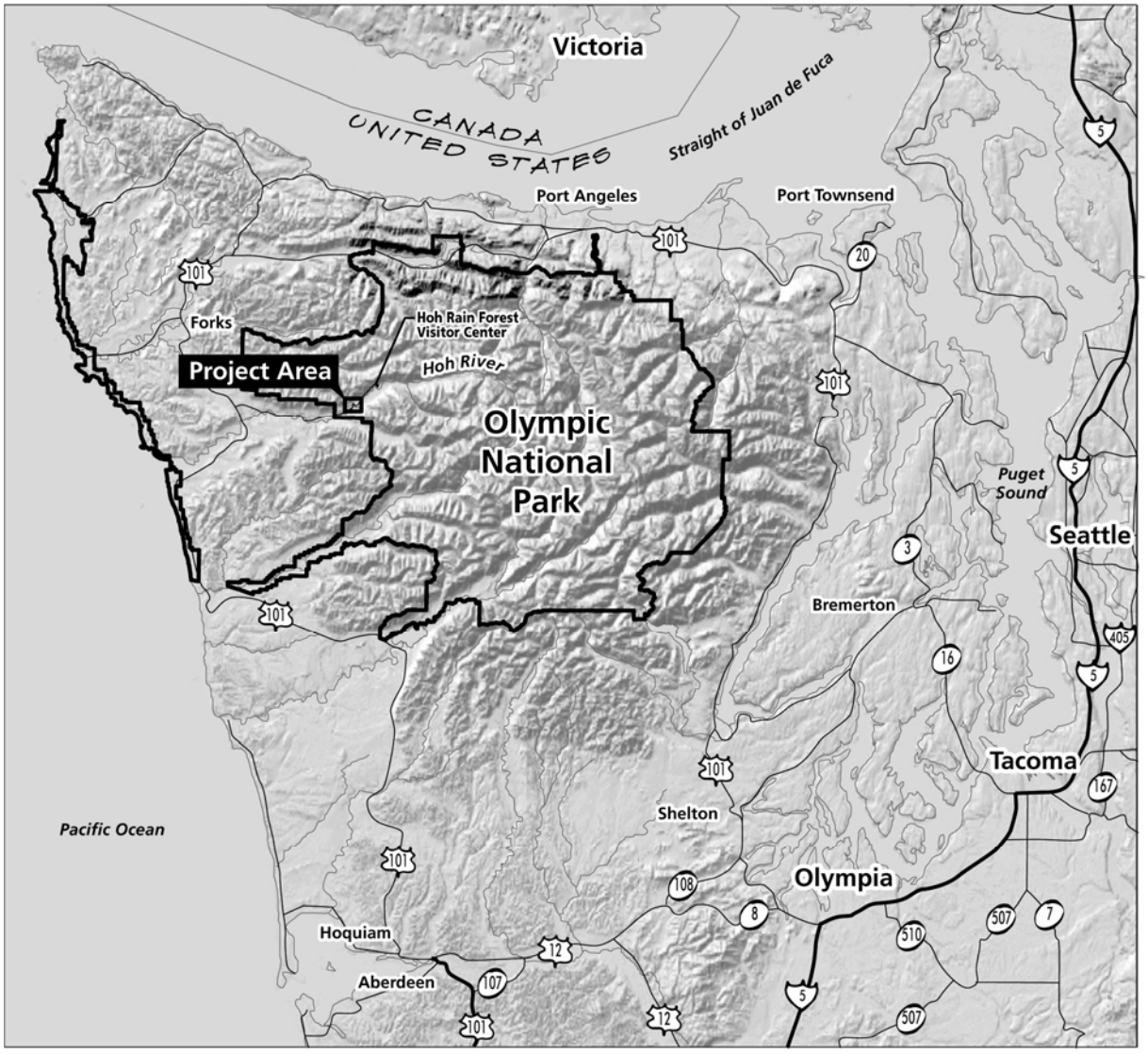


FIGURE 2. WEST TWIN CREEK ROAD DAMAGE FOLLOWING STORM

The NPS and FHWA worked to restore access following the November 2006 storm by installing a one-lane 118-foot-long temporary bridge over West Twin Creek on Upper Hoh Road on December 12, 2006. The bridge installation required the placement of riprap to protect the bridge abutments on both sides of the channel. Access to the temporary bridge required construction of a 15-foot-wide by 372-foot-long detour route slightly upstream from the washout on both sides of Upper Hoh Road. Traffic signals will be used on each side of the bridge to alternate traffic flow across the one-lane bridge during the high visitor use season between late May through September. The emergency repairs to restore access on Upper Hoh 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. ONP has adopted this categorical exclusion for the emergency repairs and temporary bridge placement project under 40 CFR 1508.4, Section 3.4A.(9) of the NPS NEPA regulations (NPS Director's Order 12, Conservation Planning, Environmental Impact Analysis, and Decision Making).

Prior to the November 2006 storm, the park was planning to replace the culverts at this location to restore the natural stream channel and remove the restriction to fish passage. Now that the culverts have washed out, the park proposes to build a bridge to span the stream and restore natural hydrological and ecological functions. The NPS completed a Value Analysis Study in 2002 that proposed construction of a bridge at West Twin Creek to

allow salmon and trout populations to freely migrate to high-quality fish habitat upstream from the fish barrier created by the washed-out culverts.

The washed-out culverts were designed and installed in the early 1960s, when little was known about designing culvert installations to allow for fish passage. Similarly, little was understood about the need to design culvert installations to allow for passage of streambed material to prevent accumulation of sediment upstream of the culverts and erosion downstream from the culverts. Erosion below the culvert outfall had created a 6-foot drop that prevented adult salmon from returning to spawn and juvenile salmon from seeking refuge during high flows on Hoh River. ONP fishery biologists, the Hoh Tribe, and the Washington Department of Fish and Wildlife (WDFW) expressed concern about the fish blockage at this location.

PROJECT PURPOSE AND NEED

The purpose of the proposed project is to protect and restore natural resource functions, while restoring permanent two-lane access along Upper Hoh Road and preserving for the benefit, use, and enjoyment of the people, convenient access to the Hoh Rain Forest. The proposed project has several objectives:

- Reestablish two-lane access for park visitors and staff to the Hoh Visitor Center, campground, picnic area, and trails
- Restore natural hydrologic conditions to West Twin Creek
- Provide fish passage along West Twin Creek

The proposed project is needed to repair damage to the Upper Hoh Road—West Twin Creek crossing caused by storm damage. Restoration of access to the Hoh Rain Forest is of vital concern to the NPS, local and regional communities, and park visitors.

LEGISLATION, PLANS, AND GUIDANCE

The NPS Organic Act of 1916 (16 USC 1, 2-4) and the General Authorities Act (16 USC 1a-8) direct the NPS to conserve the scenery, the natural and historic objects, and wildlife, and to provide for the enjoyment of those resources in such a manner as to leave them unimpaired for future generations. The Redwood Act (March 27, 1978, 16 USC 1a-1) reaffirmed the mandates of the NPS Organic Act of 1916 and provided additional guidance on national park system management as follows:

> The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the national park system and shall not be exercised in derogation of the values and purposes for which these various areas have been established.

These and other laws and mandates were incorporated into the NPS *Management Policies 2006* that provide guidance for management of all national park units. Road systems are addressed in Section 9.2.1 which states “park roads will be well constructed, sensitive to

natural and cultural resources, reflect the highest principles of park design, and enhance the visitor experience."

The 1984 NPS Park Roads Standards states that roads in national parks serve a distinctly different purpose from most other road and highway systems. Among all public resources, those of the national park system are distinguished by their unique natural, cultural, scenic, and recreational qualities. Park roads are to be designed with extreme care and sensitivity to provide access for the protection, use, and enjoyment of the resources that constitute the national park system.

Directors Order #87A: Park Roads and Parkways states that park roads are constructed only where necessary to provide access for the protection, use, and enjoyment of the natural, historical, cultural, and recreational resources that constitute our national park system. Park roads are designed with extreme care and sensitivity with respect to the terrain and environment through which they pass—they are laid lightly onto the land.

Purpose and Significance of Olympic National Park

ONP was established by House Report No. 2247 of April 28, 1938. This report established the purpose of ONP, which is to:

> Preserve for the benefit, use, and enjoyment of the people, the finest sample of primeval forests of Sitka spruce, western hemlock, Douglas fir, and western red cedar in the entire United States; to provide suitable winter range and permanent protection for the herds of native Roosevelt elk and other wildlife indigenous to the area; to conserve and render available to the people, for recreational use, this outstanding mountainous country, containing numerous glaciers and perpetual snow fields, and a portion of the surrounding verdant forests together with a narrow strip along the beautiful Washington coast.

Purpose of Park Roads

The purpose of park roads is to enhance visitor experience by providing access to park facilities, resources, and recreational opportunities. Park roads are not intended to provide fast and convenient transportation, but rather to access areas of recreation while being sensitive to the natural and cultural resources in the area (Section 9.2.1.1 Management Policies). Park roads provide access for the protection, use, and enjoyment of the resources that constitute the park. Upper Hoh Road provides important access to the Hoh Rain Forest including the visitor center, campground, picnic area, and trails.

Related Planning Documents

Park planning documents that may have relevance to the damaged Upper Hoh Road—West Twin Creek crossing include:

Olympic National Park Master Plan - 1976

This Master Plan outlines park purposes to preserve, protect, and interpret, for the enjoyment and benefit of the American people. The plan integrates park actions into the natural environment of ONP. Established goals related to access have also been addressed in this master plan. The master plan analyzes various ecological determinants — geology, soils,

slopes, drainage patterns, vegetation, and animal life — indicating that natural limitations should guide development and subsequent management.

Statement for Management: Olympic National Park - 1996

This document includes information regarding the park's purpose, the natural and cultural resources found in the park and their significance, the legislative history, and the jurisdiction over ONP and the surrounding areas of the Olympic Peninsula. The document also includes the following management objectives:

1. Resource Stewardship and Protection: The primary responsibility of the NPS must be protection of resources.

2. Access and Enjoyment: Each park should provide the nation's diverse public access to park resources in a way that is compatible with the understanding and enjoyment of those resources and their preservation for future generations.

3. Education and Interpretation: The NPS shall enhance visitor and community understanding, appreciation, and conservation of natural and cultural resources through education and interpretation.

4. Proactive Leadership: The NPS must be a leader in local, national, and international park affairs, actively pursuing the mission of the national park system and assisting others in managing their resources.

5. Science and Research: The NPS must engage in a sustained and integrated program of natural, cultural, and social science research and resource management to acquire the information needed to manage and protect park resources.

6. Professionalism: The NPS must create and maintain a highly professional organization and workforce.

Olympic National Park Draft General Management Plan and Environmental Impact Statement

ONP is developing a general management plan (GMP). The draft GMP was released for public review from June 15 to September 30, 2006. The park anticipates completion of the GMP in 2007. The GMP provides overall planning guidance for park access and protection of resources. The GMP ratifies the importance of road access by including a goal to provide visitor access and recreational opportunities.

ISSUES AND IMPACT TOPICS

Scoping

A list of issues and concerns related to repair of the Upper Hoh Road—West Twin Creek crossing were identified through park internal scoping and through the public scoping process. Internal scoping involved an interdisciplinary team of park and regional staff, and FHWA personnel who assessed the site conditions and determined potential issues and impact topics. Informal consultation was initiated with the U.S. Fish and Wildlife Service (Service) in April 2007. Tribal consultation with the Hoh Tribe were initiated with the

emergency actions in November 2006, and continue to occur to determine tribal concerns related to the proposed action.

The purpose of public scoping was to gain input on the issues or comments related to the proposed project and identify potential projects in the area that could lead to cumulative impacts. ONP conducted public scoping from February 22 to March 26, 2007 via posting on the park website, and a letter sent to about 80 individuals, park neighbors, organizations, area tribes, and agencies on the park's mailing list. A press release requesting public input was published in the *Peninsula Daily News* on February 23, 2007. A total of three individuals and organizations responded during scoping. Comments included the need to provide fish passage, prevent reoccurrence of road damage, reduce potential effects on natural resources, and prevent possible cumulative watershed effects. One commenter suggested closing Upper Hoh Road beyond West Twin Creek.

Internal and external scoping comments were considered in the choice of impact topics and were used in the development and evaluation of alternatives discussed in this EA. Scoping issues or impact topics that were considered, but were not evaluated further, are discussed below in "Impact Topics Eliminated from Further Consideration."

Issues and Impact Topics

Issues and impact topics were developed from the questions and comments brought forth during internal and external scoping. Table 1 discusses the impact topics, the reasons for retaining the topic, and the relevant laws, regulations, and policies.

TABLE 1: IMPACT TOPICS RETAINED FOR FURTHER EVALUATION AND RELEVANT LAWS, REGULATIONS, AND POLICIES

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
Vegetation	No vegetation would be removed from the project area for the placement of the bridge. Vegetation disturbance is possible for equipment access to remove the washed-out culverts. Revegetation of the detour road to the one-lane bridge would create a more vulnerable environment that could increase the likelihood of a nonnative species becoming established.	NPS Organic Act; NPS *Management Policies*; Resource Management Guidelines (NPS-77); Federal Noxious Weed Control Act; Executive Order 13112; Invasive Species (1999)
Wildlife	Construction activities and noise could affect wildlife in the vicinity. No terrestrial habitat would be removed.	NPS Organic Act; NPS *Management Policies*; NPS-77
Fishery Resources	Construction of the new bridge abutments, removal of the temporary bridge and streambank riprap, and removal of the washed-out culverts would temporarily increase sediment in West Twin Creek. Bull trout have been observed in West Twin Creek and they have been found in the Hoh River downstream. Essential fish habitat is present in West Twin Creek.	Endangered Species Act; NPS *Management Policies*; 16 USC 1535 Section 7(a)(2); Magnuson-Stevens Fishery Conservation and Management Act; Sustainable Fishery Act of 1996 (P.L. 104-267)

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
Special Status Species	There are no northern spotted owls nest sites in or near the project area, but dispersal habitat is present. There is potential marbled murrelet habitat in the project area. Both bird species could be affected by disturbance from noise and human presence during construction. There would be no removal of habitat or suitable nesting trees. As discussed above under Fishery Resources, bull trout is an endangered species that could be affected by stream sedimentation during construction.	Endangered Species Act; NPS *Management Policies*; 16 USC 1535 Section 7(a)(2)
Soils	Soil disturbance is possible from construction activities and reclamation of the detour road to the one-lane bridge.	NPS *Management Policies*
Hydrology and Water Quality	Temporary negative effects to water quality are possible during the construction of the new bridge, removal of the temporary bridge abutments, and removal of the washed-out culverts. Streamflow characteristics could be temporarily disturbed during construction, but planned restoration of normal streamflow characteristics in the project area and removal of the washed-out culverts would be a benefit.	Clean Water Act; Fish and Wildlife Coordination Act of 1934 (PL 85-624) as amended; Executive Order 12088; NPS *Management Policies,* NPS-77
Floodplains	There would be work in the floodplain for the placement of the bridge, removal of temporary bridge abutments, and the removal of the washed-out culverts.	Executive Order 11988 Floodplain Management, Floodplain Management (DO-77-2)
Visitor Experiences and Public Use	Short-term traffic delays would occur during project work. Restoring convenient access into the Hoh Rain Forest would positively impact visitor use.	NPS *Management Policies*
Park Operations	Restoring two-lane vehicular access would allow for continued trail and facility management activities and would make it less difficult for park resource specialists and researchers to conduct research and monitoring activities.	NPS *Management Policies*
Socioeconomics	Restoring two-lane vehicular access would ensure visitor access to the popular Hoh Rain Forest. Restoring access would benefit local gateway communities supported by tourism spending.	*NPS Management Policies*

Impact Topics Eliminated from Further Consideration

The following impact topics or issues were eliminated from the list of potential impacts because there would be no or minor effects from the proposed project.

Wetlands

Executive Order (EO) 11990, NPS *Management Policies*, and DO-77-1 direct that wetlands be protected and that wetlands and wetland functions and values be preserved. They further direct that direct or indirect impacts to wetlands be avoided whenever there are practicable

alternatives. Because of severe bank scouring during the November 2006 storm, no wetland vegetation is present in the project area. Because there are no wetlands in the vicinity of the project area, this topic was dismissed as an impact topic in this EA.

Prime Farmland

In 1980, the CEQ directed federal agencies to assess the effects of their actions on farmland soils classified as prime or unique by the United States Department of Agriculture, Natural Resources Conservation Service. Prime or unique farmland is defined as soil, which particularly produces general crops such as common foods, forage, fiber, and oil seed; and unique farmland produces specialty crops such as fruits, vegetables, and nuts. There are no prime or unique farmlands associated with the project area; therefore, prime and unique farmland was dismissed as an impact topic in this EA.

Geology

The Olympic Peninsula is mountainous and heavily influenced by glacial processes. The Hoh River Valley including West Twin Creek is formed in glacial outwash deposits. Since the retreat of the glaciers, deep piles of rock and soil have accumulated in the valleys and on the slopes of the mountains. Rivers have reworked sediments that were left in the valley bottoms and have spread this material along their courses. Geotechnical research has shown silt layers extend to substantial depths in the project area. The West Twin Creek streambed material consists of rounded gravel and boulders with silty and clayey soil material.

The No Action Alternative would not result in any new disturbance to geologic resources. Construction of a bridge across West Twin Creek under the Preferred Alternative would involve pile driving, earthwork for the abutment, and riprap slope protection. Installation of a bridge, rather than replacement of the washed-out culverts in the stream channel, would provide a benefit by restoring natural fluvial processes in West Twin Creek and reducing the potential for accelerated erosion and channel damage during high-flow events. For these reasons, geology was dismissed as an impact topic in this EA.

Air Quality

ONP is a Class I airshed. Earthwork and grading activities from construction of a new bridge under the Preferred Alternative could result in temporary and localized effects to air quality. Construction equipment would generate additional emissions in the air, but the effects would be short-term, negligible, and adverse. The new bridge would not increase traffic on Upper Hoh Road, so there would be no effect from additional vehicles. If the Preferred Alternative is selected, local air quality would be temporarily degraded by emissions from construction equipment and vehicles. Neither overall park air quality nor regional air quality would be more than negligibly affected. The No Action Alternative would have negligible effects on air quality from idling vehicles at signal lights used to control traffic across the one-lane bridge. For these reasons, air quality was dismissed as an impact topic in this EA.

Cultural Resources

Cultural resources include archeological resources, ethnographic resources, historic structures, and cultural landscapes. Cultural resources are found throughout ONP, from its

mountain peaks and alpine meadows down to its river valleys and coastal shoreline. Legislative acts, regulations, and NPS policies provide direction for the protection, preservation, and management of cultural resources on public lands.

The proposed project lies in the floodplain of the Hoh River on deposition terrace less than 1,000 years old. ONP staff conducted surveys of the project area for archeological resources, historic resources, ethnographic resources, and cultural landscapes. No resources eligible for listing in the National Register of Historic Places (NRHP) were identified. To meet the requirements of Section 106 of the NHPA, the Washington State Historic Preservation Office was consulted and concurred with the finding of no effect of ONP. Since it has been determined there would be no impact to cultural resources with either of the alternatives, cultural resources have been dismissed as an impact topic in this EA.

Should previously unknown cultural resources be encountered during construction activities, work would be halted in the discovery area and the park would consult according to 36 CFR 800.13 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians. No sacred sites have been identified in the project area or would be impacted by either alternative; therefore, Indian trust resources were dismissed as an impact topic in this EA.

Environmental Justice

EO 12898 requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minorities and low-income populations or communities. Neither alternative would have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's (EPA) Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed as an impact topic in this EA.

Visual Resources

Visual resources would be affected by the Preferred Alternative; however, the construction effects would be short-term, negligible, and localized. Visual impacts would occur during construction from the presence of construction equipment and materials. The long-term visual impact of the bridge would not adversely affect any viewsheds. The scenic views for which ONP is renowned would not be affected by the Preferred Alternative. Leaving the temporary bridge in place, under the No Action Alternative would have a minor localized impact on visual quality because the bridge and realigned approach road is in visual contrast with the Upper Hoh Road alignment and surrounding landscape. Because impacts

would be no greater than minor, visual resources were dismissed as an impact topic in this EA.

Soundscapes

An important part of the NPS mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. Noise associated with construction of the Preferred Alternative would be short-term, minor, adverse, and localized, and would not result in a measurable increase in long-term traffic noise or have any other continued effects on the park soundscape. The pile-driving activities would produce substantial noise, but for a limited duration. Considerations of noise impacts on wildlife and Special Status Species, as well as visitor experience, are addressed under the respective impact topics. The No Action Alternative would have no effect on the natural soundscape. For these reasons, soundscapes were dismissed as an impact topic in this EA.

Wilderness

The project area occurs outside of wilderness boundaries and, therefore, is not subject to Wilderness Act requirements. Therefore, wilderness resources and values were dismissed as an impact topic in this EA.

Energy

The Preferred Alternative would require expenditures of energy, including natural and depletable resources; however, the use would be short term and have negligible impacts to these energy resources. Neither of the alternatives analyzed in this EA would require an increase in energy consumption, nor would the alternatives have appreciable effects on energy availability or costs. Because impacts would be no greater than negligible, energy resources were dismissed as an impact topic in this EA.

Public Health and Safety

The Preferred Alternative would meet NPS road design and AASHTO bridge standards. These standards include safety features to prevent and minimize harm to the traveling public, including guardrail design, signage, pavement markings, structural bridge capacity, and other design features. Since public health and safety would essentially remain the same under the No Action Alternative or through implementation of safety features in the Preferred Alternative, this topic was dismissed as an impact topic in this EA.

ALTERNATIVES

INTRODUCTION

Replacing the washed-out culverts with a bridge was originally considered as part of a fish passage improvement project that would have replaced the culverts at West Twin Creek and a single culvert at East Twin Creek along the Upper Hoh Road with bridges. The alternatives to replace these culverts were developed through NPS staff input and public scoping and by performing a Value Analysis Study (VA) in September 2002. With a focus on restoring fish passage, the VA identified a preferred alternative of constructing a bridge over West Twin Creek. The November 6, 2006 flood event and subsequent installation of a temporary bridge made it necessary to reevaluate the VA alternatives and to determine if there were other reasonable alternatives that were not considered in the VA.

This Alternatives section describes two alternatives for the Upper Hoh Road—West Twin Creek bridge that are carried forward in this EA—the No Action Alternative and the Preferred Alternative of constructing a bridge across West Twin Creek. The Preferred Alternative carried forward for analysis was developed to address the purpose and need described previously. An action alternative must meet the project purpose, while resolving the needs in order to be considered reasonable. The Preferred Alternative presents the National Park Service's proposed action and defines the rationale for the action in terms of resource protection and management, visitor and operational use, and other applicable factors. Alternatives considered and dismissed from detailed analysis also are discussed in this section. Table 3 compares the environmental consequences of each alternative.

NO ACTION ALTERNATIVE—CONTINUED USE OF TEMPORARY BRIDGE

Under the No Action Alternative, the existing temporary bridge would remain in place indefinitely. Traffic would continue to use the one-lane bridge to access facilities and areas of the park up the Hoh River Valley. Because the bridge is not a permanent structure and is not permanently anchored to the banks, it would require frequent regular maintenance and may be more subject to washing out during floods.

When emergency repairs were made to install the temporary bridge, riprap was placed on the streambanks to create a stable location for the temporary bridge. Under the No Action Alternative, the riprap would remain in place. The washed-out culverts would not be removed and would remain an unnatural influence on stream hydrologic conditions.

Under the No Action Alternative, West Twin Creek would remain passable to fish, one of the purposes of the project, although the washed-out culverts could impede fish movement. The other project purposes of reestablishing permanent two-lane access to facilities and areas of the park and restoring natural hydrologic stream conditions would not be met under the No Action Alternative.

PREFERRED ALTERNATIVE—CONSTRUCT NEW WEST TWIN CREEK BRIDGE

The Preferred Alternative consists of three independent elements: 1) constructing a new bridge across West Twin Creek, 2) removing the temporary bridge, and 3) removing the washed-out culverts from the streambed. Although each project element is independent of the other, they would be undertaken as one project under the Preferred Alternative.

Equipment and material storage and other staging activities at the Snider Creek Maintenance Area would begin in August 2007. Work in the project area would begin after September 1, 2007 and would be completed by mid-January 2008.

Construct New Bridge

The design for the reconstructed road segments at West Twin Creek allows for two 10-foot lanes of traffic with 1-foot shoulders, matching the existing roadway width. A concrete bridge about 115 feet long, with two 14-foot-wide lanes, is proposed across West Twin Creek (Figure 3 and Figure 4). The bridge would consist of prefabricated concrete girders placed on concrete bridge abutments with concrete-filled steel pipe pile footings. The bridge road surface would be a 2-inch-thick layer of asphalt. The bridge rails would be concrete.

The Preferred Alternative includes a bridge design that allows for natural streamflow passage to occur, as well as passage of a 100-year flood (Figure 3). The proposed bridge would be economical and would allow for conventional construction methods to be used while minimizing impacts to the environment. The design also provides acceptable aesthetics, safe and efficient traffic flow, ease of maintenance, and adequate design life. The proposed bridge could be constructed within a small area of disturbance using readily available construction materials.

The proposed construction sequence and design details would include:

1. Equipment and materials would be moved to the project area after September 1, 2007 to minimize impacts to critical wildlife seasonal behavior patterns. It would take about 1 week of general activity to transport equipment and materials to the project area. During this time, erosion-control measures would be installed, the project area would be surveyed for construction activities, and other preliminary low-disturbance activities would commence.

2. Following mobilization, initial construction would involve preparing the project area for the bridge. The bridge abutment piles would be installed using a crane and pile hammer. This work would last about 1 week and would be followed by construction of the concrete abutment caps. The concrete work would last about 2 weeks and would involve concrete trucks, equipment and handwork to set forms, tying rebar and placing concrete, and generator use.

3. After the concrete caps are finished, precast bridge girders (manufactured off site) would be delivered and set using large cranes. This work would take about 2 days and would be followed by more concrete work to finish constructing the abutments, backwalls, and wingwalls to complete the bridge substructure. Equipment similar to that used for the abutment work would be used for the concrete work and the work would last about 3 weeks.

FIGURE 3. PROPOSED WEST TWIN CREEK BRIDGE ELEVATION LOOKING UPSTREAM

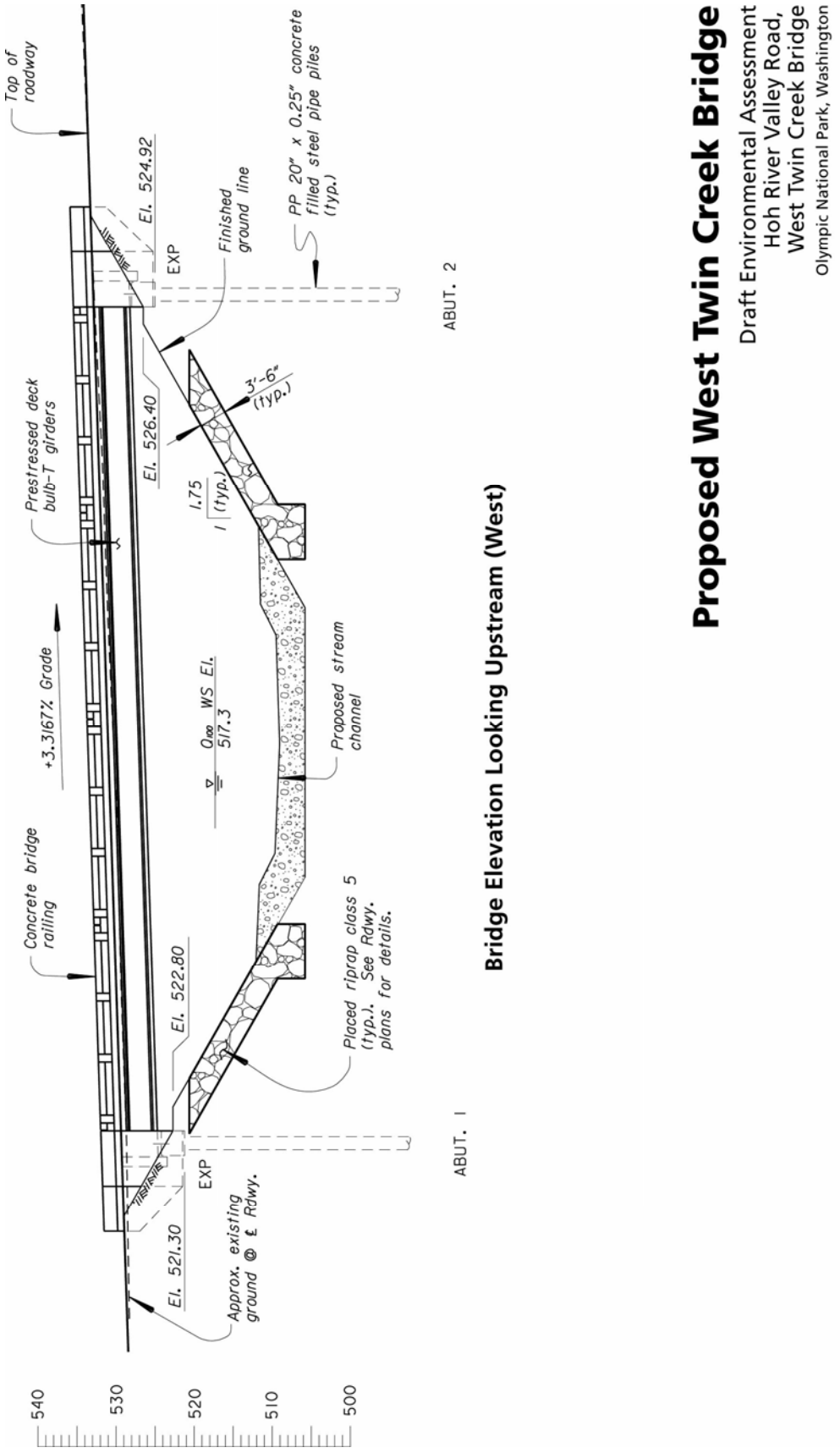
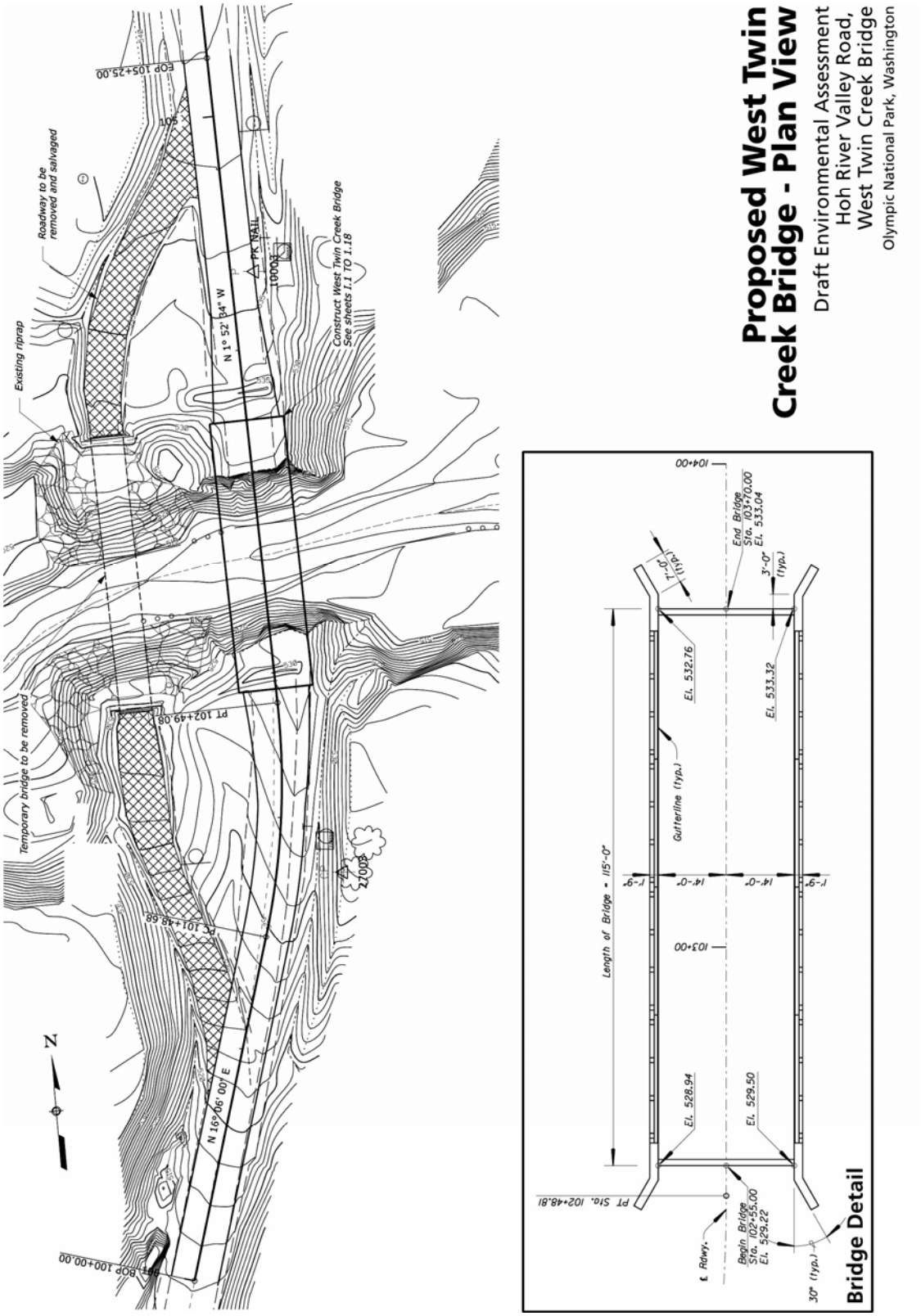


FIGURE 4. PLAN VIEW OF WEST TWIN CREEK BRIDGE DETOUR AND TEMPORARY BRIDGE THE LOCATION OF THE PROPOSED BRIDGE IS ALSO SHOWN.



4. Following completion of the substructure, it would take about 3 weeks to backfill the approach embankments using earthwork equipment such as graders, excavators, bulldozers, and compaction rollers. The final concrete work for bridge curb and rail would take about 2 weeks.

5. After completion of the bridge structure, the bridge deck would be paved to match the approach roads. Paving would take about 1 week and would involve the use of earthwork equipment (to shape the approaches), a paver, compaction equipment, haul trucks, and paint-striping trucks.

6. Once bridge work is complete, traffic would be relocated to the new bridge and roadway. Excavation equipment would then access and operate within the stream channel to install riprap (Figure 5). Riprap directly under the bridge girders would be placed prior to setting the girders. The remaining riprap would be placed after the bridge is in place. The streambanks under the bridge would be armored with riprap an average of 20 inches in diameter placed at a 1:1.75 slope. The riprap would be 4 feet thick and would extend slightly below the channel bottom to prevent scour around the abutment piles. The riprap would extend up the slope to an elevation about 2.7 feet above the 100-year water surface elevation. Prior to work in the streambed, a "clean water diversion" would be created by placing sandbags or other appropriate material in the channel and parallel to the work area. This would divert water to the opposite side of the channel at the location of in-stream work, which would minimize sediment in the stream. Construction equipment would use the detour road to access the streambed after water is diverted.

7. One lane of traffic would remain open at all times during construction, except for short-term or unexpected events. A temporary traffic signal would be in use during nonworking hours until Labor Day. After Labor Day, the detour road would be open with a requirement to stop and yield. During working hours, signage and flaggers would be used when construction operations interfere with traffic. Delays would not be more than 30 minutes with the exception of delays of up to 4 hours while the bridge girders are being placed.

8. The Snider Creek Maintenance Staging Area would be used for equipment and materials storage. This proposed staging area is located about 2 miles east of West Twin Creek (Figure 6).

Remove Temporary Bridge

Upon completion of the roadway and bridge, the temporary bridge would be removed, dismantled, and taken to a storage site (Figure 7). The riprap and temporary bridge abutment would be removed and the project area would be stabilized and revegetated. Riprap removed from the temporary bridge abutment would be used to armor the slopes beneath the new bridge. Following work in the stream channel, the gravel/pavement on the detour road would be removed and the project area would be regraded and revegetated according to a site-specific revegetation plan developed by ONP. The asphalt layer of the temporary roadway would be disposed of outside the park boundary. The gravel and rock material from the temporary road and any excess riprap from the temporary bridge abutment would be salvaged and stored at the Snider Creek Maintenance Area for other uses in the park.

Remove Washed-out Culverts

The two washed-out culverts are corrugated metal pipe. One is 9 feet in diameter and the other is 8 feet in diameter. One is located about 250 feet downstream of the existing road and the other is about 450 feet downstream (Figure 5). The washed-out culverts are partially buried and filled with streambed material (Figure 8). Because the culverts are large and buried in the stream channel, they would be removed with a large tracked excavator.

The culverts are located in cobble/gravel deposit adjacent to the stream. Following mobilization, but prior to initiating work on the bridge, a large tracked excavator would construct a temporary approach to the streambed down the north bank of the stream at the location of the proposed bridge (Figure 5). The excavator would travel down the streambed, which is mainly gravel and cobbles. This operation could damage some existing vegetation and would require moving woody debris to clear a path for the excavator.

The culverts can likely be removed without diverting the stream because they are currently located out of the flow and streamflow would be low in September when the work is done. Installation of water diversion measures to move streamflow out of the work area could be used depending on conditions at the time of work. The operator would excavate around the culvert and dismantle the culvert into smaller sections as necessary. Each piece of culvert would be transported back to Upper Hoh Road where it would be loaded onto a truck for removal from the park. Once the first culvert is removed, the excavator operator would drive the excavator downstream to the second culvert and perform a similar operation. The number of trips required to remove the culverts is unknown, but the excavator may access the streambed several times.

FIGURE 5. LOCATION OF CULVERTS WASHED DOWNSTREAM
CONSTRUCTION ELEMENTS SUCH AS REMOVING THE DETOUR AND THE LOCATION OF THE PROPOSED BRIDGE ARE ALSO SHOWN.

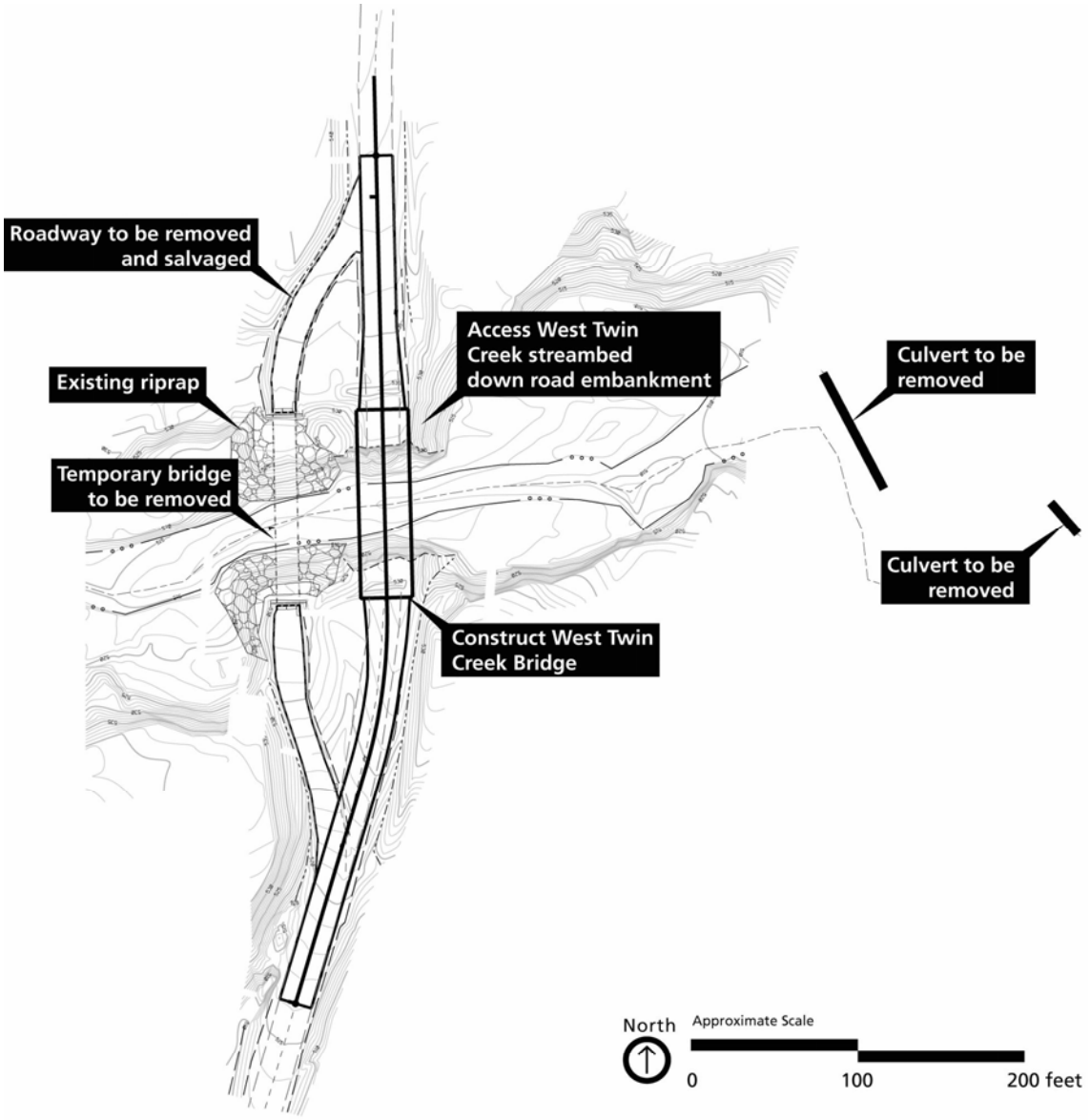


FIGURE 6. CONSTRUCTION STAGING AND MATERIALS STORAGE

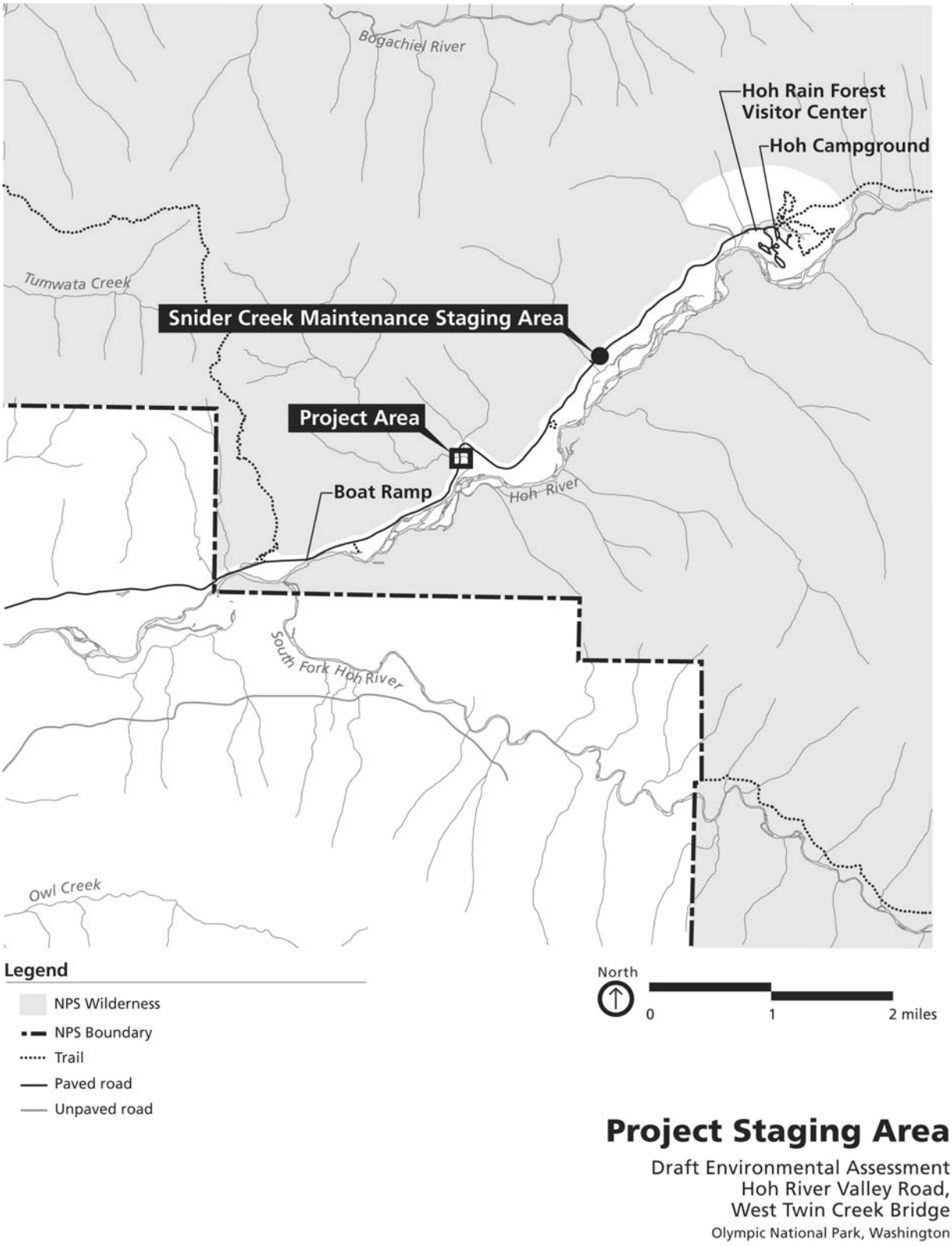


FIGURE 7. TEMPORARY BRIDGE ACROSS WEST TWIN CREEK

FIGURE 8. WASHED-OUT CULVERT IN WEST TWIN CREEK

MITIGATION

The mitigation measures in Table 2 are presented as part of the Preferred Alternative to reduce potential environmental effects.

TABLE 2: MITIGATION MEASURES

Resource Area	Mitigation
General Considerations	Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing. Temporary erosion- and sediment-control Best Management Practices (BMPs) such as silt fences, plastic covers, woddles (a biodegradable material used for sediment control), and other material, would be in place to minimize sedimentation and turbidity impacts as a result of construction activities. Silt fencing fabric would be inspected daily during project work and weekly after project completion, until the time it is removed. Accumulated sediments would be removed when the fabric is estimated to be approximately 75% full. Silt removal would be accomplished in such a way as to avoid introduction into any flowing water bodies. Although soil side-cast during construction would be susceptible to some erosion, such erosion would be minimized by placing silt fencing around the excavated soil. Excavated soil may be used in the construction project; excess soil would be stored in approved areas outside the high water mark. Construction equipment staging would occur within the roadway for active work areas or at designated turnouts. All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion.
Vegetation	Disturbed soils would be replanted with either sterile grass seed, native grass seed, or materials removed from the project area prior to work for later replacement as soon as possible following disturbance. Disturbed soils would be susceptible to erosion. Riparian vegetation would be planted as soon as possible to minimize sedimentation associated with bare ground. This would reduce construction scars and erosion. Topsoil and/or duff would be salvaged and conserved at the beginning of construction and spread over disturbed areas as near to the original location as possible; and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area. The conserved topsoil and/or duff would be covered while it is stockpiled to prevent the capture of seeds of exotic plant species. Undesirable plant species would be controlled in high-priority areas and other undesirable species would be monitored and controlled, as necessary. To prevent the introduction of, and minimize the spread of, nonnative vegetation and noxious weeds, the following measures would be implemented during construction: • Minimize soil disturbance • Pressure wash and/or steam clean all construction equipment, except hauling vehicles, before entering the park to ensure that all equipment, machinery, rocks, gravel, and other materials are cleaned and weed free before entering ONP • Pressure wash hauling vehicles before entering the park for the first time; subsequent entries would not require pressure washing unless the vehicle shows signs of mud, plant material, or other substances that could be considered harmful

Resource Area	Mitigation
Vegetation (con't)	• Cover all haul trucks bringing fill materials from outside the park to prevent seed transport • Limit vehicle and equipment parking to within construction limits • Limit disturbance to roadsides, culvert areas, and other areas inside the designated construction limits; no machinery or equipment should access areas outside the construction limits • Obtain all fill, rock, and additional topsoil from the project area, if possible; and if not possible, then obtain weed-free fill, rock, or additional topsoil from sources outside the park. NPS personnel will certify that the source is weed free. • Monitor disturbed areas for up to 3 years following construction to identify growth of noxious weeds or nonnative vegetation; treatment of nonnative vegetation would be completed in accordance with NPS-13, Integrated Pest Management Guidelines
Water Quality and Soils	Erosion- and sediment-control BMPs, as described above in General Considerations, would be implemented to minimize erosion, avoid spills, and prevent sediment and other pollutants from entering West Twin Creek or the Hoh River. The tracked excavator would drive slowly and carefully in the channel to minimize sediment movement and increases in turbidity. Spill Prevention 1. Where feasible, each piece of equipment shall have its own spill kit on board. There shall be at least two kits on hand at the job site at any given time. Each spill kit contains a sausage boom and approximately 24 absorbent pads. Each person shall be trained in the use and response to a spill including required notification procedures. 2. Repairs, refueling, and adding potentially hazardous fluids to trucks and equipment shall be conducted away from the work site, where feasible. When repairs, refueling, or adding hazardous fluids to equipment on site, extra care will be taken by project personnel to prevent leaks and spills; and spill prevention kits, described in #1 above, shall be on hand. No bulk petroleum products shall be stored on site. Fuel will be brought in by truck in approved portable tanks, which are properly secured from tipping in pickup trucks. All of the tank nozzles shall be fitted with overflow prevention triggers. Fueling shall be done as far from the river or drainage course as possible. 3. Where appropriate, environmentally friendly grease, hydraulic oil, and bar and chain oil shall be used. These lubricants are vegetable or mineral oil based, less toxic, and biodegradable. 4. Equipment used on the project shall be maintained free of external petroleum-base products while working at the project locations. 5. In the event of any spill, contaminates shall be contained immediately and any contaminated soil shall be removed using the spill prevention kits described in #1 above. Any contaminated soil or vegetation shall be removed immediately by hand or with equipment and transported to a certified disposal facility, specifically, Eclipse Corp. processing site in Port Angeles. 6. The driver/operator shall be present during refueling or transfer of any fuels or hazardous materials between equipment. Fueling shall be done at least 25 feet from the nearest culvert inlet or watercourse. Drip pans shall be present and used. Equipment shall not be topped off. Fueling shall be done during daylight hours. During periods of heavy rainfall and/or high creek flows, the project leader would halt work. During these work stoppage periods, project personnel would continue to check to ensure the silt fences or other erosion-control measures are performing adequately.
Special Status Species	To minimize impacts to the marbled murrelet, project activities would not begin until early September, near the end of the murrelet late breeding season (August 6 to September 15). To protect marbled murrelets during sensitive feeding periods, construction activities would not start until 2 hours after sunrise and would stop 2 hours before sunset through September 15. The park would maintain strict garbage control to prevent scavengers (e.g., crows), which are predators on murrelet nests, from being attracted to the project area. No food scraps would be discarded or fed to wildlife. Mitigation for bull trout would be the same as described for Fishery Resources.

Resource Area	Mitigation
Fishery Resources	In accordance with Washington Department of Fish and Wildlife work windows, in-stream work would be scheduled from the beginning of September through mid-January, during periods of low flow to minimize impacts to fish. The stream would be diverted during construction activities on each side of the bridge, but natural flow would be unimpeded after construction is completed. The project area would be stabilized and revegetated following construction. Pile driving would not occur in the stream and would be scheduled to occur after September 1, during low-flow periods when larval and juvenile Essential Fish Habitat (EFH) species are not likely to be present During culvert removal, operation of the tracked excavator would be avoided in the streambed, to the extent possible. Water-diversion measures would be installed if needed around the washed-out culverts before removal to move streamflow out of the work area and minimize suspension of sediments in the stream. Turbidity would be monitored during in-stream construction and culvert removal activities. Work would be suspended if turbidity levels show significant increases over background levels until corrective measures could be implemented. ONP would work with the Hoh Tribe to remove fish from the channel near the project area. Seining would be conducted to prevent fish from entering the project area and to avoid trapping fry and other fish in the project area during in-stream work. During diversion, screens, flow-maintenance measures, and erosion-control measures would be used, and stranded fish would be hand netted. Where necessary, electro-fishing would be used to capture stranded fish.
Cultural Resources	Park cultural resources staff would be available during construction to advise or take appropriate actions, if necessary. Should construction unearth previously undiscovered archeological resources, work would be stopped in the area of any discovery and the park would consult with the state historic preservation officer/tribal historic preservation officer and the Advisory Council on Historic Preservation, as necessary, according to 36 CFR 800.13, Post Review Discoveries. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed. The NPS would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction. Equipment and material staging areas would also avoid known archeological resources.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Reconstruct Road Using Culverts

Under this alternative, the temporary crossing would be replaced with a two-lane culvert crossing similar to the washed-out crossing. The temporary bridge would be removed and the washed-out culverts would be retrieved from downstream.

This alternative was eliminated from detailed analysis because it does not meet the project purposes. Although two-lane access would be restored, the culverts would be subject to washing out in future storm events. Natural hydrologic conditions would not be restored and West Twin Creek would become impassable for fish.

Close Upper Hoh Road at West Twin Creek

Under this alternative, the temporary bridge and riprap would be removed and Upper Hoh Road would be closed at the milepost 1 parking area where a steel gate is currently located. Existing facilities such as the ranger station/visitor center, maintenance shop, and

campground would be inaccessible by vehicle. West Twin Creek would remain passable for fish.

This alternative was eliminated from further analysis. While this alternative would meet the project objective of providing fish passage and restoring natural hydrologic stream conditions, it does not meet the project purpose of providing permanent two-lane access to the Hoh Rain Forest and park facilities.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The CEQ defines the Environmentally Preferred Alternative as "…the alternative that will promote the national environmental policy as expressed in the National Environmental Policy Act § 101." Section 101 states that, "…it is the continuing responsibility of the Federal Government to:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

2. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;

3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

4. Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment, which supports diversity and variety of individual choice;

5. Achieve a balance between population and resource use, which will permit high standards of living and a wide sharing of life's amenities; and

6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

The identification of the "Environmentally Preferred Alternative" was based on an analysis that balances factors such as physical impacts on various aspects of the environment, mitigation measures to deal with impacts, and other factors including the statutory mission of the NPS and the purposes for the project.

While the No Action Alternative would preserve existing conditions, it would not be considered the Environmentally Preferred Alternative because allowing the temporary bridge to remain in place would not meet the goals of providing the widest range of beneficial uses without degradation and risk of health or safety. The No Action Alternative is not the Environmentally Preferred Alternative for the following reasons: (1) implementing this alternative would not improve road safety, (2) this alternative would not allow park managers to effectively preserve and maintain park resources and facilities in the Hoh River Valley because access would be restricted to the one-lane temporary bridge, (3) maintaining the temporary bridge at higher levels than required for a permanent structure would continue to require resource materials (e.g., riprap and road base), and (4) there is a higher likelihood the temporary bridge would not withstand large flood events, which would result in road closure making it more difficult for visitors and staff to access the park complex. Thus, the No Action Alternative would not meet goals 2, 3, 5, or 6.

The NPS determined that the Environmentally Preferred Alternative is to construct a new bridge at West Twin Creek because it surpasses the other alternative in realizing the full range of national environmental policy goals as stated in § 101 of NEPA. Constructing a new bridge at West Twin Creek is the Environmentally Preferred Alternative because it would provide the widest range of beneficial uses without degradation, and would reduce risks to health and safety because it would provide sustainable vehicular access to the facilities and trailheads in the Hoh River Valley. Implementing the Preferred Alternative would best preserve the natural aspects of West Twin Creek and its floodplain as compared to the No Action Alternative because it better restores natural hydrologic stream conditions (goals 1 and 4). Constructing the bridge to pass the 100-year flood event would allow for more unimpeded access (i.e., fewer road closures due to bridge washouts) to the recreational opportunities in the Hoh River Valley (goals 2, 3, and 5). The Preferred Alternative provides for the reuse of riprap and other materials that were used to install the temporary bridge (goal 6).

IMPACT SUMMARY

A summary of potential environmental effects for the alternatives is presented in Table 3.

TABLE 3: IMPACT SUMMARY TABLE

Impact Topic	No Action	Preferred Alternative
Vegetation	The No Action Alternative would have long-term negligible adverse impacts on vegetation and would therefore contribute slightly to the short-term minor adverse cumulative effects. Because there would be no major adverse impacts to vegetation, there would be no impairment of park resources or values.	The Preferred Alternative would have short-term negligible adverse effects and long-term beneficial effects on vegetation. The Preferred Alternative would have a slight contribution to the short-term minor adverse cumulative effects. Because there would be no major adverse impacts to vegetation, there would be no impairment of park resources or values.
Wildlife	The No Action Alternative would result in short-term minor adverse localized impacts to wildlife. The cumulative effects on wildlife would be short-term, minor, and adverse, with only a slight contribution from the No Action Alternative. Because there would be no major adverse impacts to wildlife, there would be no impairment of park resources or values.	The Preferred Alternative would result in short-term minor adverse impacts to wildlife in the immediate area during the construction period. Cumulative effects would be short-term, minor, and adverse, with only a slight contribution from the Preferred Alternative. Because there would be no major adverse impacts to wildlife, there would be no impairment of park resources or values.
Fishery Resources	The No Action Alternative would cause long-term minor adverse localized impacts on fish from bank erosion associated with leaving the temporary road, bridge, and washed-out culverts in place. There would also be a long-term beneficial effect to fish from the restored fish passage. Cumulative effects would be long-term, minor, and adverse. Because there would be no major adverse impacts to fish or their habitat, there would be no impairment of park resources or values.	The Preferred Alternative would have short-term negligible adverse localized impacts due to construction of the permanent bridge and removal of the temporary bridge and washed-out culverts. There would be long-term beneficial effects to fish from construction of a permanent bridge designed to withstand a 100-year flood, stabilization of the streambanks, and removal of the washed-out culverts from the stream. Cumulative effects would be negligible, short-term, and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to fish or their habitat, there would be no impairment of park resources or values.

Impact Topic	No Action	Preferred Alternative
Special Status Species	The No Action Alternative would have no effect on terrestrial Special Status Species or suitable habitat, but it could cause long-term minor localized adverse effects on bull trout. There would be no cumulative effects on terrestrial Special Status Species, but the cumulative effects on bull trout would be long-term, minor, and adverse. Because there would be no major adverse impacts to special status species, there would be no impairment of park resources or values.	Implementation of Preferred Alternative may affect, but is not likely to adversely affect, northern spotted owls, marbled murrelets, and bull trout, and would have no effect on bald eagles. This alternative would provide long-term moderate benefits for bull trout and other water-dependent special status species. The Preferred Alternative would result in short-term minor adverse effects to other species of concern during the construction period. Impacts to water-dependent species resulting from sedimentation, physical disturbance of the streambed, and noise disturbance would be minor, temporary, and localized. Cumulative effects on bull trout and water-dependent species would be short-term, negligible, and adverse, with the Preferred Alternative contributing long-term beneficial effects. The Preferred Alternative would result in short-term, minor adverse cumulative impacts on the northern spotted owl, marbled murrelet, and other terrestrial Special Status Species. There would be no impact on federally listed plants in the project area because there are none present. Because there would be no major adverse impacts to special status species, there would be no impairment of park resources or values.
Soils	The No Action Alternative would have long-term minor adverse impacts on soil productivity by leaving the road detour in place. The temporary bridge abutment and washed-out road streambank are subject to erosion, which would have long-term minor adverse effects on soils. Cumulative effects would be long-term, minor, and adverse. Because there would be no major adverse impacts to soils, there would be no impairment of park resources or values.	The Preferred Alternative would have short-term minor adverse impacts on soils from bridge construction, temporary bridge and detour road removal, and culvert removal. There would be long-term beneficial effects to soils from stabilization of the stream channel at the Upper Hoh Road—West Twin Creek crossing, restoration of soil productivity under the detour road, and removal of the washed-out culverts from the stream. Cumulative effects would be short-term and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to soils, there would be no impairment of park resources or values.
Hydrology and Water Quality	The No Action Alternative would have long-term minor adverse impacts from leaving the washed-out culverts, temporary road, and temporary bridge in place. Cumulative effects would be short-term, minor, and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to hydrology and water quality, there would be no impairment of park resources or values.	The Preferred Alternative would have short-term minor adverse impacts, to water quality, from construction of the permanent bridge and removal of the temporary bridge and washed-out culverts. There would be long-term beneficial effects to hydrology and water quality due to construction of a permanent bridge designed to withstand a 100-year flood, stabilization of the streambanks, and removal of the washed-out culverts from the stream. Cumulative effects would be short-term, minor, and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to hydrology and water quality, there would be no impairment of park resources or values.

Impact Topic	No Action	Preferred Alternative
Floodplain	The No Action Alternative would have long-term minor adverse impacts to the West Twin Creek and Hoh River floodplains from leaving the washed-out culverts and temporary bridge in place. Cumulative effects would be long-term, minor, and adverse. Because there would be no major adverse impacts to the floodplain, there would be no impairment of park resources or values.	The Preferred Alternative would have long-term beneficial effects to the West Twin Creek and Hoh River floodplains. Cumulative effects would be long-term and beneficial. Because there would be no major adverse impacts to the floodplain, there would be no impairment of park resources or values.
Visitor Experience and Public Use	The No Action Alternative would have long-term moderate adverse effects to visitors who wish to experience the Hoh area resources by vehicle. This alternative would alter use in the area and may increase visitor numbers to other areas of the park. These effects would cause long-term moderate adverse impacts to the visitor experience. Cumulative effects would be moderate and adverse.	Under the Preferred Alternative, the effects to visitor experience and public use would be long-term and beneficial. This alternative would have a long-term beneficial contribution to cumulative effects.
Park Operations	The No Action Alternative would result in a change to park operations because the temporary bridge would remain in place. Park operations related to emergency response, bridge, trail, facility maintenance, resource management, and research would be altered, which would result in long-term moderate adverse impacts on park operations. Cumulative effects to park operations would be long-term, moderate, and adverse.	The Preferred Alternative would result in long-term beneficial effects to park operations from restoring vehicle access to the Hoh Rain Forest area. The contribution to cumulative effects would be long–term and beneficial.
Socioeconomics	The No Action Alternative would have long-term minor adverse effects to socioeconomics if park visitation decreases from the inconvenience associated with accessing the Hoh Rain Forest. Cumulative effects would be long-term, moderate, and adverse with short-term beneficial effects associated with construction-related spending for reasonably foreseeable future actions. Because there would be no major adverse impacts to socioeconomics, there would be no impairment of park resources or values.	The Preferred Alternative would have long-term beneficial effects to socioeconomics by ensuring visitor access into one of the most popular destinations in the park, the Hoh Rain Forest. Construction-related spending would also benefit the local economy. Cumulative effects would be long-term, moderate, and adverse with the Preferred Alternative contributing long-term beneficial effects to socioeconomics. Because there would be no major adverse impacts to socioeconomics, there would be no impairment of park resources or values.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section provides a summary of the resources associated with the Preferred Alternative and the environmental consequences associated with the alternatives. It is organized by impact topics that were derived from internal park and external public scoping. Impacts are evaluated based on context, duration, intensity, and whether they are direct, indirect, or cumulative impacts. NPS policy also requires that impairment of resources be evaluated in all environmental documents except for Visitor Experience and Public Use, and Park Operations, which require no impairment determination. More detailed information on resources in ONP may be found in the *Statement for Management: Olympic National Park – 1996*, the *Olympic National Park Resource Management Plan* (1990, 1999), and the *Draft General Management Plan and Environmental Impact Statement* (2006).

GENERAL METHODOLOGY

This section contains the environmental impacts, including direct and indirect effects, and their significance to the alternatives. The analysis is based on the assumption that the mitigation measures identified in the "Mitigation" section of this EA would be implemented for the Preferred Alternative. Overall, the NPS based these impact analyses and conclusions on the review of existing literature and park studies, information provided by experts within the park, the Hoh Tribe, and other agencies, professional judgment and park staff insights, and public input.

There are several terms used within the "Environmental Consequences" section to assess the impacts of each alternative on each impact topic. The following terms were used to define the nature of impacts associated with project alternatives:

Type: Impacts can be beneficial or adverse.

Context: Context is the setting within which an impact would occur, such as local, park-wide, or regional.

Impact intensity: Impact intensity is defined individually for each impact topic. There may be no impact, or impacts may be negligible, minor, moderate, or major.

Duration: Duration of impact is analyzed independently for each resource because impact duration is dependent on the resource being analyzed. Depending on the resource, impacts may last for the construction period, a single year or growing season, or longer. For purposes of this analysis, impact duration is described as short-term or long-term.

Direct and Indirect Impacts: Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are still reasonably foreseeable.

Direct and indirect impacts are considered in this analysis, but are not specified in the narratives. Cumulative effects are discussed on page 35.

THRESHOLD FOR IMPACT ANALYSIS

The duration and intensity of effects vary by resource. Therefore, the definitions for each impact topic are described separately. These definitions were formulated through the review of existing laws, policies, and guidelines; and with assistance from park, regional NPS, and Washington office NPS specialists.

Vegetation

Predictions about short- and long-term impacts were based on professional judgment and experience with previous projects with similar vegetation. Impacts were assessed qualitatively. The thresholds of change for the intensity of an impact on vegetation are defined in Table 4.

TABLE 4: VEGETATION IMPACT AND INTENSITY

Impact Intensity	Intensity Description
Negligible	The impacts on vegetation (individuals or communities) would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected. The effects would be on a small scale and no species of special concern would be affected. Ecological processes and biological productivity would not be affected.
Minor	The alternative would not necessarily decrease or increase the project area's overall biological productivity. The alternative would affect the abundance or distribution of individuals in a localized area, but would not affect the viability of local or regional populations or communities. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective. Mitigation may be needed to offset adverse effects, would be relatively simple to implement, and would likely be successful.
Moderate	The alternative would result in effects to some individual native plants and could also affect a sizeable segment of the species' population and over a relatively large area. Permanent impacts could occur to native vegetation but in a relatively small area. Some special status species could also be affected. Mitigation measures, for both vegetation and soil, would be necessary to offset adverse effects and would likely be successful.
Major	The alternative would have considerable effects on native plant populations, including special status species, and affect a relatively large area in and out of the park. Extensive mitigation measures to offset the adverse effects would be required; success of the mitigation measures would not be guaranteed.

Short-term—recovers in less than 1 year
Long-term—takes more than 1 year to recover

Wildlife

The NPS Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted to mean that native animal life should be protected and perpetuated as part of the park's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible; otherwise they are protected from harvest, harassment, or harm by human activities. According to NPS *Management Policies 2006*, the restoration of native species is a high priority (sec. 4.1). Management goals for wildlife include maintaining components and processes of naturally

evolving park ecosystems, including natural abundance, diversity, and the ecological integrity of plants and animals. Information on ONP wildlife was taken from park documents and records. ONP natural resource management staff, the Service, and the WDFW also provided information. The thresholds of change for the intensity of impacts to wildlife are defined in Table 5.

TABLE 5: WILDLIFE IMPACT AND INTENSITY

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

Short-term—recovers in less than 1 year
Long-term—takes more than 1 year to recover

Fishery Resources

Fish and their habitat would be evaluated with the same criteria listed above under "Wildlife."

Special Status Species

Section 7 of the Endangered Species Act (ESA) mandates all federal agencies to determine how to use their existing authorities to further the purposes of the ESA to aid in recovering listed species, and to address existing and potential conservation issues. Section 7(a)(2) states that each federal agency shall, in consultation with the Secretary of the Interior, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. NPS *Management Policies* state that potential effects of agency actions would also be considered for state or locally listed species. The thresholds of change for the intensity of impacts to special status species are defined in Table 6.

TABLE 6: SPECIAL STATUS SPECIES IMPACT AND INTENSITY

Impact Intensity	Intensity Description
Negligible	The action could result in a change to a population or individuals of a species, but the change would not be of any measurable or perceptible consequence and would be well within natural variability. In the case of federally listed species, this impact intensity equates to a Service determination of "may affect, not likely to adversely affect."

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

Short-term—recovers in less than 1 year
Long-term—takes more than 1 year to recover

Soils

Available information on potentially impacted soils in the project was compiled. Potential impacts from the alternatives were based on professional judgment and experience with similar actions. The thresholds of change for the intensity of an impact are defined in Table 7.

TABLE 7: SOIL IMPACT AND INTENSITY

Impact Intensity	Intensity Description
Negligible	The effects to soils would be below or at a lower level of detection. Any effects on productivity or erosion potential would be slight.
Minor	An action's effects on soils would be detectable. It would change a soil's profile in a relatively small area, but it would not appreciably increase the potential for erosion of additional soil. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.
Moderate	An action would result in a change in quantity or alteration of the topsoil, overall biological productivity, or the potential for erosion to remove small quantities of additional soil. Changes to localized ecological processes would be of limited extent. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
Major	An action would result in a change in the potential for erosion to remove large quantities of additional soil or in alterations to topsoil and overall biological productivity in a relatively large area. Key ecological processes would be altered, and landscape-level changes would be expected. Mitigation measures to offset adverse effects would be necessary, extensive, and their success could not be guaranteed.

Short-term—recovers in less than 3 years
Long-term—takes more than 3 years to recover

Hydrology and Water Quality

Available information on hydrology in the project area was compiled. Potential impacts from the alternatives are based on professional judgment and experience with similar actions. Impacts would be considered short term if hydrologic effects occur during construction activities and long term if effects occur longer than the duration of construction. The

thresholds of change for the intensity of an impact (beneficial or adverse) are defined in Table 8.

TABLE 8: HYDROLOGY AND WATER QUALITY IMPACT AND INTENSITY

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

Short-term—following project completion, recovery would take less than 1 year
Long-term—following project completion, recovery would take more than 1 year

Floodplains

Floodplains are defined by the NPS Floodplain Management Guideline (1993) as "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, and including, at a minimum, that area subject to temporary inundation by a regulatory flood." Executive Order 11988 ("Floodplain Management") requires an examination of impacts to floodplains; of potential risk involved in placing facilities within floodplains, and protecting floodplain values. The NPS has adopted the policy of preserving floodplain values and minimizing potentially hazardous conditions associated with flooding (NPS Floodplain Management Guideline, July 1, 1993). The planning team based the impact analysis and the conclusions for possible impacts to 100- and 500-year floodplains on the on-site inspection of known and potential 100- and 500-year floodplains within the park, review of existing literature and studies, information provided by experts in the NPS and other agencies, and park staff insights and professional judgment. Where possible, map locations of 100- and 500-year floodplains were compared with locations of proposed developments and modifications of existing facilities. Predictions about short- and long-term site impacts were based on previous studies of impacts to 100- and 500-year floodplains from similar projects and recent scientific data. The thresholds of change for the intensity of an impact are defined in Table 9.

TABLE 9: FLOODPLAIN IMPACT AND INTENSITY

Impact Intensity	Intensity Description
Negligible	There would be very little change in the ability of a floodplain to convey floodwaters, or its values and functions. The proposed project would not contribute to flooding.
Minor	Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local, although the changes would be barely measurable. The proposed project would not contribute to flooding. No mitigation would be needed.
Moderate	Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local. The proposed project could contribute to flooding. The impacts could be mitigated by modification of proposed facilities in floodplains.

Impact Intensity	Intensity Description
Major	Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and widespread. The proposed project would contribute to flooding. The impacts could not be mitigated by modification of proposed facilities in floodplains.

Short-term—usually less than 1 year; impacts would not be measurable or measurable only during the life of construction

Long-term—usually more than 1 year; impacts would be measurable during and after project construction

Visitor Experiences and Public Use

NPS *Management Policies 2006* state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate high-quality opportunities for visitors to enjoy the parks. Part of the purpose of ONP is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

Public scoping input and observation of visitation patterns, combined with assessment of what is available to visitors under current park management, were used to estimate the effects of the alternatives. The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources and objectives presented in the park significance statements, as derived from its enabling legislation. The potential for change in visitor experience proposed by the alternatives was evaluated by identifying projected increases or decreases in access and other visitor uses, and determining whether or how these projected changes would affect the desired visitor experience, to what degree, and for how long. The thresholds of change for the intensity of an impact to visitor experiences and public use are described in Table 10.

TABLE 10: VISITOR EXPERIENCE AND PUBLIC USE IMPACT AND INTENSITY

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

Short-term—occurs only during project construction

Long-term—continues after project construction

Park Operations

Park operations, for the purposes of this EA, refers to the quality and effectiveness of the infrastructure, and the ability to maintain the infrastructure, used in the operation of the park in order to adequately protect and preserve vital resources and provide for an effective visitor experience. This includes an analysis of the condition and usefulness of the facilities and developed features used to support the operations of the park. Facilities included in the

Preferred Alternative include Upper Hoh Road and access to park facilities in the Hoh Rain Forest, such as the visitor center and campground.

Park staff knowledgeable of the park operations issues are members of the planning team that evaluated the impacts of each alternative. Impact analysis is based on the current description of park operations presented in the "Affected Environment" section of this EA. The thresholds of change for the intensity of an impact to visitor experiences and public use are described in Table 11.

TABLE 11: PARK OPERATIONS IMPACT AND INTENSITY

Impact Intensity	Intensity Description
Negligible	The effects would be at low levels of detection and would not have appreciable effects on park operations.
Minor	The effects would be detectable and would be of a magnitude that would not have appreciable effects on park operations. If mitigation is needed to offset adverse effects, it would be simple and likely successful.
Moderate	The effects would be readily apparent and result in a change in park operations that would be noticeable to park staff and the public. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
Major	The effects would be readily apparent, result in a substantial change in park operations in a manner noticeable to staff and the public, and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and success could not be guaranteed.

Short-term—Effects lasting for the duration of the treatment action
Long-term—Effects lasting longer than the duration of the treatment action

Socioeconomics

Issues were identified through the scoping process, and concerns covered by this section, include effects on the economic contribution of ONP to the local economies in the gateway communities if two-lane access to the Hoh Rain Forest is not restored. The thresholds of change for the intensity of an impact to socioeconomics are described in Table 12.

TABLE 12: SOCIOECONOMIC IMPACT AND INTENSITY

Impact Intensity	Intensity Description
Negligible	No effects would occur or the effects to socioeconomic conditions would be below the level of detection.
Minor	The effects to socioeconomic conditions would be detectable. Any effects would be small and if mitigation were needed to offset potential adverse effects, it would be simple and successful.
Moderate	The effects to socioeconomic conditions would be readily apparent. Any effects would result in changes to socioeconomic conditions on a local scale. If mitigation is needed to offset potential adverse effects, it could be extensive, but would likely be successful.
Major	The effects to socioeconomic conditions would be readily apparent and would cause substantial changes to socioeconomic conditions in the region. Mitigation measures to offset potential adverse effects would be extensive and their success could not be guaranteed.

Short-term—Effects lasting for the duration of the treatment action
Long-term—Effects lasting longer than the duration of the treatment action

CUMULATIVE EFFECTS

Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are reasonably foreseeable. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. The CEQ regulations that implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects.

Cumulative impacts are considered for the No Action Alternative and Preferred Alternative and are presented at the end of each impact topic discussion.

Methods for Assessing Cumulative Effects

To determine potential cumulative effects, actions and land uses were identified that have occurred, are occurring, or are reasonably expected to occur near the project area, particularly those along Hoh Road east of U.S. 101 in the Hoh River Valley. Potential future actions were determined by reviewing the plans and activities of ONP and Jefferson County. Identified actions include road construction, repairs, and regular maintenance. These actions were then assessed in conjunction with the impacts of the alternatives to determine if they would have any added adverse or beneficial effects on a particular natural resource, park operation, or visitor use. The evaluation of cumulative effects was based on available information of the actions. Cumulative effects are considered for both alternatives and are presented at the end of each impact topic discussion.

Past Actions

Past actions include activities that influenced and affected the current conditions of the environment in the vicinity of the project area. These actions primarily include disturbances to the landscape along the Hoh Road corridor and activities such as maintenance and repair of Hoh Road. These past actions contributed to both temporary and long-term disturbances to the existing quality of the natural environment. The following past actions were identified near the project area.

In the spring of 2007, the park installed new culvert crossings for Snider Creek and Taft Creek along Upper Hoh Road east of West Twin Creek to repair storm damage.

There were 31 emergency projects on Hoh Road east of U.S. 101 in Jefferson County between 1996 and 2006. There were typically one to three projects each year. In 2006, there were seven emergency repair projects, many associated with the November 2006 storm. It is reasonable to assume that one to three projects were undertaken each year prior to 1996.

There were seven NPS emergency repair projects on or near Upper Hoh Road in ONP between 1996 and 2006. The repairs were typically associated with erosion or flood events. It is reasonable to assume that there was at least one emergency repair along Upper Hoh Road in the park each year prior to 1996.

An unknown number of past emergency repairs have been made to U.S. 101. Given the highway's proximity to the Hoh River, it is reasonable to assume that at least two or three emergency repairs have occurred in each year since the highway was built.

In addition to emergency repairs, since their construction, roads and U.S. 101 in the Hoh River Valley have undergone regular maintenance such as resurfacing, shoulder repair, surface patching, and vegetation management. Additionally, there have been road improvement projects such as widening shoulders and lanes, improving intersections, and replacing bridges and culverts.

Current and Future Actions

The following current and reasonably foreseeable future actions were considered in the cumulative effects analysis.

The NPS is planning to replace the East Twin Creek culvert along Upper Hoh Road with a bridge similar to the proposed West Twin Creek project.

The Hoh Boundary Pond project is another planned activity on Upper Hoh Road. This project would restore the natural hydrologic pathways between Hoh River and a wetland complex located to the north of Upper Hoh Road, just inside of the park boundary at Hoh Boundary Pond. The park is working with the Hoh Tribe to determine the best course of action to restore the pathway for water, streambed sediments, and woody debris to move between the wetlands and Hoh River. This project would also help maintain a more consistent water elevation in the wetlands behind Upper Hoh Road allowing natural riparian vegetation to reestablish around the wetlands. This project would allow juvenile and adult fish to access high-value rearing, over wintering, and spawning habitat.

Jefferson County anticipates needing to perform three emergency projects on Hoh Road in 2007 and two in 2008. Based on the number of yearly emergency repairs in the past, it is likely there would be between one and three projects each year in the future. In addition to emergency repairs, there would be regular road maintenance and it is likely that there would be several road improvement projects over the next 10 years. Similar emergency, maintenance, and improvement projects are anticipated on U.S. 101.

Jefferson County has identified the 12-mile section of Hoh Road from U.S. 101 to the park boundary as a "backcountry route" and has proposed incorporating space for bike lanes. Due to the narrow footprint of the current road, the project would not involve adding separate bike lanes or paved shoulders, but would make both lanes 11 feet wide, for a total paved roadway width of 22 feet. This plan would likely be implemented the next time this reach of road is repaved.

IMPAIRMENT OF OLYMPIC NATIONAL PARK RESOURCES OR VALUES

In addition to determining the environmental consequences of the Preferred and No-Action Alternatives, NPS *Management Policies* and DO-12 require an analysis of potential effects to determine if actions would impair park resources or cause unacceptable impacts. The fundamental purpose of the national park system established by the Organic Act and

reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must seek ways to avoid, or minimize to the greatest degree practicable, adversely impacting park resources and values. Congress has given NPS managers direction; however, to allow impacts to park resources and values when necessary and appropriate to fulfill the purpose of the park, so long as the impact does not constitute impairment of the affected resources and values.

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

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

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in ONP. The "Environmental Consequences" section includes a determination on impairment in the conclusion statement of the appropriate impact topics for each alternative. Impairment statements are not required for recreational values/visitor experience, park operations, or health and safety topics. In addition, neither NPS policies nor managerial determinations regarding impairment apply to non-NPS lands or resources.

VEGETATION

Affected Environment

The temperate climate and high levels of precipitation in the Hoh River Valley supports riparian forest and old-growth temperate rain forest unique to the Pacific Northwest coast. The forest in the vicinity of the project area is dominated by large conifers, including Douglas fir, Sitka spruce, and western hemlock. 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 level 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 West Twin Creek. In disturbed areas, nonnatives such as Scot's broom are occasionally found, and invasive exotic plants such as evergreen and Himalayan blackberry also occur along the Upper Hoh Road corridor.

There is currently almost no vegetation present in uplands or along the streambanks at the temporary bridge and detour. There is also no vegetation near the washed-out culverts. Any vegetation that was present prior to the November 2006 storm that washed out the West Twin Creek Upper Hoh Road culverts was either scoured away by the flood event or was removed during installation of the temporary bridge and detour.

Downstream of the temporary bridge, there is dense vegetation on the upper streambanks. The streambed itself is mostly cobble and gravel, but there are widely scattered individual alders and willows on more stable cobble and gravel areas. No federally or state-listed threatened or endangered plant species occur in the project area at West Twin Creek and Upper Hoh Road.

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. Under the No Action Alternative, there would be no project-related ground disturbance with the potential to impact vegetation. The detour road would not be removed and areas would not be revegetated. There would be no change in the current status of vegetative communities either in terms of species composition or population dynamics other than those brought about by natural environmental processes. There would be a long-term loss of vegetation production on about 0.4 acre from leaving the detour road to the temporary bridge in place.

Leaving the washed-out culverts in place downstream would change the hydrologic conditions of the stream, causing unnatural patterns of excessive stream scour that could remove vegetation on the upper streambanks immediately downstream of the washed-out culverts. In that event, the influence of the washed-out culverts on scour patterns and subsequent vegetation removal would have indirect adverse effects on vegetation. The effects would be negligible because it would be on a small localized scale.

The No Action Alternative would not create disturbed conditions conducive to the establishment of invasive plants; however, invasive species may establish on streambanks disturbed by flood flows and the washed-out road. The detour road and streambanks would not be revegetated.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact vegetation resources. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from vegetation removal, introduction of invasive and nonnative species, and changes in species composition. The Hoh Boundary Pond project would have beneficial effects on riparian vegetation. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term minor adverse cumulative impacts to vegetation. Because the No Action Alternative would result in negligible adverse impacts, it would contribute slightly to the overall cumulative effects on vegetation

Conclusion. The No Action Alternative would have long-term negligible adverse impacts on vegetation and would therefore contribute slightly to the short-term minor adverse cumulative effects. Because there would be no major adverse impacts to vegetation, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts. The Preferred Alternative would have both adverse and beneficial effects on vegetation. Individual willows and alders could be damaged by excavator travel in the streambed to access the washed-out culverts. Adverse effects on

vegetation would be short-term and negligible because only a few individual plants would be impacted and plants may survive if their roots remain intact. Beneficial effects on vegetation would result from revegetation efforts undertaken after removing the temporary bridge and restoration of about 0.4 acre of vegetation where the detour road is located along with revegetation of any disturbance at the bridge site. Revegetation would include importing and spreading sterile topsoil as needed, placing erosion-control blankets on the streambanks, and spreading duff and litter to improve the seed bank in areas targeted for revegetation. There would be long-term beneficial effects from revegetating disturbed areas.

The Preferred Alternative would increase the likelihood for invasive species to become established by removing the detour road and exposing bare ground. During construction, invasive plants and their seeds may be transported into ONP on vehicles, equipment, and materials. Revegetation, weed-control measures, and other BMPs would minimize the potential for invasive plant establishment. The potential for the establishment and spread of invasive plant species would be short-term, minor, adverse, and localized.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact vegetation resources. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from vegetation removal, introduction of invasive and nonnative species, and changes in species composition. The Hoh Boundary Pond project would have beneficial effects on riparian vegetation. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term minor adverse cumulative impacts to vegetation. The Preferred Alternative would add a relatively small increment to the overall cumulative impacts. Because the Preferred Alternative would result in primarily beneficial effects with minor adverse effects from potential invasive weed establishment, it would contribute only slightly to the short-term minor adverse cumulative effects on vegetation.

Conclusion. The Preferred Alternative would have short-term negligible adverse effects and long-term beneficial effects on vegetation. The Preferred Alternative would have a slight contribution to the short-term minor adverse cumulative effects. Because there would be no major adverse impacts to vegetation, there would be no impairment of park resources or values.

WILDLIFE

Affected Environment

The Olympic Peninsula has developed a distinct array of plants and animals after being isolated for eons by glacial ice, and later, the waters of the Pacific Ocean, Puget Sound, and the Strait of Juan de Fuca. Eight types of plants and 15 types of animals are found on the Olympic Peninsula but nowhere else on Earth. Park habitats extend from sea level to glaciers and are diverse, including expansive ocean beaches and rocky intertidal areas, lowland bogs, 11 major inland river systems, extensive tracts of moist-coniferous forest, subalpine meadows, alpine tundra, and glaciers. Lands managed by the NPS provide havens for wildlife because they are more protected and generally less developed than privately owned lands. There are an estimated 61 land mammal species, 10 near-shore marine mammal species, and 14 offshore

mammal species; 301 bird species; 14 amphibian and 6 reptile species; and an unknown number of insect species that frequent the park (NPS 1999).

Mammals seen in the Hoh River Valley and project area include Roosevelt elk, black-tailed deer, raccoon, spotted skunk, Douglas squirrel, beaver, and snowshoe hare. Predators are seen less frequently in the area and include black bear, coyote, mountain lion, and bobcat. Smaller, less conspicuous or nocturnal mammals are numerous and may include mice, shrews, moles, and bats. More prominent bird species known in the project area include great blue heron, osprey, Stellar's jay, kingfisher, crow, water ouzel, robin, varied thrush, winter wren, and species of warblers, woodpeckers, kinglets, and sparrows.

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.

Lowland forests of the Hoh River Valley contain numerous invertebrate species such as slugs and snails. Some of these species are widespread within the Hoh 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.

Wildlife is currently affected in the road corridor as a result of human activity. Vehicle collisions with wildlife, especially small mammals, occur along the Upper Hoh Road corridor and locally affect individuals. Upper Hoh Road bisects habitats and restricts movement patterns. Streamside habitat in the project area has been disturbed by the November 2006 storm and the floodplain currently consists of cobble substrate with very little vegetative cover.

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. There would be no disturbance to the project area if the temporary bridge is left in place, except in the case of a flood that damages or removes the temporary bridge. If the temporary bridge washed out during flooding, either major emergency repairs to reinstall the temporary crossing or replacement of the bridge would be necessary. In the worst-case scenario, emergency repairs could be conducted during particularly vulnerable life stages for wildlife species, such as during breeding periods for amphibians and birds. However, stream habitat degraded by flooding would provide low-quality breeding habitat for most wildlife species. In the worst-case scenario, effects on biotic communities in terms of species composition or population dynamics would be short-term, minor, and adverse.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could potentially impact wildlife. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from habitat loss or disturbance during construction. The Hoh Boundary Pond project would have beneficial effects on wildlife by restoring natural processes. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and

under "Current and Future Actions," would result in short-term minor adverse cumulative impacts to wildlife. Because the No Action Alternative would result in short-term minor, but localized, adverse impacts, it would contribute slightly to the overall cumulative effects on wildlife.

Conclusion. The No Action Alternative would result in short-term minor adverse localized impacts to wildlife. The cumulative effects on wildlife would be short-term, minor, and adverse, with only a slight contribution from the No Action Alternative. Because there would be no major adverse impacts to wildlife, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts. The Preferred Alternative would result in short-term wildlife disturbance in the project area from construction activities to ground-dwelling invertebrates, mammals, amphibians, and birds. Increased human presence and the noise of construction would likely affect resident wildlife, resulting in temporary behavior modification because of fear and avoidance reactions. Construction activities associated with the Preferred Alternative could result in the inadvertent mortality of some individuals of smaller wildlife, such as reptiles, amphibians, and small mammals. However, impacts would be avoided during particularly vulnerable life stages for most wildlife species (breeding and rearing periods) because construction activities would occur from September 1 through mid-January. Project impacts would occur primarily in an area already degraded or disturbed by the existing road corridor and the effects of the November 2006 storm. Also, impacts would not be expected to be outside the natural range of variability of native species' populations, their habitats, or the natural processes sustaining the species. Thus, adverse impacts resulting from the Preferred Alternative would be short-term, minor, and highly localized.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact wildlife. Other past, present, and foreseeable future actions are likely to result in minor adverse impacts from disturbance of individual animals through noise and human presence and/or fragmented habitat. The Hoh Boundary Pond project would have beneficial effects on wildlife by restoring natural hydrologic functions. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term minor adverse cumulative impacts to wildlife. Because the Preferred Alternative would result in minor adverse effects, it would add a relatively slight increment to the overall cumulative impacts on wildlife.

Conclusion. The Preferred Alternative would result in short-term minor adverse impacts to wildlife in the immediate area during the construction period. Cumulative effects would be short-term, minor, and adverse, with only a slight contribution from the Preferred Alternative. Because there would be no major adverse impacts to wildlife, there would be no impairment of park resources or values.

FISHERY RESOURCES

Affected Environment

Fish Habitat

Prior to the November 2006 storm, the culverts at West Twin Creek were impeding the passage of salmon, trout, and other fish, including the federally listed bull trout, to approximately 2 miles of high-quality fish habitat upstream. Since the November 2006 storm, these impediments to fish passage have been removed. However, the washed-out culverts are acting as berms in the West Twin Creek channel and have changed the normal flow of the stream.

Characteristics of West Twin Creek are described in more detail in the "Hydrology" and "Water Quality" sections. The stream contains riffles and pools in the channel, gravel and cobbles in the streambed, and large woody debris. The stream is bordered by riparian vegetation consisting of large conifers and dense underbrush. The streambanks are vegetated, not generally undercut, and appear moderately stable. These characteristics provide favorable habitat conditions for the fish and macroinvertebrates that are a food source for many fish. In addition, the water quality of West Twin Creek is excellent. Sources of natural turbidity that could adversely affect fish include suspended fine material caused by shifts in the river channel and resulting bank erosion. High-flow events can also cause substantial turbidity in the stream.

Species Potentially Present

Fish species that inhabit the Hoh River Basin include summer and winter steelhead trout, cutthroat trout, bull trout, coho salmon, spring/summer and fall chinook salmon, chum salmon, longnose dace, mountain whitefish, largescale sucker, and several species of sculpins and lamprey (ONP files). Occasionally, other salmonids are found in the Hoh River including pink and sockeye salmon. The salmonids have considerable ecological, recreational, tribal and commercial importance. They are also a key factor in the ecological processes of the biotic communities of the Olympic Peninsula. Nonnative fish in the Hoh River Basin include a historic report of brook trout found in Elk Lake (Hagen 1961).

Several of the species documented to occur in the Hoh River Basin are considered species of concern by the Service or the State of Washington. The federally listed bull trout is discussed in the "Special Status Species" section. Species of concern documented to occur in Jefferson County include the Pacific lamprey, the river lamprey, and the coastal cutthroat trout.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fishery Act of 1996 (Public Law 104-267), requires federal agencies to consult with National Oceanic and Atmospheric Administration (NOAA) Fishery on activities that may adversely affect EFH. Freshwater EFH for salmon applies to all streams, lakes, ponds, and wetlands that support chinook, coho, and Puget Sound pink salmon. West Twin Creek is within the area designated as EFH for chinook and coho salmon. The NPS sent a letter to the NOAA Fishery to initiate consultation on EFH. The letter details measures

to be taken to mitigate any impacts to EFH and includes the Biological Assessment (BA) as an attachment for project information.

According to NOAA Fishery website information on salmon life history for EFH (NOAA Fishery 2006), coho and chinook salmon use graveled areas in a variety of stream and river sizes for spawning. The sites must have oxygenated flows, sufficient depth, cool temperatures, and stable streambeds. Coho salmon spawn during the winter, with fry hatching in March through May. Juveniles will rear in protected stream locations for 1 year or longer before migrating to the ocean. Chinook salmon spawn from late July through October. Fry typically hatch after 3 to 4 months of incubation. Juveniles may immediately migrate to the ocean, though stream-based chinook will often rear in freshwater for over a year.

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. There would be no disturbance to the stream channel if the temporary bridge is left in place, except in the case of a flood that damages or removes the temporary bridge. Fish passage would remain unimpeded at the bridge crossing. The streambanks where the road and culverts washed out in the November 2006 storm would be subject to slumping and erosion and could introduce increased sediment to West Twin Creek. Increases in suspended sediment could affect juvenile fish downstream by damaging gills, reducing feeding, increasing avoidance of sediment areas, reducing reactive distance, suppressing production, increasing mortality, and reducing habitat capacity (Reiser and Bjornn 1979). These impacts would be long-term, minor, adverse, and localized. The washed-out culverts could be carried further downstream during future flood events, increasing turbidity in the short term and continuing to adversely affect the natural flow of West Twin Creek. If the washed-out culverts are not removed, it is possible that the stream would change course, potentially pushing the culvert into the Hoh River. These long-term minor impacts could adversely affect fish in West Twin Creek.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact fish. The Hoh Boundary Pond project would have beneficial effects on fish by improving access to quality habitat. Replacement of the East Twin Creek culvert would also have beneficial effects on fish movement by removing a barrier to fish passage. Overall, other past, present, and foreseeable future actions would likely result in both short-term and long-term minor adverse impacts from disturbance of habitat or introduction of sediment into streams. The No Action Alternative would result in minor adverse effects that would add a relatively slight increment to the overall cumulative impacts on fish. The impacts of the No Action Alternative in combination with the impacts of other actions described above and under "Current and Future Actions," would result in long-term minor adverse cumulative impacts to fish.

Conclusion. The No Action Alternative would cause long-term minor adverse localized impacts on fish from bank erosion associated with leaving the temporary road, bridge, and washed-out culverts in place. There would also be long-term beneficial effects to fish from the restored fish passage. Cumulative effects would be long-term, minor, and adverse. Because there would be no major adverse impacts to fish or their habitat, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts. The streambank and channel would be temporarily disturbed during preparation and installation of the bridge abutments and stabilization of the channel slopes with riprap. Construction of the permanent bridge, removal of the temporary bridge, and streamside work on both the new and temporary road would likely generate short-term erosion and sediment transport to West Twin Creek until the site is stabilized. Removal of the washed-out culverts would result in a short-term disturbance of the stream channel and short-term increases in suspended sediments. Increases in suspended sediments potentially affect juvenile fish by damaging gills, reducing feeding, increasing avoidance of sediment areas, reducing reactive distance, suppressing production, increasing mortality, and reducing habitat capacity (Reiser and Bjornn 1979). Elevated levels of suspended sediments may also degrade spawning habitat and reduce survival from egg to fry emergence. However, impacts on fish would be minimized through implementation of the mitigation measures and BMPs described in the following paragraphs.

Project work would be scheduled to occur from September 1 through mid-January, during low-flow periods to minimize erosive stream action. This scheduling would also provide the least impact to coho salmon spawning, larval, and early fry stages of their life cycle. The work would occur near the early chinook spawning times; however, suitable spawning flow levels and pool depths do not occur at the project area during this time. In-stream construction should be completed before any chinook fry hatchings. The use of erosion-control measures, such as the installation of silt fences, sediment traps, and stream diversions and implementation of spill-protection controls, would further minimize potential effects to EFH. The stream would be diverted during construction activities on each side of the bridge, but natural flow would be unimpeded after construction is completed. If high flows are encountered, construction would be suspended and/or measures to minimize erosion would be implemented. The site would be stabilized and revegetated following construction.

To minimize effects on fish, pile driving would not occur in the stream and, according to recommendations from the "Non Fishing Impacts to EFH and Recommended Conservation Measures" guide by NOAA Fishery (July 2004, http://swr.nmfs.noaa.gov/EFH-NonGear-Master.PDF, p 33, p 15), would be scheduled to occur after September 1, during low-flow periods when larval and juvenile EFH species are not likely to be present.

During culvert removal, operation of the tracked excavator would avoid the active stream to the extent possible. Water-diversion measures would be installed if necessary around the washed-out culverts before removal to move streamflow out of the work area and minimize suspension of sediments in the stream. All woody debris would be left in the active channel to maintain fish habitat. Removing the washed-out culverts would restore normal flows in the stream channel and prevent disturbances associated with the potential movement of the culverts during future flood events. In the long term, removing the washed-out culverts would allow West Twin Creek to return to a more natural condition. Removal of the washed-out culverts also would provide possible spawning grounds and allow colonization of the streambed by aquatic macroinvertebrates that are a food source for many fish.

Turbidity would be monitored by the construction contractor during in-stream construction and culvert-removal activities. Work would be suspended if turbidity levels

show substantial increases over background levels until corrective measures could be identified and the stream returns to pre-disturbance levels of turbidity.

To prevent harm to any fish in the stream, diversion would be conducted in a manner to minimize disturbance and sedimentation. Stream diversions would utilize screens and other methods to protect fish. This would include restrictions on maintaining water flow, preventing erosion, and hand netting stranded fish.

ONP would work with the Hoh Tribe to remove fish from the channel near the project area. Seining would be conducted to prevent fish from entering the project area and to avoid trapping fry and other fish in the project area during in-stream work (ONP 2007a). If necessary, electro-fishing would be utilized to capture stranded fish, but would be restricted to direct current pulse frequencies of 30 Hz or less and water temperatures of 4°C to 24°C.

Replacement of the washed-out culverts with a new bridge would allow salmon, trout, and other fish, including federally listed bull trout populations, to freely migrate and access approximately 2 miles of high-quality fish habitat upstream from the road crossing. These fish populations are of great value to the park and surrounding communities, including the Hoh Tribe, which maintains treaty fishing rights. These fish also play an important role in the park, and habitat improvement would contribute to regional fishery and species recovery under the ESA. Considering the project timing, and that the mitigation measures described for Fishery Resources (Table 2) would minimize adverse effects, implementation of the Preferred Alternative would result in short-term negligible adverse localized impacts and long-term benefits for fish. Adverse effects of the Preferred Alternative on chinook or coho salmon EFH would be negligible. In addition, there would be long-term beneficial effects to fish from construction of a permanent bridge designed to withstand a 100-year flood, stabilization of the streambanks, and removal of the washed-out culverts from the stream.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact fish. The Hoh Boundary Pond project would have beneficial effects on fish by improving access to quality habitat. Replacement of the East Twin Creek culvert would also have beneficial effects on fish movement by removing a barrier to fish passage. Overall, other past, present, and foreseeable future actions would likely result in both short-term and long-term negligible adverse impacts from disturbance of habitat or introduction of sediment into streams. The Preferred Alternative would result in negligible adverse effects that would add a relatively slight increment to the overall cumulative impacts on fish, but would add incremental beneficial effects with the East Twin Creek and Hoh Boundary Pond project. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term negligible adverse, as well as long-term beneficial cumulative impacts to fish.

Conclusion. The Preferred Alternative would have short-term negligible adverse localized impacts due to construction of the permanent bridge and removal of the temporary bridge and washed-out culverts. There would be long-term beneficial effects to fish from construction of a permanent bridge designed to withstand a 100-year flood, stabilization of the streambanks, and removal of the washed-out culverts from the stream. Cumulative effects would be short-term, negligible, and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to fish or their habitat, there would be no impairment of park resources or values.

SPECIAL STATUS SPECIES

Affected Environment

Special status species include species listed as threatened or endangered under the ESA; State endangered, threatened, sensitive, or candidate species; and Service species of concern. WDFW state candidate species are fish and wildlife species that are under review for possible listing as State endangered, threatened, or sensitive. Service species of concern are those plant and animal species for which conservation status is of concern to the Service, but which requires additional information before listing. Federal- and state-listed species and species of concern potentially occurring in ONP are shown in Appendix D. State-listed fish species are discussed in the "Fishery Resources" section.

Four species federally listed under the ESA potentially occur in the project area: marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), bald eagle (*Haliaeetus leucocephalus*), and bull trout (*Salvelinus confluentus*), as confirmed by the Service (Service, Saunders, pers. comm. 2007). According to the NOAA Fishery website (2006), the ESA status of West Coast salmon and steelhead trout in the project area is "Not Warranted" for the Evolutionary Significant Unit (ESU) that includes the project area for all salmon and steelhead species. There are no federally listed plant species in the project area.

Federally Listed Species

No critical habitat has been formally designated within ONP for marbled murrelet, bald eagle, and northern spotted owl, 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 is not thought to require special management consideration or protection by virtue of its national park status. The Hoh River contains designated critical habitat for bull trout.

A Biological Assessment (BA) has been prepared as part of this action (Appendix A) and was submitted to the Service for informal consultation under Section 7 of the ESA for the marbled murrelet, bald eagle, northern spotted owl, and bull trout. The purpose of the BA is to review the Preferred Alternative in sufficient detail to determine whether any of the federally threatened, endangered, proposed, or candidate species in the project area would be affected. The BA has been prepared in accordance with legal requirements of the ESA (16 U.S.C. 1531 *et seq.*) and follows the standards established by the NPS and FHWA.

Information on life history, habitat requirements, distribution, and potential habitat in the project area, and other characteristics of the four federally listed species potentially occurring in the project area is presented below. More detailed species information is provided in the BA.

Northern Spotted Owl (Strix occidentalis caurina)

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.

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 no longer considered suitable habitat by northern spotted owls. This is likely due to the influx of barred owls into the project area in recent years. Surveys are conducted three to six times per year by NPS biologists and have resulted in detections of only barred owls on the river flats for 10 years. The only exception is a single northern spotted owl sighting in 1997 at an elevation of 700 feet on the Hoh-Bogachiel Trail just above the Hoh entrance station (ONP files).

There are four known inactive northern spotted owl nest sites within 3 miles of the project area, although two are several hundred feet higher upslope than the project area. These sites have been active at various times in the past; however, northern spotted owls have not been documented at this elevation since 1985 (ONP files). Recent nesting locations have been identified at about 1,700 feet in elevation at the head of the unnamed stream between East and West Twin Creeks, about 0.8 mile from the nearest segment of Upper Hoh Road, where it crosses East Twin Creek. These nesting locations were not active in the 2006 breeding season (ONP 2007b). It is possible that northern spotted owls use the project area for infrequent foraging and dispersal.

For purposes of Section 7 consultation, 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 are usually fledged by July 15, but stay near the nest and are fed by the parents after that date. Construction for this project would start in early September at the end of the late breeding season.

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is a large North American bird of prey with a historical distribution throughout most of the U.S. The bald eagle was federally listed as an endangered species in 1978. Population declines are attributed to habitat loss, the use of organochlorine pesticides, and mortality from shooting. Since the species was listed, the population trend for the bald

eagle has been increasing. The bald eagle was downlisted from endangered to threatened in 1995. In 2006, the Service published new draft guidelines for bald eagle management and reopened the comment period for delisting (71 Fed. Reg. 8238 (February 16, 2006)). If the bald eagle is removed from the list of threatened and endangered species, it would continue to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Bald eagles inhabit areas that are close to water and provide a suitable food resource, such as anadromous or resident fish, waterfowl, or carrion. They use perches during the day while hunting, feeding, or resting; roosts are used at night or for protection during bad weather, and one roost may be occupied by one to several hundred bald eagles. Roost and nest sites are used year after year. Perching and roosting sites are typically larger trees, with nesting sites often occurring in large trees on cliffs near water. Wintering sites typically occur in the vicinity of concentrated food resources such as anadromous fish spawning areas, waterfowl concentration areas, or sources of mammalian carrion, such as ungulate winter ranges. Other important wintering habitat features include perch sites and communal roost sites (Service 1986).

In the Pacific Northwest, bald eagles typically nest in multilayered, coniferous forest stands with old-growth trees that are located within 1 mile of large bodies of water. Factors such as relative tree height, diameter, species, form, position on the surrounding topography, distance from the water, and distance from disturbances appear to influence nest site selection. Bald eagles usually nest in the same territories each year, and often use the same nest repeatedly. Availability of suitable trees for nesting and perching is critical for maintaining bald eagle populations (Service 1986). Bald eagle nesting season in ONP begins January 1 and concludes August 15. Wintering season is from October 31 through March 31. This project would start between the nesting season and the wintering season.

Though bald eagles may occasionally migrate through the project area, the closest known bald eagle nest site is approximately 3 miles downstream from the project area outside the park boundary, and it is not known to be in use (ONP files). There are no known bald eagle winter concentration areas in the Hoh River Valley. The project area may contain habitat for limited foraging; however, there is not a significant prey source and the dense forest compromises mobility for hunting eagles.

Marbled Murrelet (Brachyramphus marmoratus)

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 murrelet—Service photo

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 or more 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. They 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 to occur 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 surveys have not been conducted in the immediate vicinity of the project area; however, occupied detections were recorded during protocol surveys in 1997 and 1998 at the Hoh Campground, approximately 5 miles upriver from the project area, and limited surveys in the campground in 1999 documented presence (ONP files). Surveys upstream on the South Fork of the Hoh River in 1998 also documented occupancy at three sites. Since murrelet presence has been documented at 100% of the survey sites throughout the park in recent years, and occupancy has been documented at 80% of those sites, it is reasonable to assume that suitable habitat in the project vicinity is also occupied. For the purposes of Section 7 consultation, 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, with some chicks hatched and approximately 50% fledged as early as August 6. Construction would start in early September at the end of the late breeding season.

Bull Trout (Salvelinus confluentus)

All populations of bull trout are designated as threatened in the conterminous United States under the ESA (64 Fed. Reg. 58910 (November 1, 1999)). The Hoh River has been designated as critical habitat for the Coastal-Puget Sound population (70 Fed. Reg. 56212 (September 26, 2005)). 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, which has severely affected sensitive breeding habitat.

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, as well as 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 resident, fluvial, adfluvial, and anadromous forms: 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 ad fluvial 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).

The project area occurs within the area encompassed by the Hoh River subpopulation of the Coastal-Puget Sound distinct population segment of bull trout. Although West Twin Creek contains suitable habitat for bull trout, snorkel and electro-fishing surveys conducted by the NPS in the late 1990s did not identify the presence of bull trout in the stream (Brenkman and Meyer 1999). However, more recently biologists with the Wild Salmon Center conducted snorkel surveys in the lower reaches of West Twin Creek under a NPS scientific research permit and observed several juvenile bull trout in the vicinity of the proposed bridge project (Starr, pers. comm. 2007). Surveys were conducted both during summer low flow in 2006 and during spring run-off in 2007, with bull trout found during both efforts.

Prior to the November 2006 storm, fish passage upstream of the current bridge location was impeded by culverts. Although the small stream has not been known to provide spawning habitat for adult bull trout, it apparently provides rearing habitat for a few juvenile bull trout. The Hoh River, near the confluence with West Twin Creek, provides habitat for stream-resident, fluvial, and anadromous forms of adult and juvenile bull trout. Adfluvial bull trout are not present. Table 13 identifies documented bull trout presence in the Hoh River Basin.

TABLE 13: BULL TROUT PRESENCE

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.

Other Species of Concern

Other species of concern that may occur in ONP (see Appendix D) that are not federally listed, but that potentially occur in or near the project area, include:

- Long-eared myotis (*Myotis evotis*)
- Long-legged myotis (*Myotis volans*)
- Pacific Townsend's big-eared bat (*Corynorhinus townsendii townsendii*)
- Northern goshawk (*Accipiter gentilis*)
- Olive-sided flycatcher (*Contopus cooperi*)
- Peregrine falcon (*Falco peregrinus*)
- Tailed frog (*Ascaphus truei*)
- Van Dyke's salamander (*Plethodon vandykei*)
- Western toad (*Bufo boreas*)
- Tall bugbane (*Cimicifuga elata*)

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. If the No Action Alternative is implemented, there would be no project-related ground disturbance or change in noise disturbance levels and, therefore, there would be no change in the current conditions for federally listed terrestrial species or species of concern.

There would be no disturbance to the stream channel if the temporary bridge is left in place, except in the case of a flood that would damage or remove the temporary bridge. The streambanks where the road and culverts washed out in the November 2006 storm would be subject to slumping and erosion and could introduce increased sediment to West Twin Creek. Increases in suspended sediment could affect juvenile bull trout downstream by damaging gills, reducing feeding, increasing avoidance of sediment areas, reducing reactive distance, suppressing production, increasing mortality, and reducing habitat capacity (Reiser and Bjornn 1979). These impacts would be adverse, long-term, minor, and localized. Also, the washed-out culverts could be carried further downstream during future flood events, increasing turbidity in the short term and continuing to adversely affect the natural flow of West Twin Creek. If the washed-out culverts are not removed, it is possible that high flows could transport the culvert into the Hoh River. These long-term minor impacts could adversely affect bull trout in the Hoh River.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact Special Status Species. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from disturbance of habitat, disruption of river processes, or introduction of sediment into streams. The Hoh Boundary Pond project would have beneficial effects on bull trout by improving access to quality habitat. Replacement of the East Twin Creek culvert would also have beneficial effects on bull trout movement by removing a barrier to fish passage. The impacts of the No Action Alternative in combination with the impacts of other actions described above and under "Current and Future Actions," would result in long-term minor adverse cumulative impacts to bull trout. The No Action Alternative would add a relatively slight increment to the overall cumulative impacts on bull trout, but would have no effect on terrestrial Special Status Species.

Conclusion. The No Action Alternative would have no effect on terrestrial Special Status Species or suitable habitat, but it could cause long-term minor localized adverse effects on bull trout. There would be no cumulative effects on terrestrial Special Status Species, but the cumulative effects on bull trout would be long-term, minor, and adverse. Because there would be no major adverse impacts to special status species, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts

Northern Spotted Owl. No suitable or critical northern spotted owl habitat would be modified or removed. Foraging owls may be disturbed by machinery noise during construction, causing owls to temporarily avoid the project area. Mobilization of heavy equipment and site preparation beginning in early September would create noise above

ambient levels and visual disturbance in the project area during the late breeding season. However, 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 area and along the roadway between the project and staging areas, and a minimal increase in traffic on the Upper Hoh Road. However, the northern spotted owl is not known to occur in the vicinity of the project area and no suitable habitat would be modified or removed. In addition, the project would start September 1, during the late breeding season (after July 15), when breeding owls and their young would be less vulnerable to disturbance. Also, northern spotted owls forage primarily at night when there would be no construction activity. Thus, the Preferred Alternative would have short-term negligible adverse localized effects on foraging owls and may affect, but is not likely to adversely affect, northern spotted owls.

Bald Eagle. No suitable bald eagle habitat would be lost and no perching, roosting, or nesting sites would be modified or removed as a result of the project. The proposed work would occur outside of bald eagle nesting and wintering seasons, and bald eagles are not known to nest in the project area. Since foraging opportunities and potential prey base would not be impacted, the Preferred Alternative would have no adverse effects on the bald eagle.

Marbled Murrelet. Activities associated with the Preferred Alternative would occur near suitable habitat for marbled murrelets but would not result in any loss of identified habitat. No trees large enough to contain suitable habitat for murrelets would be cut under the Preferred Alternative. Mobilization of heavy equipment and site preparation beginning in early September would create noise above ambient levels and visual disturbance. However, 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.

To avoid adverse impacts to breeding murrelets, construction activities would not begin until September 1, during the murrelet late breeding season (August 6 to September 15), and would be initiated as late as possible. Any work that generates above ambient noise 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. This would ensure that pile driving and other heavy equipment operation would occur outside of the prime breeding season, yet provide a window for construction to be completed before winter weather and marbled murrelet breeding seasons begin.

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 Preferred Alternative would have short-term minor adverse localized impacts on the marbled murrelet and may affect, but is not likely to adversely affect, marbled murrelets.

Bull Trout. Direct impacts from the Preferred Alternative to bull trout would be similar to those described for Fishery Resources. Construction activities would not begin until after September 1, 2007, avoiding high-flow periods and prime bull trout spawning and egg-laying periods. Considering that the mitigation measures described for Fishery Resources would be implemented, the Preferred Alternative would result in short-term negligible adverse localized impacts and long-term benefits to bull trout. The Preferred Alternative may affect, but is not likely to adversely affect, bull trout.

Species of Concern. Short-term minor adverse effects could occur to species of concern in the project vicinity during the construction period in the form of aversion behavior and temporary relocation of individuals. Impacts to water-dependent species resulting from sedimentation, physical disturbance of the streambed, and noise disturbance would be temporary, negligible, adverse, and localized. Construction activities associated with the Preferred Alternative could result in the inadvertent mortality of some individuals of smaller species of concern, such as reptiles, amphibians, and small mammals. However, impacts would be avoided during particularly vulnerable life stages for most sensitive species (breeding and rearing periods) because construction activities would occur from September 1 through mid-January. Also, impacts would not be expected to be outside the natural range of variability of native species' populations, their habitats, or the natural processes sustaining the species. In the long term, this alternative would restore the creek bed to a more natural condition, which would benefit all water-dependent species including fish, snails, and amphibians. Recolonization of the streambed by invertebrates and other small aquatic animals is likely to occur. Terrestrial species would most likely reinhabit the area once construction is completed. Thus, adverse impacts on species of concern resulting from the Preferred Alternative would be short-term, minor, and highly localized.

Cumulative Impacts

Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact Special Status Species. The Hoh Boundary Pond project would have beneficial effects on bull trout by improving access to quality habitat. Replacement of the East Twin Creek culvert would also have beneficial effects on bull trout movement by removing a barrier to fish passage. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from disturbance of habitat, disruption of river processes, or introduction of sediment into streams. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term negligible adverse cumulative impacts to bull trout and long-term beneficial effects. The Preferred Alternative would add a relatively slight increment to the overall adverse cumulative impacts on terrestrial Special Status Species, but would add incremental long-term beneficial effects to water-dependent species with the East Twin Creek and Hoh Boundary Pond project. Cumulative effects for individual species include:

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

Bald Eagle. The Preferred Alternative would have no effect on the bald eagle and, therefore, there would be no cumulative impacts on the bald eagle.

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

Bull Trout. The Preferred Alternative would add a short-term relatively small increment to overall cumulative impacts. However, removal of the washed-out culverts from West

Twin Creek and replacing the culvert with a bridge at East Twin Creek, along with the Hoh Boundary Pond project would contribute to improved stream conditions in the project area, resulting in long-term beneficial cumulative effects. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term negligible adverse, as well as long-term and beneficial, cumulative impacts to bull trout.

Species of Concern. The visual and noise disturbance associated with the Preferred Alternative would be short-term. The Preferred Alternative would add a relatively slight increment to the overall cumulative effect on species of concern. The Preferred Alternative would result in short-term minor adverse cumulative impacts on terrestrial Special Status Species. Cumulative effects to water-dependent Special Status Species would be short-term, negligible, and adverse, with the Preferred Alternative contributing long-term beneficial effects.

Conclusion

Implementation of Preferred Alternative may affect, but is not likely to adversely affect, northern spotted owls, marbled murrelets, and bull trout, and would have no effect on bald eagles. This alternative would provide long-term benefits for bull trout and other water-dependent special status species. The Preferred Alternative would result in short-term minor adverse effects to other species of concern during the construction period. Impacts to water-dependent species resulting from sedimentation, physical disturbance of the streambed, and noise disturbance would be negligible, temporary, and localized. Cumulative effects to bull trout and water-dependent species would be short-term, negligible, and adverse, with the Preferred Alternative contributing long-term beneficial effects. The Preferred Alternative would result in short-term minor adverse cumulative impacts on the northern spotted owl, marbled murrelet, and other terrestrial Special Status Species. There would be no impact on federally listed plants in the project area because there are none present. Because there would be no major adverse impacts to special status species, there would be no impairment of park resources or values.

SOILS

Affected Environment

The soils of the Olympic Peninsula reflect a varied environment and complex history, but are generally quite young. The complex geologic history of the Olympic Mountains has created a diversity of parent materials for soils. Much of the lowlands and valley bottoms, such as the lands bordering the West Twin Creek area are covered with glacial sediments. Soil development in the Olympic Peninsula is greatly influenced by the amount of moisture in the soil. Sufficient water is present over most of the Olympic Peninsula to cause both rapid weathering and leaching of nutrients; therefore, the soils tend to be relatively infertile. Forest soils adjacent to West Twin Creek have a thick organic horizon and support a diversity of trees, shrubs, and herbaceous species. Alluvial soil material within West Twin Creek includes a mix of silts and clays on the streambank with gravel and boulders in the stream channel. Silt deposits from years of glacial deposits extend to substantial depths.

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. There would be no new soil disturbance if the temporary bridge is left in place. Soils covered with gravel for construction of the detour road to the temporary bridge would remain buried and soil productivity on about 0.4 acre would be lost. The stream channel embankment where the road and culverts washed out would be subject to slumping and erosion. The abutments for the temporary bridge are subject to erosion because they were not designed for long-term use.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could increase erosion or impact soil productivity. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from grading and other earthwork. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in long-term minor adverse cumulative impacts to soil. Because the No Action Alternative would result in minor adverse impacts, it would contribute slightly to the overall cumulative effects on soils.

Conclusion. The No Action Alternative would have long-term minor adverse impacts on soil productivity by leaving the road detour in place. The temporary bridge abutment and washed-out road streambank are subject to erosion, which would have long-term minor adverse effects on soils. Cumulative effects would be long-term, minor, and adverse. Because there would be no major adverse impacts to soils, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts. Construction of a new bridge would result in soil disturbance from earthwork to prepare the bridge abutments on each side of the channel. No vegetation clearing is required and affected soils are primarily within existing disturbed areas. Removal of the temporary bridge would result in excavation of soil material used to create the bridge abutments. Streamside work on both the new and temporary road would likely generate short-term erosion and sediment transport in West Twin Creek until the site is stabilized.

Gravel/pavement on the detour road would be removed and soils under the temporary roadway would be disked or ripped to prepare the seedbed for revegetation. Productivity of about 0.4 acre of soils under the road would be restored. Some surface erosion is possible until vegetation is established, but planned erosion-control BMPs would minimize soil loss.

Removal of the two washed-out culverts located downstream from the bridge site would result in additional short-term soil disturbance. Excavator activities in the stream channel to remove the culverts would result in additional disturbance to streambed material. Removal of the washed-out culverts would result in a short-term disturbance to the streambed, but would substantially reduce the potential for unnatural erosion or deposition in the stream over the long term.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could increase erosion or impact soil

productivity. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from grading and other earthwork. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in minor adverse cumulative impacts to soil. Because the Preferred Alternative would result in short-term minor adverse impacts, it would contribute slightly to the overall cumulative effects on soils, but would also result in long-term beneficial effects.

Conclusion. The Preferred Alternative would have short-term minor adverse impacts on soils from bridge construction, temporary bridge and detour road removal, and culvert removal. There would be long-term beneficial effects to soils from stabilization of the stream channel at the Upper Hoh Road—West Twin Creek crossing, restoration of soil productivity under the detour road, and removal of the washed-out culverts from the stream. Cumulative effects would be short-term and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to soils, there would be no impairment of park resources or values.

HYDROLOGY AND WATER QUALITY

Affected Environment

West Twin Creek is a perennial tributary to Hoh River. The drainage area is approximately 2.9 square miles and is mountainous and heavily timbered, with elevations ranging from 500 to 3,200 feet above mean sea level. Mean annual precipitation in this area exceeds 140 inches (FHWA 2002). West Twin Creek flows in an undisturbed channel above the project area, with the highest flows typically occurring in winter and spring. The stream is moderately sloped (2 to 4%) and entrenched, and has moderate sinuosity. Bankfull width is approximately 42 feet and bankfull depth is about 2 feet. West Twin Creek lies in a narrow colluvial valley with flood-prone area widths between 50 and 60 feet. The floodplain is not well defined.

The washed-out culverts have altered streamflow in the West Twin Creek channel. The culverts have changed the normal flow of the stream by causing water to flow around them at an increased rate. The washed-out culverts may cause alteration of the stream channel if left in place and could move downstream.

Peak flood discharges at the Upper Hoh Road—West Twin Creek crossing were estimated using several methods for ungaged watersheds (FHWA 2002). Those results are presented in Table 14.

TABLE 14: PEAK DISCHARGE ESTIMATES FOR WEST TWIN CREEK AT PROPOSED BRIDGE LOCATION

Recurrence Interval	Peak Discharge (cfs)
2-year	430
10-year	680-710
25-year	800-850
50-year	900-950
100-year	1,000-1,060
500-year	1,310-1,600

Riffles and pools are the dominant channel bed morphology. Both bed load material and bank materials are predominantly gravel and cobbles. No bedrock is observed in the streambanks or channel in the project area. Large woody debris in the channel and floodway indicate a moderate debris supply. Developed point bars suggest a moderate sediment supply. Riparian vegetation is primarily large conifer trees and dense underbrush. The streambanks are vegetated, not generally undercut, and appear moderately stable.

The water quality of West Twin Creek is excellent, with minimal human sources of pollutants to the creek. There are several sources of natural turbidity in the stream, including normal suspended fine material caused by shifts in the river channel and resulting bank erosion. High-flow events cause significant turbidity in the stream.

Environmental Consequences

The flow that generally occurs in West Twin Creek would flow in an unimpeded manner under either the existing temporary bridge on West Twin Creek or under the proposed permanent bridge.

No Action Alternative

Direct and Indirect Impacts. There would be no disturbance to the stream channel if the temporary bridge is left in place, except in the case of a flood that damages or removes the temporary bridge. Streamflow in West Twin Creek would not be obstructed. The streambanks where the road and culverts washed out would be subject to slumping and erosion and could introduce increased sediment to West Twin Creek. In addition, the washed-out culverts may remain in place or may move farther downstream, but in either case, they could impede natural streamflow.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could increase erosion and change hydrologic functions. The East Twin Creek project to replace the culvert with a bridge would result in beneficial effects to natural flow and geomorphologic conditions, as would the Hoh Boundary Pond project. Other past, present, and foreseeable future actions would likely result in minor adverse impacts during construction. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term minor adverse cumulative impacts to hydrology and water quality. Because the No Action Alternative would result in minor adverse impacts, it would contribute slightly to the overall cumulative effects on hydrology and water quality.

Conclusion. The No Action Alternative would have long-term minor adverse impacts from leaving the washed-out culverts, temporary road, and temporary bridge in place. Cumulative effects would be short-term, minor, and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to hydrology and water quality, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts. The new bridge would be designed to accommodate natural streamflows, as well as 100-year flood flows. The concrete girders would completely span the creek channel. In-stream construction would be limited to riprap placement for

embankment slope protection. The stream channel would be disturbed during preparation and installation of the bridge abutments and during placement of the riprap to stabilize the channel slopes. The stream would be diverted during construction activities on each side of the channel below the bridge, but would flow naturally, without impedance, after construction is completed. Construction of the permanent bridge, removal of the temporary bridge, and streamside work on both the existing road and temporary detour road would likely generate short-term erosion and sediment transport to West Twin Creek until the site is stabilized.

Removal of the two washed-out culverts would involve an excavator accessing the streambed several times. To the extent possible, the excavator would be kept out of the water. Given that the channel is largely gravel and cobbles, the excavator would likely alter the channel bottom only slightly in the sections it traverses. The excavator would be operated slowly and carefully to minimize movement of stream sediment and increased turbidity downstream. In addition, the excavator would be carefully inspected before entering the channel to ensure that fuel or lubricants are not visible on the outside of the excavator and would not leak during use of the equipment in the channel.

Spills of fuel, cement, or other products associated with bridge construction and removal of the washed-out culverts could enter the stream channel. BMPs would be implemented to prevent spills from entering West Twin Creek, prevent sediment transport to the creek, and minimize water quality impacts to West Twin Creek. Construction would not occur during heavy precipitation events or during high creek flows. After construction is completed, the disturbed area would be revegetated and stabilized as soon as possible.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could increase erosion and change hydrologic functions. The East Twin Creek project to replace the culvert with a bridge would result in beneficial effects to natural flow and geomorphologic conditions, as would the Hoh Boundary Pond project. Other past, present, and foreseeable future actions would likely result in minor adverse impacts during construction. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in minor adverse cumulative impacts to hydrology and water quality. The Preferred Alternative would result in short-term minor adverse impacts during construction and, therefore, would contribute slightly to the overall cumulative effects on hydrology and water quality. However, the Preferred Alternative would add a beneficial increment to long-term cumulative effects.

Conclusion. The Preferred Alternative would have short-term minor adverse impacts to water quality from construction of the permanent bridge and removal of the temporary bridge and washed-out culverts. There would be long-term beneficial effects to hydrology and water quality due to construction of a permanent bridge designed to withstand a 100-year flood, stabilization of the streambanks, and removal of the washed-out culverts from the stream. Cumulative effects would be short-term, minor, and adverse, as well as long-term and beneficial. Because there would be no major adverse impacts to hydrology and water quality, there would be no impairment of park resources or values.

FLOODPLAIN

EO 11988 (*Floodplain Management*) requires an examination of impacts to floodplains and potential risks involved in placing facilities within floodplains. EO 11988 directs that, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains are to be avoided when there is a practicable alternative. In this case, occupation and modification of the floodplain cannot be avoided; therefore, NPS Order #77-2: Floodplain Management states that a Statement of Findings (SOF) must be prepared and approved, in accordance with procedures described in NPS Procedural Manual 77-2. The Floodplain SOF is found in Appendix B. In addition, the NPS would take all reasonable actions to minimize impacts to the natural resources of floodplains and ensure that structures are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).

Affected Environment

Upper Hoh Road and the West Twin Creek project area are within the floodplain of the Hoh River, which is approximately 1 mile wide. The floodplain of West Twin Creek is poorly developed. Until West Twin Creek enters the Hoh River floodplain, the stream has a very narrow floodplain constrained by steep slopes. The 2-year bankfull flow of West Twin Creek is estimated to be 430 cfs and the 100-year peak flow is estimated to be 1,000 to 1,060 cfs (Table 14).

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. The floodplain of the lower West Twin Creek and Hoh River could be adversely affected if the temporary bridge and washed-out culverts are left in place. Failure of the temporary bridge would introduce metal debris into the floodplain as the culverts have previously done. At their present location or in locations into which they could move during high flows, the washed-out culverts could diminish the ability of lower West Twin Creek or Hoh River to change course or inundate the floodplain.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could occur in stream floodplains. The East Twin Creek project to replace the culvert with a bridge would result in beneficial effects to floodplains, as would the Hoh Boundary Pond project. Other past, present, and foreseeable future actions would likely result in primarily beneficial effects to the floodplain. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in minor adverse cumulative impacts to floodplains. Because the No Action Alternative would result in long-term minor adverse impacts, it would contribute slightly to the overall cumulative effects on floodplains.

Conclusion. The No Action Alternative would have long-term minor adverse impacts to the West Twin Creek and Hoh River floodplains from leaving the washed-out culverts and temporary bridge in place. Cumulative effects would be long-term, minor, and adverse. Because there would be no major adverse impacts to the floodplain, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts. Installation of a permanent bridge that would span the entire creek channel would be beneficial to floodplain flow because it would allow unrestricted flows up to the 100-year peak flow under the bridge. Removal of the washed-out culverts would also be beneficial to West Twin Creek and the Hoh River floodplains.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could occur in stream floodplains. The East Twin Creek project to replace the culvert with a bridge would result in beneficial effects to floodplains, as would the Hoh Boundary Pond project. Other past, present, and foreseeable future actions would likely result in primarily beneficial effects to floodplains. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in beneficial cumulative impacts to floodplains. The Preferred Alternative would result in beneficial effects, and a small contribution to the overall cumulative effects on floodplains.

Conclusion. The Preferred Alternative would have long-term beneficial effects to the West Twin Creek and Hoh River floodplains. Cumulative effects would be long-term and beneficial. Because there would be no major adverse impacts to floodplains, there would be no impairment of park resources or values.

VISITOR EXPERIENCE AND PUBLIC USE

Affected Environment

ONP hosted 3.1 million visits in 2005. Most ONP visitors visit the park during the months of June through September. The Hoh Rain Forest is one of the prime destination points for visitors to the west side of the Olympic Peninsula and received about 148,000 visitors in 2005 (NPS 2007). Facilities include the ranger station, visitor center, nature trails, residences, maintenance shop, campgrounds, and Upper Hoh Road. The Hoh Trailhead is a major wilderness trailhead and provides the most direct trail access to Mt. Olympus.

In summer 2001, traffic counts were conducted along U.S. 101 around the park, and on access roads within the park. These counts were used to determine the highest daily volumes to park destinations during the summer. Counts for some roads were made only in one direction; for other roads traffic was counted in both directions. The peak daily number of inbound vehicles to Upper Hoh Road was 608 vehicles. Minor increases in visitation may occur, but no substantial increases are predicted.

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. Visitors would continue to use the one-lane bridge to access facilities and areas of the park up the Hoh River Valley, although the bridge does not provide adequate access for the volume of traffic that uses the road. Travel delays at the one-lane bridge would result in long-term moderate adverse impacts to visitor experience and public use. High streamflow could place the existing temporary bridge at risk. Closures may be necessary if the temporary bridge is unsafe or damaged, until emergency actions could

restore access. This could redirect visitors to other areas of the park, and reduce access to the Hoh area, resulting in short-term moderate adverse impacts to visitor experience and public use. However, maintaining vehicular access to the visitor center and amenities would result in long-term beneficial effects on visitor experience and public use.

Cumulative Impacts. Visitors to the Olympic Peninsula have been displaced in the region by past activities or events, including road closures due to washouts or flooding, closures for resource protection, or logging. Currently, ONP has a closure on the eastern portion of the park at Dosewallips Road, which restricts vehicular access into national forest and national park lands. Queets Road is also closed due to a landslide, but is expected to reopen in the summer of 2007. Other road closures outside the park have occurred and would likely occur in the future from road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley. Future temporary closures are possible as a result of high water or flood events. Other past, present, and foreseeable future actions would likely result in moderate adverse impacts from restrictions and delays in accessing the Hoh Rain Forest during construction. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in long-term moderate adverse cumulative impacts to visitor experience and public use. The No Action Alternative would add incremental long-term adverse cumulative effects on visitor experience and public use.

Conclusion. The No Action Alternative would have long-term moderate adverse effects to visitors who wish to experience the Hoh area resources by vehicle. This alternative would alter use in the area and may increase visitor numbers to other areas of the park. These effects would cause long-term moderate adverse impacts to the visitor experience. Cumulative effects would be moderate and adverse.

Preferred Alternative

Direct and Indirect Impacts. The Preferred Alternative would reopen permanent two-lane vehicle access to the trailheads, campground, and visitor center. Visitors, including those with limited mobility, would be able to access Upper Hoh Road by vehicle. This alternative would improve vehicle access, thus improving the visitor experience and public use for visitors. Recreational resources, such as the trails at Hoh Rain Forest and campground, would remain readily accessible, resulting in beneficial effects visitor use. Overall, this alternative would result in long-term beneficial effects to the visitor experience and public use in the Hoh area.

Cumulative Impacts. Visitors to the Olympic Peninsula have been displaced in the region by past activities or events, including road closures due to washouts or flooding, closures for resource protection, or logging. Currently, ONP has a closure on the eastern portion of the park at Dosewallips Road, which restricts vehicular access into national forest and national park lands. Queets Road is also closed due to a landslide, but is expected to reopen in the summer of 2007. Other road closures outside the park have occurred and would likely occur in the future from road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley. Future temporary closures are possible as a result of high water or flood events. Other past, present, and foreseeable future actions would likely result in moderate adverse impacts from restrictions and delays in accessing the Hoh Rain Forest during construction. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under

"Current and Future Actions," would result in long-term moderate adverse cumulative impacts to visitor experience and public use. The No Action Alternative would add a beneficial increment to the overall cumulative effects on visitor experience and public use.

Conclusion. Under the Preferred Alternative, the effects to visitor experience and public use would be long-term and beneficial. This alternative would have a long-term beneficial contribution to cumulative effects.

PARK OPERATIONS

Affected Environment

Maintenance of the Upper Hoh Road within ONP is the responsibility of the park's maintenance staff. Park personnel use the road to access portions of the park for visitor services, maintenance, law enforcement, search and rescue, and resource management purposes.

Environmental Consequences

No Action Alternative

Direct and Indirect Impacts. The Upper Hoh Road provides access to park visitor and maintenance facilities. Allowing for emergency access to these areas is important for effective NPS response to medical emergencies, search and rescues, fires, and for facility and trail maintenance. There would be no changes to park operations related to the maintenance of Upper Hoh Road, but convenient access could be difficult when traffic is high. Because the bridge is not a permanent structure and is not permanently anchored to the banks, it would require frequent regular maintenance and greater potential for damage in future storm events. Traffic signal lights for the one-lane bridge would also require additional maintenance. Access for research and resource management in the area would be more challenging. Some resource management and research projects have been postponed due to the existing road conditions. The No Action Alternative constitutes a long-term moderate adverse impact on park operations.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact park operations. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from delays or access issues to the Hoh area during construction. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in long-term moderate adverse cumulative impacts to park operations. Because the No Action Alternative would result in moderate adverse impacts, it would contribute to the overall cumulative effects on park operations.

Conclusion. The No Action Alternative would result in a change to park operations because the temporary bridge would remain in place. Park operations related to emergency response, bridge, trail, facility maintenance, resource management, and research would be altered, which would result in long-term moderate adverse impacts on park operations. Cumulative effects to park operations would be long-term, moderate, and adverse.

Preferred Alternative

Direct and Indirect Impacts. Allowing unimpeded vehicle access into the Hoh Rain Forest portion of the park at the end of Upper Hoh Road would allow a more effective NPS response to medical emergencies, search and rescue, and fires, and would also improve access for research, resource management, and facility and trail maintenance. Maintenance operations would continue on Upper Hoh Road and in the developed area without traffic delays. The proposed bridge would be a permanent structure requiring less frequent maintenance and traffic signal lights would not be needed. The Preferred Alternative would result in long-term beneficial effects to park operations.

Cumulative Impacts. Future road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley could impact park operations. Other past, present, and foreseeable future actions would likely result in minor adverse impacts from delays or access issues to the Hoh area during construction. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in minor adverse cumulative impacts to park operations. The Preferred Alternative would result in a beneficial contribution to the overall cumulative effects on park operations.

Conclusion. The Preferred Alternative would result in long-term beneficial effects to park operations from restoring vehicle access to the Hoh Rain Forest area. The cumulative effects to park operations would be minor and adverse, but the contribution of the Preferred Alternative to cumulative effects would be long–term and beneficial.

SOCIOECONOMICS

Affected Environment

ONP hosted 3.1 million recreation visits in 2005. Park visitors spent $100.5 million in the local area, generating $38.4 million in direct personal income (i.e., wages and salaries) for local residents and supporting about 2,080 jobs in area tourism businesses (Stynes 2006). In 2000, tourism accounted for approximately 10% of area employment, park visitors accounted for approximately 28% of all tourist spending in the region, and 62% of tourism spending in Clallam and Jefferson counties (Stynes et al. 2001). Access to the Hoh Rain Forest area is popular and important part of the park that visitors enjoy visiting.

Environmental Consequences

No Action Alternative

Direct and Indirect Effects. The No Action Alternative, keeping the one-lane bridge in place, would result in long-term inconveniences to visitors, which could result in long-term minor adverse socioeconomic effects if fewer people visited the park. A slight decrease in tourism-related spending would occur if fewer people visited the park.

Cumulative Impacts. Recent road closures due to washouts or flooding, closures for resource protection, and other activities have affected visitor access and associated tourism-related spending. Other road closures outside the park have occurred and would likely occur in the future from road work, bridge construction, culvert replacement, and other

maintenance activities in the Hoh River Valley. Other past, present, and foreseeable future actions would likely result in short-term moderate adverse impacts to socioeconomics from reduced visitor spending. Construction spending would have short-term minor beneficial effects on local economics. The impacts of the No Action Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term moderate adverse cumulative impacts to socioeconomics. The No Action Alternative would add incremental long-term minor adverse cumulative effects to socioeconomics.

Conclusion. The No Action Alternative would have long-term minor adverse effects to socioeconomics if park visitation decreases because of the inconveniences associated with accessing the Hoh Rain Forest. Cumulative effects would be long-term, moderate, and adverse, with short-term beneficial effects associated with construction-related spending for reasonably foreseeable future actions. Because there would be no major adverse impacts to socioeconomics, there would be no impairment of park resources or values.

Preferred Alternative

Direct and Indirect Impacts. During the construction associated with the Preferred Alternative, there may be traffic delays, which may discourage or affect tourism-related spending. These impacts would be short-term, negligible, and adverse. Construction of a permanent bridge would result in long-term benefits to the local gateway communities by ensuring access to one of the most popular visitor destinations on the Olympic Peninsula, the Hoh Rain Forest. A construction project could also make available employment positions, and increase spending in the area for living costs by contractor employees and the purchase of local materials for construction. However, these beneficial effects would be short-term since the Preferred Alternative is relatively small and would be constructed in several months.

Cumulative Impacts. Recent road closures due to washouts or flooding, closures for resource protection, and other activities have affected visitor access and associated tourism-related spending. Other road closures outside the park have occurred and would likely occur in the future from road work, bridge construction, culvert replacement, and other maintenance activities in the Hoh River Valley. Other past, present, and foreseeable future actions would likely result in short-term moderate adverse impacts to socioeconomics from reduced visitor spending. Construction spending would have short-term minor beneficial effects on local economics. The impacts of the Preferred Alternative, in combination with the impacts of other actions described above and under "Current and Future Actions," would result in short-term moderate adverse cumulative impacts to socioeconomics. The Preferred Alternative would add incremental long-term beneficial cumulative effects to socioeconomics.

Conclusion. The Preferred Alternative would have long-term beneficial effects to local socioeconomics by ensuring visitor access into one of the most popular destinations in the park, the Hoh Rain Forest. Construction-related spending would also benefit the local economy. Cumulative effects would be long-term, moderate, and adverse with the Preferred Alternative contributing long-term beneficial effects to socioeconomics. Because there would be no major adverse impacts to socioeconomics, there would be no impairment of park resources or values.

CONSULTATION AND COORDINATION

SCOPING/CONSULTATION

A press release was circulated February 22, 2007 (Appendix C) requesting scoping comments related to replacement of the Upper Hoh Road—West Twin Creek crossing. The press release was sent to about 80 individuals, park neighbors, organizations, area tribes, local news media, and agencies on the park's mailing list. In addition, the press release was posted on the park website. One individual and two organizations responded with scoping comments (Appendix C).

Agencies and organizations contacted to assist in identifying issues and provided an opportunity to review or comment on this EA include, but are not limited to, the following:

Federal Agencies

Department of Agriculture, U.S. Forest Service
Olympic National Forest

Department of Commerce
National Oceanic and Atmospheric Administration

Department of Interior
U.S. Fish and Wildlife Service, Western Washington Office

Department of Transportation
Federal Highway Administration

U.S. Army Corps of Engineers

Congressional Representatives

Senator Parry Murray
Senator Maria Cantwell
Senator Jim Hargrove
Rep. Norm Dicks
Rep. Lynn Kessler

State Agencies

Department of Natural Resources
Department of Ecology
Department of Fish and Wildlife
Department of Parks and Recreation
Office of Archeology and Historic Preservation

Local Agencies

Forks Chamber of Commerce
Grays Harbor Chamber of Commerce
Grays Harbor County Commissioners
Jefferson County Commissioners
City of Sequim
City of Forks
City of Hoquiam

American Indian Tribes

Hoh Tribal Business Council
Quinault Indian Nation

Organizations and Businesses

Eastern Washington Steelhead Foundation
Federation of Fly Fishers
Institute for Policy Research
National Audubon Society
National Parks and Conservation Association-NW Regional District
Northwest Ecosystem Alliance
Olympic Forest Coalition
Olympic Park Associates
Olympic Peninsula Intertribal Cultural Advisory Committee
Protect the Peninsula's Future
Quinault Community Action Forum
Sierra Club-Cascade Chapter
Sunnydell Shooting Grounds
The Wilderness Society
Washington Environmental Council
Washington's National Park Fund
Wilderness Watch

Area Libraries

North Olympic Library System
- Port Angeles Branch
- Sequim Branch
- Forks Branch

Timberland Regional Library
- Aberdeen Branch
- Amanda Park Branch
- Hoquiam Branch

COMPLIANCE WITH FEDERAL AND STATE REGULATIONS

The NPS and FHWA would comply with all applicable federal and state regulations when implementing the Preferred Alternative to install a bridge at the Upper Hoh Road—West Twin Creek crossing and associated activities. Permitting and regulatory requirements for the Preferred Alternative are expected to include:

TABLE 15: ENVIRONMENTAL COMPLIANCE REQUIREMENTS

Agency	Statute, Regulation, or Order	Purpose	Project Application
Federal			
National Park Service	National Environmental Policy Act	Applies to federal actions that may significantly affect the quality of the environment	Environmental review of proposed action and decision to prepare a FONSI or EIS
	National Historic Preservation Act, Section 106	Protection of historic and cultural resources in coordination with the State Historic Preservation Office	No cultural resources present; the park consulted with SHPO
	Executive Order 11990, Protection of Wetlands	Requires avoidance of adverse wetland impacts where practicable and mitigation, if necessary	No wetlands present
	Executive Order 11988, Floodplain Management	Requires avoidance of adverse floodplain impacts were practicable and mitigation, if necessary	Activities within stream floodplains
	NPS Order No. 77-2 Floodplain Management	Protection of natural resources and floodplains	The park prepared a statement of floodplain findings
National Oceanic & Atmospheric Administration (NOAA)	Magnuson-Stevens Fishery Conservation Management Act and Sustainable Fisheries Act	Protection of essential fish habitat (EFH)	The park consulted NOAA on effects to EFH and submitted an EFH Assessment.
U.S. Army Corps of Engineers (Corps)	Clean Water Act – Section 404 Permit to discharge dredge and fill material	Authorizes placement of fill or dredge material in waters of the U.S. including wetlands	The park would seek a Nationwide 404 Permit (NW Permit 14, Linear Transportation Project) per communication with the Corps for channel work
U.S. Fish and Wildlife Service	Endangered Species Act	Protection of federally listed threatened or endangered species	The park prepared and submitted a BA to the U.S. Fish and Wildlife Service as part of informal consultation.
State of Washington			
Washington Department of Fish and Wildlife and Department of Ecology	Joint federal and state permit application for activities in aquatic habitat; addresses habitat protection, 401 water quality certification, and 404 permitting	Protection of aquatic habitat	The park prepared a Joint Aquatic Resource Permit Application Form for a Nationwide Permit

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REFERENCES

Brenkman, S. J. and J. Meyer. 1999. Distribution and Spawning Migration of Bull Trout (*Salvelinus confluentus)* in the Hoh River Basin, WA. Report written for the Olympic National Park. September 15. 50 pp.

Federal Highways Administration. 2002. Preliminary Hydraulic Design Report by Sven Leon, P.E. West Twin Creek Culvert Replacement – Olympic National Park. March 18. 5 pp.

Hagen, H. K. 1961. An Inceptive Study of the Distribution and Relative Condition of the Endemic and Exotic Fishes of Several Selected Areas in Olympic National Park. 46 p. Olympic National Park files, Port Angeles, WA.

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) Fishery. 2006. Endangered Species Act Status of West Coast Salmon & Steelhead. Last updated June 8, 2006. Available at: <http://www.nwr.noaa.gov/Species-Lists.cfm>.

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

National Park Service (NPS)
1990. Resource Management Plan.
1996. Statement of Management: Olympic National Park- 1996. Published by Olympic National Park, Port Angeles, WA.
1999. Resource Management Plan.
2006. National Park Service Management Policies.
2007. Public Use Statistics Office: Monthly Public Use Report, Olympic National Park. Available at: <http://www2.nature.nps.gov/mpur/Reports/viewreport.cfm>. Accessed April 20, 2007.

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

Olympic National Park (ONP). 2007a. Memorandum summarizing the Hoh Creek site visit with representatives from the ONP, Service, Corps, and the Hoh Tribe conducted on April 12, 2007.

Olympic National Park (ONP). 2007b. Spotted Owl Monitoring in Olympic National Park: 2006 Annual Report. Preliminary summary of 2006 northern spotted owl monitoring data. January 10. 16 pp.

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.

Saunders, L. 2007. U.S. Fish and Wildlife Service. Personal communication with Patti Happe. April 14.

Starr, J. 2007. Wild Salmon Center (360) 452-5410. Personal communication. May 14.

Stynes, D. J. 2006. National Park Spending and Payroll Impacts: Fiscal Year 2005. Available at: <http://web4.canr.msu.edu/mgm2/>. Accessed April 16, 2007.

Stynes, D. J., D. Probst, and Y. Sun. 2001. Economic Impacts of Visitors to Olympic National Park, 2000. Available at: <http://web4.canr.msu.edu/mgm2/>. Accessed April 16, 2007.

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. USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service. Portland, OR.

U.S. Fish and Wildlife Service (Service). 1986. Recovery Plan for the Pacific Bald Eagle. U.S. Fish and Wildlife Service, Portland, OR. 160 pp.

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.

APPENDICES

APPENDIX A—BIOLOGICAL ASSESSMENT

Olympic National Park

Biological Assessment

for

Hoh River Valley Road,
West Twin Creek Bridge
Olympic National Park

May 2007

US Department of the Interior, National Park Service

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BIOLOGICAL ASSESSMENT

HOH RIVER VALLEY ROAD, WEST TWIN CREEK BRIDGE
OLYMPIC NATIONAL PARK

Introduction

The National Park Service (NPS) prepared an Environmental Assessment (EA) for the Upper Hoh Road—West Twin Creek Bridge (hereafter referred to as the Proposed Project). As part of the EA, and in compliance with Section 7 of the Endangered Species Act (ESA), this Biological Assessment (BA) has been prepared to address potential effects to 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.

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 construction of a new bridge across West Twin Creek at Upper Hoh Road to replace washed-out culverts and other related actions.

The NPS is the lead federal agency for the Upper Hoh Road—West Twin Creek Bridge project (Proposed Project) and Section 7 consultation with the Service is required.

Agency Consultation

Informal consultation with the Service was initiated on April 3, 2007 when Olympic National Park (ONP or park) scheduled a site visit with the Service. On April 12, 2007, a site visit was conducted with representatives from ONP, the Hoh Tribe, U.S. Army Corps of Engineers (Corps), and the Service to discuss the proposed bridge construction and the culvert removals from downstream of the project area, and to identify issues that should be addressed in this BA (ONP 2007a). The Service confirmed a list of federally listed and proposed species potentially occurring in the project area (Service 2007).

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 construct a two-lane vehicular bridge across West Twin Creek on the Hoh Valley Road to replace culverts washed out during a major storm in November 2006 (washed-out culverts). The purpose of this Proposed Project is to restore permanent access to the Hoh Rain Forest Visitor Center, campground, park facilities, picnic areas, and trailheads, and to improve fish passage along West Twin Creek. In addition, the Proposed Project includes removal of a

temporary one-lane bridge that was installed as an emergency action following the November 2006 storm and removal of two culverts that were washed downstream.

The West Twin Creek crossing of Hoh Valley Road is located at the western edge of ONP in the State of Washington (Figure 1). Hoh Valley Road extends 12 miles off U.S. Highway 101 (U.S. 101) to the park boundary and another 6 miles to the Hoh Rain Forest Visitor Center. The West Twin Creek Road crossing is located at milepost 2.5, as measured from the park boundary.

On Monday, November 6, 2006, heavy rain fell throughout the Pacific Northwest and ONP received almost 11 inches of rain in less than 24 hours in some areas (November 2006 storm). During the November 2006 storm, elevated flows in the mainstem of the Hoh River (approaching 60,000 cfs) and its tributaries caused significant damage to the Hoh Road both inside and outside ONP. The November 2006 storm washed out a 75-foot section of the Upper Hoh Road at the West Twin Creek crossing including a 9-foot culvert and an 8-foot culvert that were washed downstream (Figure 2). A temporary footbridge was constructed across the site within 24 hours of the washout to rescue the stranded park visitors, park ranger/resident, and park volunteer/resident from the area.

The NPS and FHWA worked to restore access following the November 2006 storm by installing a one-lane 118-foot-long temporary bridge over West Twin Creek on Upper Hoh Road. The bridge installation required the placement of riprap to protect the bridge abutments on both sides of the channel. Access to the temporary bridge required construction of a 15-foot-wide by 372-foot-long detour route slightly upstream from the washout on both sides of the Upper Hoh Road.

The Proposed Project consists of three parts: 1) constructing a new bridge across West Twin Creek, 2) removing the temporary bridge, and 3) removing the washed-out culverts from the streambed. Equipment and material storage, and other staging activities of the Snider Creek Maintenance Area would begin in August 2007. August staging activities would not produce noise above ambient levels in the project area and would have no effect on listed species. Work in the project area would begin after September 1, 2007 and would be completed by mid-January 2008. A description of each of these activities is provided below.

Construct New Bridge

The design for the reconstructed road segments at West Twin Creek allows for two 10-foot lanes of traffic with 1-foot shoulders, matching the existing roadway width. A concrete bridge about 115 feet long, with two 14-foot-wide lanes, is proposed across West Twin Creek (Figure 3 and Figure 4). The bridge would consist of prefabricated concrete girders placed on concrete bridge abutments with concrete-filled steel pipe pile footings. The bridge road surface would be a 2-inch thick later of asphalt. The bridge rails would be concrete. This design would allow for natural stream flow passage to occur, as well as passage of the 100-year flood (Figure 3). The proposed bridge would be constructable within a small area of disturbance using readily available construction materials.

The proposed construction sequence and design details would include:

1. Equipment and materials would be moved to the project area after September 1, 2007 to minimize impacts to critical wildlife seasonal behavior patterns. It would take about 1 week of general activity to transport equipment and materials to the project area. During this time, erosion-control measures would be installed, the project area would be surveyed for construction activities, and other preliminary low-disturbance activities would commence.

2. Following mobilization, initial construction would involve preparing the project area for the bridge. The bridge abutment piles would be installed using a crane and pile hammer. This work would last about 1 week and would be followed by construction of the concrete abutment caps. The concrete work would last about 2 weeks and would involve concrete trucks, equipment, and handwork to set forms, tying rebar and placing concrete, and generator use.

3. After the concrete caps are finished, precast bridge girders (manufactured off site) would be delivered and set using large cranes. This work would take about 2 days and would be followed by more concrete work to finish constructing the abutments, backwalls, and wingwalls to complete the bridge substructure. Equipment similar to that used for the abutment work would be used for the concrete work and the work would last about 3 weeks.

4. Following completion of the substructure, it would take about 3 weeks to backfill the approach embankments using earthwork equipment such as graders, excavators, bulldozers, and compaction rollers. The final concrete work for bridge curb and rail would take about 2 weeks.

5. After completion of the bridge structure, the bridge deck would be paved to match the approach roads. Paving would take about 1 week and would involve the use of earthwork equipment (to shape the approaches), a paver, compaction equipment, haul trucks, and paint-striping trucks.

6. Once bridge work is complete, traffic would be relocated to the new bridge and roadway. Excavation equipment would then access and operate within the stream channel to install riprap (Figure 5). Riprap directly under the bridge girders would be placed prior to setting the girders. The remaining riprap would be placed after the bridge is in place. The streambanks under the bridge would be armored with riprap, an average of 20 inches in diameter, placed at a 1:1.75 slope. The riprap would be 4 feet thick and would extend slightly below the channel bottom to prevent scour around the abutment piles. The riprap would extend up the slope to an elevation about 2.7 feet above the 100-year water surface elevation. Prior to work in the streambed, a “clean water diversion” would be created by placing sandbags or other appropriate material in the channel and parallel to the work area. This would divert water to the opposite side of the channel at the location of in-stream work, which would minimize sediment in the stream. Construction equipment would use the detour road to access the streambed after water is diverted.

7. One lane of traffic would remain open at all times during construction, except for short-term or unexpected events. A temporary traffic signal would be in use during nonworking

hours until Labor Day. After Labor Day, the detour road would be open with a requirement to stop and yield. During working hours, signage and flaggers would be used when construction operations interfere with traffic. Delays would not be more than 30 minutes with the exception of delays of up to 4 hours while the bridge girders are being placed.

8. The Snider Creek Maintenance Staging Area would be used for equipment and materials storage. This proposed staging area is located about 2 miles east of West Twin Creek (Figure 6).

Remove Temporary Bridge

Upon completion of the roadway and bridge, the temporary bridge would be removed, dismantled, and taken to a storage site. Riprap and the temporary bridge abutment would be removed and the site would be stabilized and revegetated. Riprap removed from the temporary bridge abutment would be used to armor the slopes beneath the new bridge. Following work in the stream channel, the gravel/pavement on the detour road would be removed and the site regraded and revegetated according to a site-specific revegtation plan developed by ONP. The asphalt layer of the temporary roadway would be disposed of outside the park boundary. The gravel and rock material from the temporary road and any excess riprap from the temporary bridge abutment would be salvaged and stored at the Snider Creek Maintenance Area for other uses in the park.

Remove Washed-Out Culverts

The two culverts washed downstream are corrugated metal pipe. One culvert is 9 feet in diameter and located about 250 feet downstream of the existing road, and the other is 8 feet in diameter and is about 450 feet downstream (Figure 5). The culverts are partially buried and filled with streambed material. Because the culverts are large and buried in the stream channel, they would be removed with a large tracked excavator.

The culverts are located in cobble/gravel deposit adjacent to the stream. Following mobilization, but prior to initiating work on the bridge, a large tracked excavator would construct a temporary approach to the streambed down the north bank of the stream at the location of the proposed bridge (Figure 5). The excavator would travel down the streambed, which is mainly gravel and cobbles. This operation could damage some existing vegetation and would require moving woody debris to clear a path for the excavator.

The culverts can likely be removed without diverting the stream because they are currently located out of the flow and streamflow would be low in September when the work is done. Installation of water-diversion measures to move streamflow out of the work area could be used depending on conditions at the time of work. The operator would excavate around the culvert and dismantle the culvert into smaller sections as necessary. Each piece of culvert would be transported back to Upper Hoh Road where it would be loaded onto a truck for removal from the park. Once the first culvert is removed, the excavator operator would drive the excavator downstream to the second culvert and perform a similar operation. The number of trips required to remove the culverts is unknown, but the excavator may access the streambed several times.

Constructing the new bridge and removing the temporary bridge and detour would not disturb existing vegetation. However, the excavator used during culvert removal would damage individual willows and alders while moving back and forth in the streambed to access the washed-out culverts. However, only some individual plants would be damaged, and these may survive if their roots remain intact.

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 1.

Table 1. Federally listed endangered and threatened species potentially affected by the Proposed Project.

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

Source: Service 2007.

Though bald eagles may occasionally migrate through the project area, the closest known bald eagle nest site is approximately 3 miles downstream from the project area outside the park boundary, and is not known to be in use (ONP files). There are no known bald eagle winter concentration areas in the Hoh River Valley. The project area may contain habitat for limited foraging; however, there is not a significant prey source and the dense forest compromises mobility for hunting eagles. No suitable bald eagle habitat would be lost and no perching, roosting, or nesting sites would be modified or removed as a result of the Proposed Project. The proposed work would occur outside the bald eagle nesting season and bald eagles are not known to nest in the project area. Bald eagle foraging opportunities and potential prey base would not be impacted by the Proposed Project. Because there would be no effect to bald eagles, they are not discussed further in this document.

Conservation Measures

Conservation measures include measures taken to avoid, minimize, and compensate for impacts to federally listed species that are included by the NPS as an integral part of the Proposed Project.

Northern Spotted Owl

The Proposed Project would begin September 1, during the late breeding season (after July 15), when breeding owls and their young would be less vulnerable to disturbance.

Marbled Murrelet

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

- To avoid adverse impacts to breeding murrelets, any noise-producing construction activities above ambient noise levels would not begin until September 1, during the murrelet late breeding season (August 6 to September 15), and would be initiated as late as possible. This would ensure that pile driving and other heavy equipment operation would occur outside of the prime breeding season, yet provide a window for construction to be completed before winter weather and bull trout spawning seasons begin.
- 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, during the project work period between September 1 and 15.
- Garbage and food items would be carefully controlled to prevent attraction of potential nest predators, such as corvids and raccoons.
- Constructing the new bridge and removing the temporary bridge and detour would not disturb existing vegetation. 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:

- In-stream project work would be scheduled to occur from September 1 through mid-January, during low-flow periods, to minimize erosive stream action and impacts to bull trout spawning, larval, and early fry stages of their life cycle. The work would occur near the early bull trout spawning times; however, suitable spawning flow levels and pool depths do not occur at the project area during this time. In-stream construction should be completed before any bull trout fry hatchings.
- 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.
- Weirs would move the stream from one side of the channel to the other during construction activities on each side of the channel below the bridge, but natural flow would be unimpeded after construction is completed. If high flows are

encountered, construction would be suspended and/or measures to minimize erosion would be implemented.

- To minimize effects on bull trout, pile driving would not occur in the stream and would be scheduled to occur after September 1 during low-flow periods when larval and juvenile bull trout are not present.
- The construction contractor would monitor turbidity during in-stream construction and culvert-removal activities. The contractor would suspend work if turbidity levels show significant increases over background levels until corrective measures can be identified and the stream returns to background levels of turbidity.
- Diversions would be conducted in a manner to minimize disturbance and sedimentation. ONP would work with the Hoh Tribe to remove fish from the channel near the project area. Seining would be conducted to prevent fish from entering the project area and to avoid trapping fry and other fish in the project area during in-stream work (ONP 2007a). If necessary, electro-fishing would be utilized to capture stranded fish, but would be restricted to direct current pulse frequencies of 30 Hz or less and water temperatures of 4ºC to 24ºC.
- During culvert removal, the tracked excavator would avoid working in live water and the active streambed, to the extent possible. Weirs would be installed around culverts prior to removal, if necessary, to divert streamflow out of the work area and minimize suspension of sediments in the stream. All woody debris would be left in the active channel to maintain bull trout habitat.
- 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 West Twin Creek drainage for terrestrial species, and the Hoh River Basin for aquatic species.

The temperate climate and high levels of precipitation in the Hoh 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-level 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 West Twin Creek. In disturbed areas, nonnatives such as Scot's broom are occasionally found, and invasive exotic plants, such as evergreen and Himalayan blackberry, also occur along the Upper Hoh Road corridor.

There is currently almost no vegetation present in uplands or along the streambanks at the temporary bridge and detour. There is also no vegetation near the washed-out culverts. Any vegetation that was present prior to the November 2006 storm that washed out the West Twin Creek—Upper Hoh Road culverts either was scoured away or was removed during installation of the temporary bridge and detour.

Downstream of the temporary bridge, there is dense vegetation on the upper streambanks. The streambed itself is mostly cobble and gravel, but there are widely scattered individual alders and willows on more stable cobble and gravel areas.

Mammals seen in the Hoh River Valley and project area include Roosevelt elk, black-tailed deer, raccoon, spotted skunk, Douglas squirrel, beaver, and snowshoe hare. Predators are seen less frequently in the project area and include black bear, coyote, mountain lion, and bobcat. Smaller, less conspicuous or nocturnal mammals are numerous and may include mice, shrews, moles, and bats. The more prominent bird species known in the project area include great blue heron, osprey, Stellar's jay, kingfisher, crow, water ouzel, robin, varied thrush, winter wren, and species of warblers, woodpeckers, kinglets, and sparrows. 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 gartersnake. Amphibians are 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.

Prior to the November 2006 storm that damaged the road, the culverts at West Twin Creek were impeding the passage of salmon, trout, and other fish, including the federally listed bull trout, preventing access to approximately 2 miles of high-quality fish habitat upstream. Since the November 2006 storm, these impediments to fish passage have been removed. However, the washed-out culverts are acting as berms in the West Twin Creek channel and have changed the normal flow of the stream.

West Twin Creek contains riffles and pools in the channel, gravel and cobbles in the streambed, and a moderate supply of woody debris, and is bordered by riparian vegetation consisting of large conifers and dense underbrush. The streambanks are vegetated, not generally undercut, and appear moderately stable. These characteristics provide favorable habitat conditions for the fish and macroinvertebrates on which many fish species feed. In addition, the water quality of West Twin Creek is excellent. Sources of natural turbidity that can adversely affect fish include suspended fine material caused by shifts in the river channel and resulting in bank erosion. High-flow events cause significant turbidity in the stream.

Fish species that inhabit the Hoh River Basin include summer and winter steelhead trout, cutthroat trout, bull trout, coho salmon, spring/summer and fall chinook salmon, chum salmon, longnose dace, mountain whitefish, largescale sucker, and several species of sculpins and lamprey (ONP files). Occasionally, other salmonids are found in the Hoh River including pink and sockeye salmon.

Threatened and Endangered Species Accounts and Effects of the Proposed Project

Potential habitats for the federally listed species shown in Table 1 were identified within the project area based on information available in ONP files and research documents. Potential effects on habitat, population viability, distribution, travel, and reproduction were evaluated for each species. The following subsections describe life history characteristics, habitat requirements, distribution, and potential habitat in the project area for the species listed in Table 1, as well as potential effects of the Proposed Project.

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 no longer considered suitable habitat by northern spotted owls. This is likely due to the influx of barred owls into the project area in recent years. Surveys are conducted three to six times per year by NPS biologists and have resulted in detections of only barred owls on the river flats for 10 years. The only exception is a single northern spotted owl sighting in 1997 at an elevation of 700 feet on the Hoh-Bogachiel Trail just above the Hoh entrance station (ONP files).

There are four known inactive northern spotted owl nest sites within 3 miles of the project area, although two are several hundred feet higher upslope than the project area. These sites have been active at various times in the past; however, northern spotted owls have not been documented at this elevation since 1985 (ONP files). Recent nesting locations have been identified at about 1,700 feet in elevation at the head of the unnamed stream between East and West Twin Creeks, about 0.8 mile from the nearest segment of Upper Hoh Road, where it crosses East Twin Creek. These nesting locations were not active in the 2006 breeding season (ONP 2007b). It is possible that northern spotted owls use the project area for infrequent foraging and dispersal.

Effects of the Proposed Project

No suitable or critical northern spotted owl habitat would be modified or removed. Foraging owls may be disturbed by machinery noise during construction, causing owls to avoid the project area temporarily. Mobilization of heavy equipment and site preparation beginning September 1 would create noise above ambient levels and visual disturbance in the project area during the late breeding season. However, 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 area and along the roadway between the project and staging areas, and a minimal increase in traffic on the Hoh River Road. However, the northern spotted owl is not known to be near the project area and no suitable habitat would be modified or removed. In addition, the project would start September 1, during the late breeding season (after July 15), when breeding owls and their young would be less vulnerable to disturbance. Also, northern spotted owls forage primarily at night, when there would be no construction activity.

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. They 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 to occur 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, with some chicks hatched and approximately 50% fledged as early as August 6.

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

Marbled murrelet surveys have not been conducted in the immediate vicinity of the project area; however, occupied detections were recorded during protocol surveys in 1997 and 1998 at the Hoh campground, approximately 5 miles upstream from the project area, and limited surveys in the campground in 1999 documented presence (ONP files). Surveys upstream on the South Fork of the Hoh River in 1998 also documented occupancy at three sites. Since murrelet presence has been documented at 100% of the survey sites throughout the park in recent years, and occupancy has been documented at 80% of those sites, it is reasonable to assume that suitable habitat in the project area 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 any loss of identified habitat. No trees large enough to contain suitable habitat for murrelets would be cut. Mobilization of heavy equipment and site preparation beginning September 1 would create noise above ambient levels and visual disturbance that could temporarily affect murrelets in the project area in the form of aversion responses. However, construction-timing restrictions to avoid disturbances during murrelet high-activity periods and other conservation measures described previously

would minimize effects to the species. Also, mature trees and thick foliage in the project area provide natural screening, which would reduce the intensity of noise and visual impacts.

Bull Trout

Species Background, Habitat Requirements, and Distribution

All populations of bull trout are designated as threatened in the conterminous 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, which has severely affected sensitive breeding habitat.

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, as well as 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 resident, fluvial, adfluvial, and anadromous forms: 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

The Hoh River has been designated as critical habitat for the Coastal-Puget Sound population of bull trout (70 Fed. Reg. 56212 (September 26, 2005)). The project area occurs within the area encompassed by the Hoh River subpopulation of the Coastal-Puget Sound distinct population segment of bull trout.

Potential Habitat in the Project Area

Although West Twin Creek contains suitable habitat for bull trout, snorkel and electro-fishing surveys conducted by the NPS in the late 1990s did not identify the presence of bull trout in the stream (Brenkman and Meyer 1999). However, more recently biologists with the Wild Salmon Center conducted snorkel surveys in the lower reaches of West Twin Creek under a NPS scientific research permit and observed several juvenile bull trout (Starr, pers. comm. 2007) in the vicinity of the proposed bridge project. Surveys were conducted both during summer low flow in 2006 and during spring run-off in 2007, with bull trout found during both efforts.

Prior to the November 2006 storm, fish passage upstream of the current bridge location was impeded by culverts. Although the small stream has not been known to provide spawning habitat for adult bull trout, it apparently provides rearing habitat for a few juvenile bull trout. The Hoh River, near the confluence with West Twin Creek, provides habitat for stream-resident, fluvial, and anadromous forms of adult and juvenile bull trout. Adfluvial bull trout are not present. Table 2 identifies documented bull trout presence in the Hoh River Basin.

Table 2. Documented bull trout presence in the Hoh 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

The streambank and channel would be temporarily disturbed during preparation and installation of the bridge abutments and during placement of the riprap to stabilize the channel slopes. Construction of the permanent bridge, removal of the temporary bridge, and streamside work on both the existing road and temporary detour road would likely generate short-term erosion and sediment transport to West Twin Creek until the project area is stabilized. In addition, removal of the washed-out culverts would result in a short-term disturbance of the stream channel and short-term increases in suspended sediments. Increases in suspended sediments potentially affect juvenile bull trout by damaging gills, reducing feeding, increasing avoidance of sediment areas, reducing reactive distance, suppressing production, increasing mortality, and reducing habitat capacity (Reiser and Bjornn 1979). Elevated levels of suspended sediments may also degrade spawning habitat and reduce survival of bull trout eggs to fry emergence. However, impacts on bull trout would be minimized through implementation of the conservation measures described previously.

Removing the washed-out culverts would restore normal flows in the stream channel and prevent disturbances associated with the potential movement of the culverts during future flood events. In the long term, removing the washed-out culverts would allow West Twin Creek to return to a more natural hydrologic condition. Removal of the washed-out culverts would provide possible spawning grounds and allow colonization of the streambed by aquatic macroinvertebrates that are a food source for bull trout prey species.

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. A variety of planned future activities related to road construction, use, and maintenance in the Hoh River Valley, particularly those along Hoh Road east of U.S. 101, could adversely impact federally listed species.

Reasonably foreseeable future actions considered in the cumulative effects analysis are described in the following paragraphs:

- Jefferson County anticipates needing to perform three emergency projects on Hoh Road in 2007 and two in 2008. Based on the number of yearly emergency repairs in the past, it is likely there would be between one and three projects each year in the future. In addition to emergency repairs, there would be regular road maintenance and it is likely that there would be several road improvement projects over the next 10 years. Similar emergency, maintenance, and improvement projects are anticipated on U.S. 101.
- Jefferson County has identified the 12-mile section of Hoh Road from U.S. 101 to the park boundary as a "backcountry route" and has proposed incorporating space for bike lanes. Due to the narrow footprint of the current road, the project would not involve adding separate bike lanes or paved shoulders, but would make both lanes 11 feet wide, for a total paved roadway width of 22 feet. This plan would likely be implemented the next time this reach of road is repaved.

Because the Proposed Project would not affect the bald eagle, it would not contribute to cumulative impacts on this species. Because of the low likelihood that northern spotted owls occur near the project area, and because no suitable habitat would be modified or removed, the Proposed Project would not contribute to cumulative impacts on the spotted owl. The Proposed Project would add to cumulative visual and noise disturbance that would affect the marbled murrelet, resulting in short-term cumulative impacts on the marbled murrelet. The Proposed Project, in addition to future actions, would result in short-term cumulative impacts on bull trout. Installation of a bridge on the Upper Hoh Road at West Twin Creek would contribute to improved stream conditions and would provide bull trout access to additional potential habitat, resulting in a long-term beneficial contribution to cumulative effects on bull trout.

Conclusion and Determination

Noise and visual disturbance associated with the Proposed Project could have temporary impacts on northern spotted owls and the marbled murrelets in the form of aversion responses. Because the noise-producing activities (above ambient background noise) would not start until after September 1, near the end of 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 not 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.

The preliminary determination of effects to federally listed species from the Proposed Project is shown in Table 3.

Table 3. Preliminary determination of effects to federally listed species 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
Bald eagle	*Haliaeetus leucocephalus*	No effect
Marbled murrelet	*Brachyramphus marmoratus*	May affect, not likely to adversely affect
Bull trout	*Salvelinus confluentus*	May affect, not likely to adversely affect

References

Brenkman, S. J. and J. Meyer. 1999. Distribution and Spawning Migration of Bull Trout (*Salvelinus confluentus)* in the Hoh River Basin, Washington. Report written for the Olympic National Park. September 15. 50 pp.

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 Park Service (NPS). 1999. Resource Management Plan.

NOAA Fishery. 2007. NOAA Fishery Office of Habitat Conservation website. Accessed April 16, 2007. Available at: <http://www.nmfs.noaa.gov/habitat/habitatprotection/index.htm>.

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

Olympic National Park (ONP). 2007a. Memorandum summarizing the Hoh Creek site visit with representatives from the ONP, Service, Corps, and the Hoh Tribe. April 12.

Olympic National Park (ONP). 2007b. Spotted Owl Monitoring in Olympic National Park: 2006 Annual Report. Preliminary summary of 2006 northern spotted owl monitoring data. January 10. 16 pp.

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.

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

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.

Starr, J. 2007. Wild Salmon Center (360) 452-5410. Personal communication. May 14.

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). 1986. Recovery Plan for the Pacific Bald Eagle. U.S. Fish and Wildlife Service. Portland, OR. 160 pp.

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). 2007. Personal communication from Linda Saunders, U.S. Fish and Wildlife Service, to Patti Happe, Olympic National Park. April 17.

List of Preparers and Consultations

Preparers:

Karen Baud, ERO Resources Corporation, Wildlife Biologist
Sadie Russo, ERO Resources Corporation, Natural Resource Specialist
Mary Powell, ERO Resources Corporation, Natural Resource Specialist

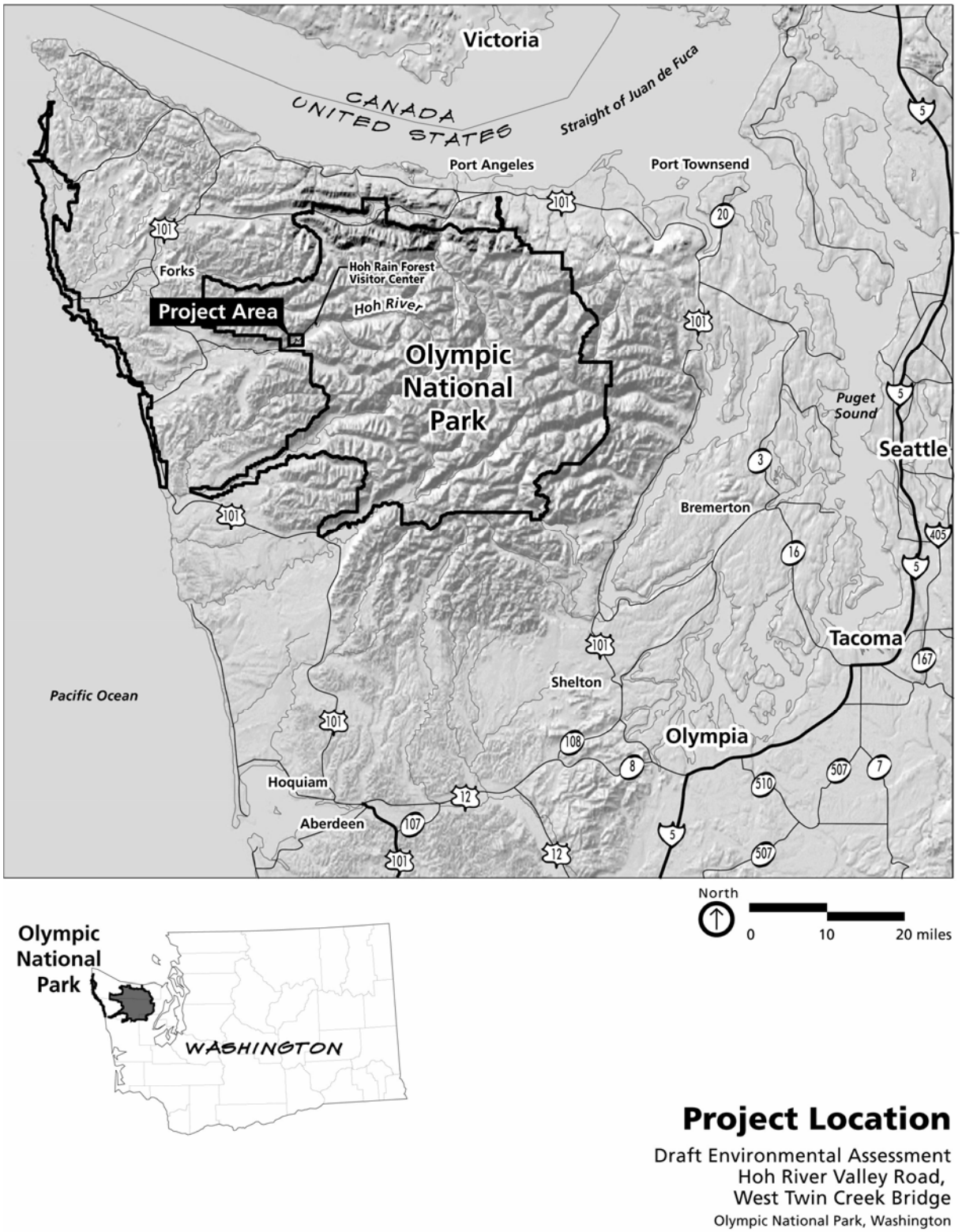
Project Description and Plans Provided by:

Olympic National Park
Federal Highway Administration — Western Federal Lands Highway Division

Experts Consulted:

Linda Saunders, U.S. Fish and Wildlife Service
Jack Kennedy, U.S. Army Corps of Engineers
Steve Allison, Hoh Tribe
Patti Happe, NPS Wildlife Biologist
Pat Crain, NPS Fisheries Biologist
Sam Brenkman, NPS Fisheries Biologist
Scott Gremel, NPS Wildlife Biologist

Figure 1. Project Location.



Project Location

Draft Environmental Assessment
Hoh River Valley Road,
West Twin Creek Bridge
Olympic National Park, Washington

Figure 2. West Twin Creek Road Damage Following Storm.

Figure 3. Proposed West Twin Creek Bridge Elevation Looking Upstream.

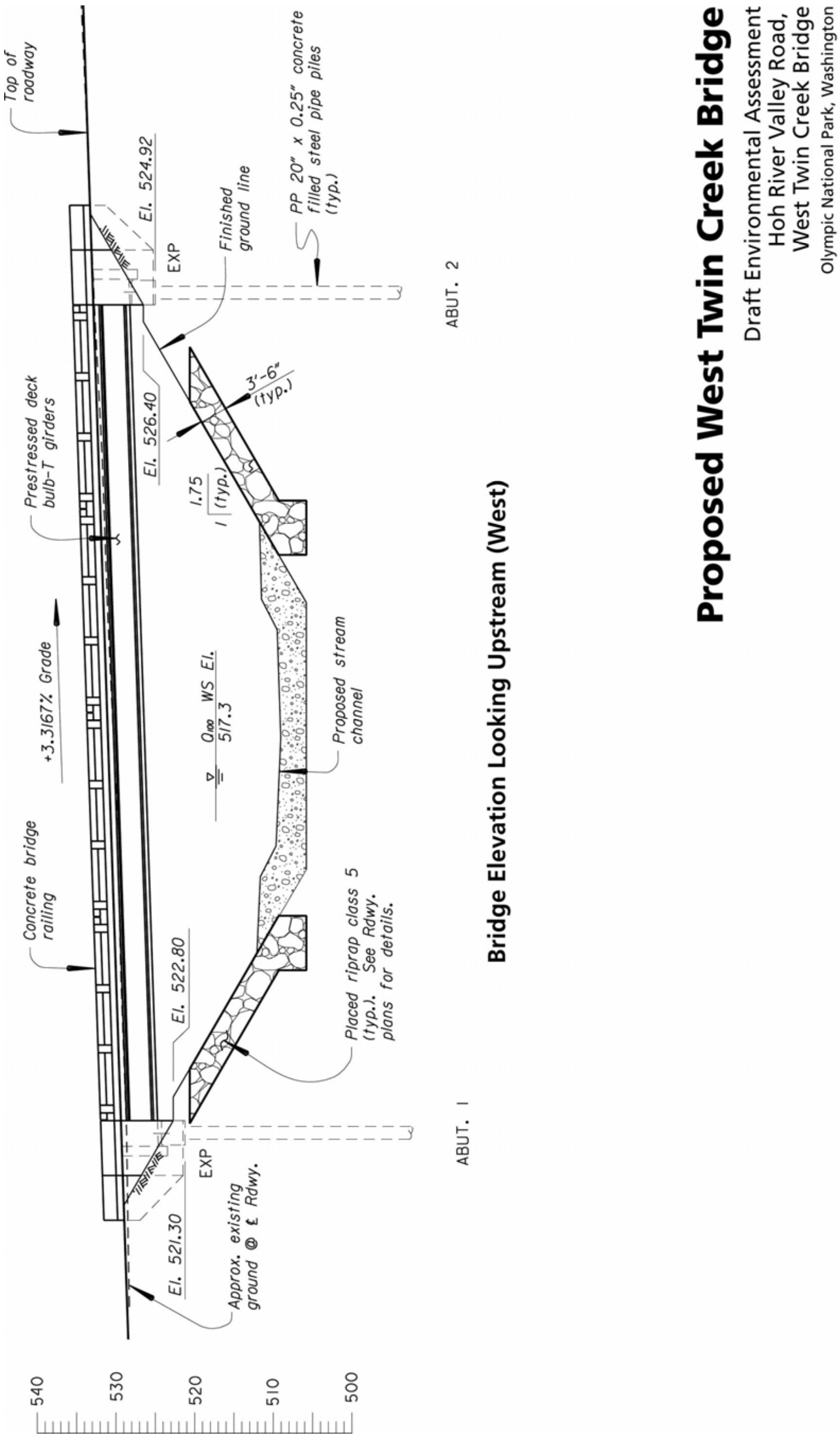


Figure 4. Plan View of West Twin Creek Bridge Detour and Temporary Bridge.
The location of the proposed bridge is also shown.

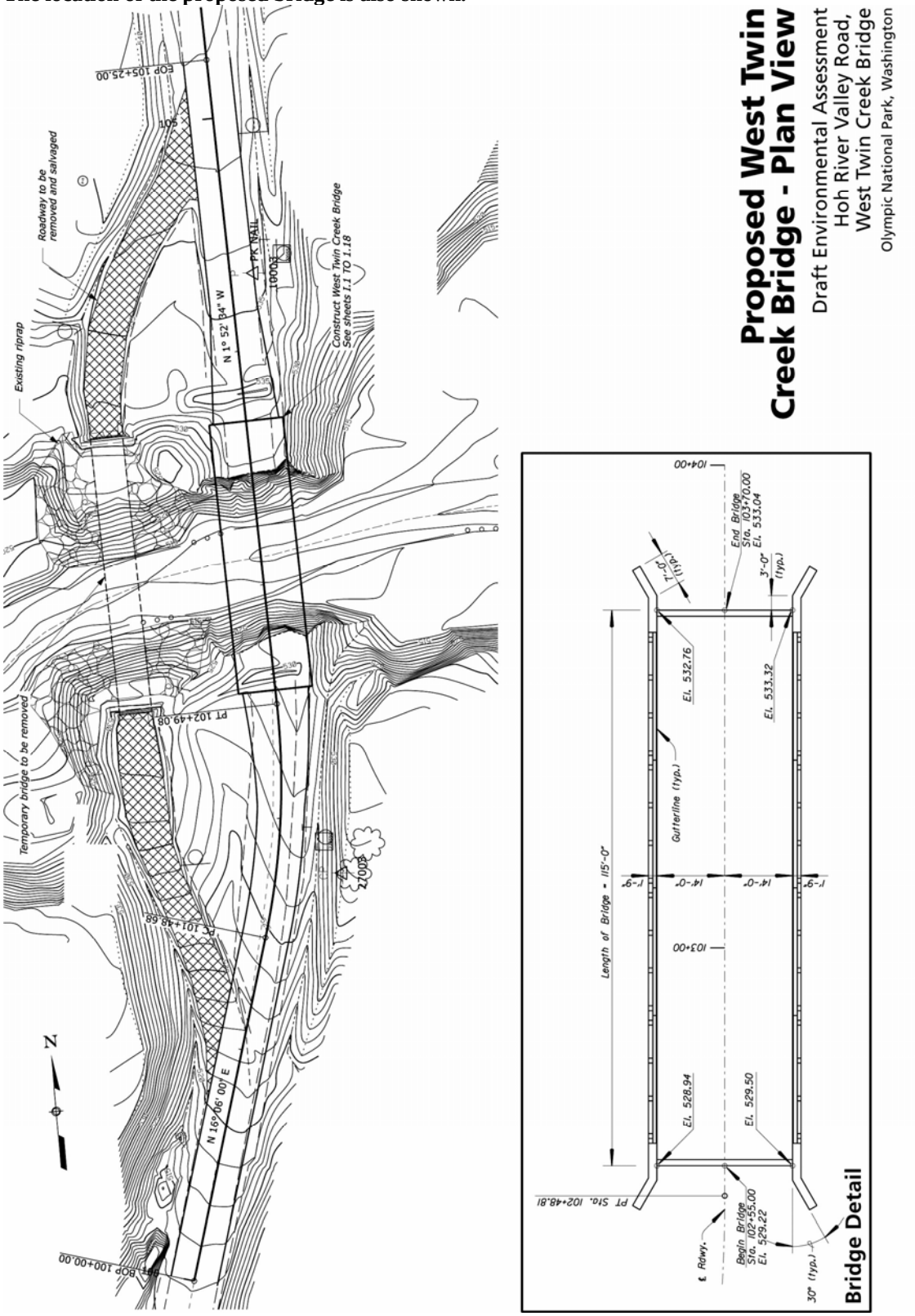


Figure 5. Location of Culverts Washed Downstream.
Construction elements such as removing the detour and the location of the proposed bridge are also shown.

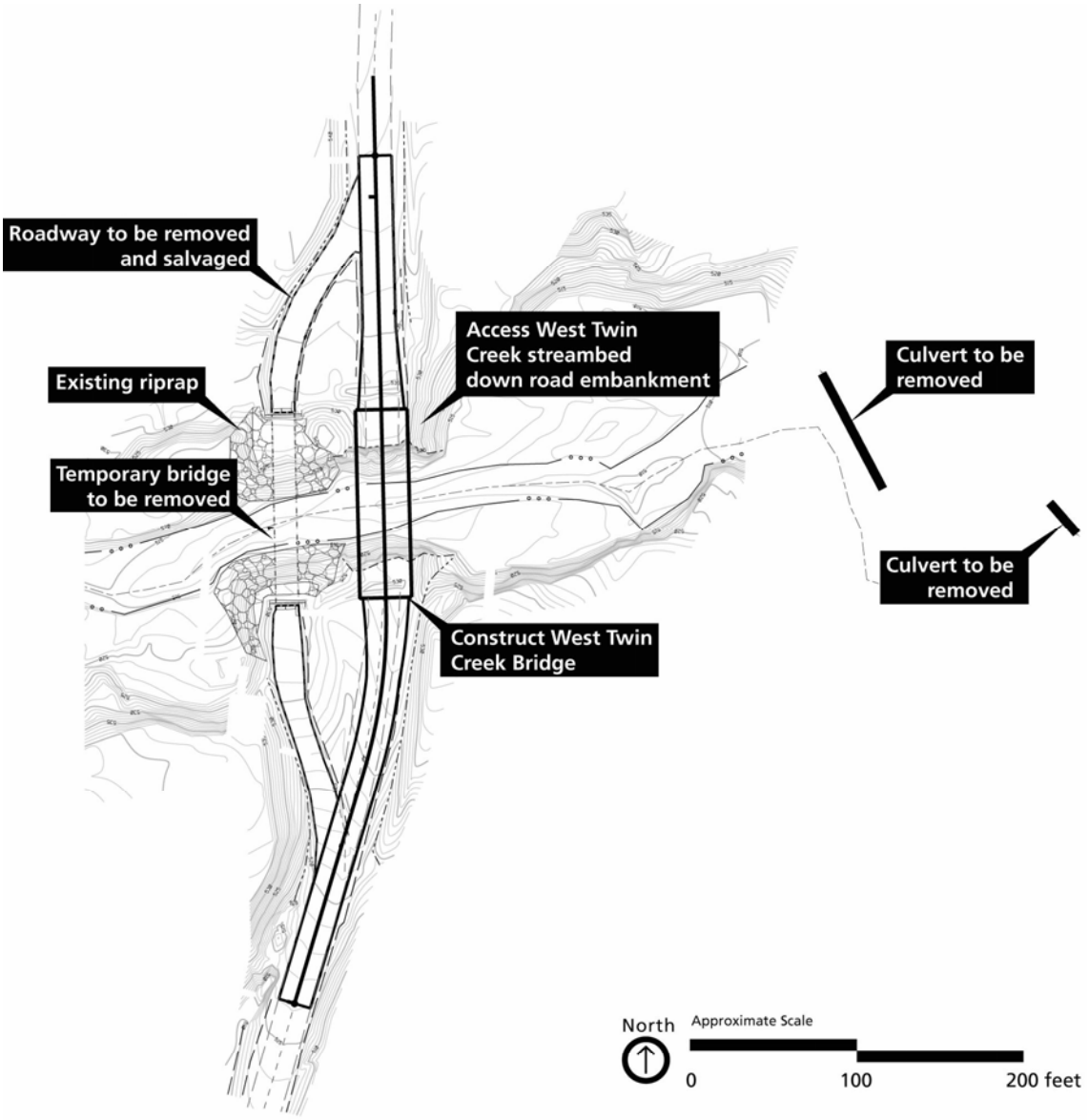
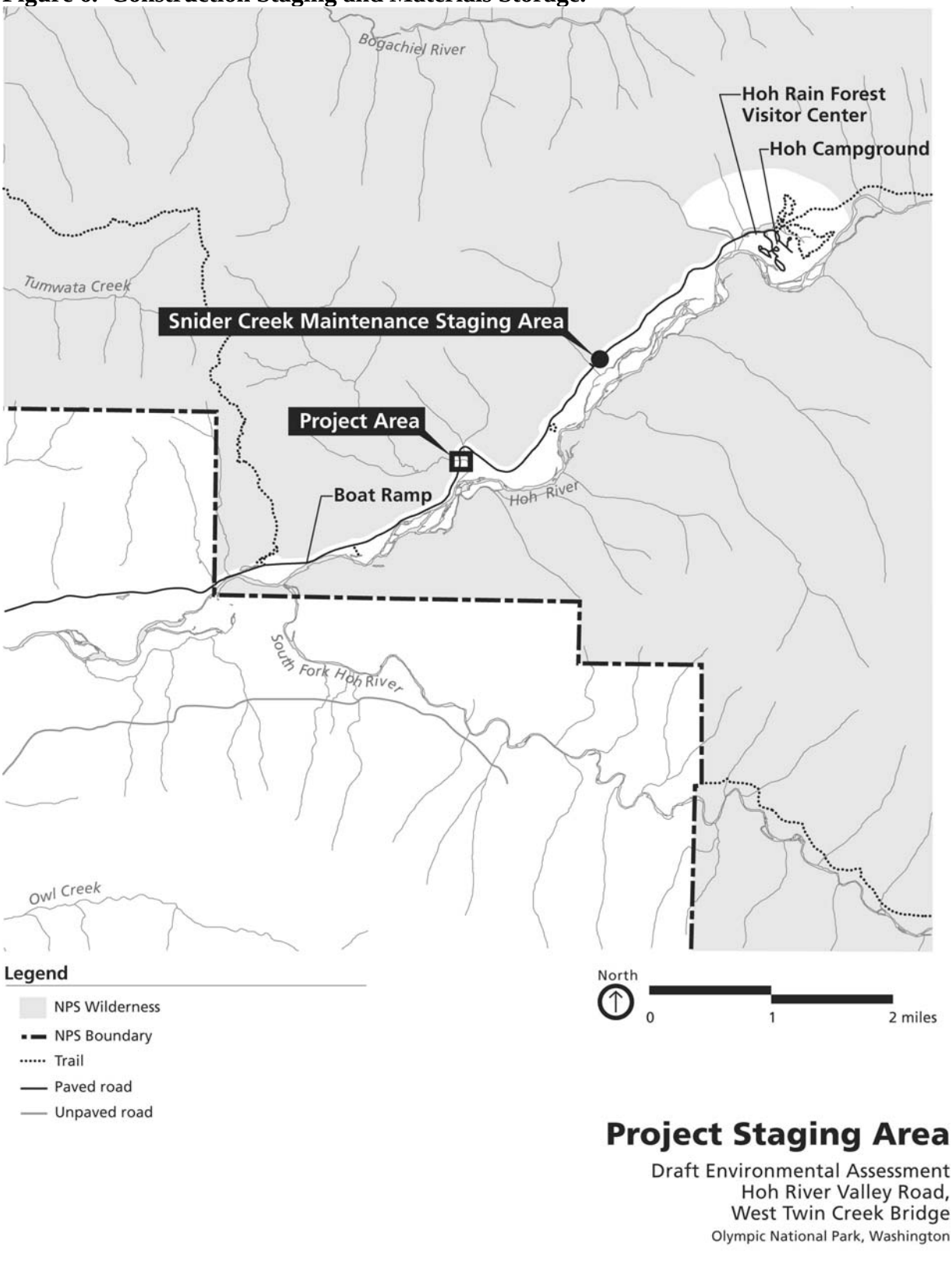


Figure 6. Construction Staging and Materials Storage.



APPENDIX B—FLOODPLAIN STATEMENT OF FINDINGS

Hoh River Valley Road, West Twin Creek Bridge
Environmental Assessment
Olympic National Park
Washington

Recommended:_____
Superintendent, Olympic National Park Date

Concurred:_____
Chief, Water Resources Division Date

Concurred:_____
Regional Safety Officer, Pacific West Region Date

Approved:_____
Director, Pacific West Region Date

The above signatures certify that this document is technically adequate and consistent with NPS policy.

Executive Order (EO) 11988 ("Floodplain Management") requires the National Park Service (NPS) and other agencies to evaluate the likely impacts of actions in floodplains. It is NPS policy to preserve floodplain values and minimize potentially hazardous conditions associated with flooding. If a proposed action is in an applicable regulatory floodplain, then flood conditions and associated hazards must be quantified, and a formal Statement of Findings (SOF) must be prepared. The NPS *Procedural Manual #77-2, Floodplain Management* provides direction for the preparation of a floodplain SOF. This SOF has been prepared to comply with EO 11988 and with *Procedural Manual #77-2*.

PROPOSED ACTION

The National Park Service, in cooperation with the Federal Highway Administration (FHWA), is proposing to install a two-lane bridge across West Twin Creek on Upper Hoh Road at milepost 2.5 to restore permanent access to the roadway and the visitor center. The bridge would replace culverts that were washed out during a major storm in November 2006. The bridge would improve fish passage along West Twin Creek. In addition, this action includes removal of a temporary one-lane bridge that was installed following the storm and removal of two culverts that were washed downstream.

Site Description

The proposed West Twin Creek Bridge project will:

- Reestablish two-lane access for park visitors and staff to the Hoh Visitor Center, campground, picnic area, and trails
- Restore natural hydrologic conditions to West Twin Creek
- Provide fish passage along West Twin Creek

The proposed action is needed to repair damage to the Upper Hoh Road—West Twin Creek crossing caused by storm damage. Restoration of access to the Hoh Rain Forest is of vital concern to the NPS, local and regional communities, and park visitors. The Hoh Rain Forest is one of the prime destination points for visitors to the west side of the Olympic Peninsula. Facilities include the ranger station/visitor center, nature trails, residences, maintenance shop, campground, as well as Upper Hoh Road. The Hoh Trailhead is a major wilderness trailhead and provides the most direct trail access to Mt. Olympus. ONP received more than 3 million visitors in 2005 (Stynes 2006). In 2005, about 148,000 visitors traveled by vehicle to the Hoh Valley (NPS 2007). In 2002, the average daily traffic (ADT) on Upper Hoh Road during the month of August was 600 vehicles, and during September the ADT was 100 vehicles. The temporarily installed one-lane bridge does not provide adequate access for the volume of traffic.

Other needs associated with the proposed project include removal of the temporary bridge and abutments. This includes removal, reclamation, and revegetation of the temporary road detour to restore natural resource values. To restore stream function and reduce the potential for resource damage, the two culverts washed downstream by the storm need to be removed. The project area encompasses the Upper Hoh Road—West Twin Creek crossing and washed-out culverts located about 250 feet and 450 feet downstream from the road crossing.

Floodplains

The project area is within the West Twin Creek and Hoh River floodplains, which have not been mapped. The Hoh River floodplain is about 1 mile wide. The floodplain of West Twin Creek is poorly developed. Until West Twin Creek enters the Hoh River floodplain, the stream has a very narrow floodplain constrained by steep slopes. The 2-year bankfull flow of West Twin Creek is estimated to be 430 cfs and the 100-year peak flow is estimated to be 1,000 to 1,060 cfs (Table B-1).

Justification for Use of the Floodplains

Construction of this bridge in the floodplain cannot be avoided. The impact of the project on floodplains would be minor and beneficial.

Investigation of Alternative Sites

There are no other alternative sites for this project.

Hydrologic Risk

The project would be completed during low creek flow. Construction would be halted if high precipitation or high flows occur. The floodplains would be slightly negatively impacted during construction and would be improved in the long term.

During high precipitation or high flow events, the road and bridge could be closed and the area within the floodplain evacuated. The floodplain has not been mapped, but peak flows have been estimated for purposes of bridge design:

TABLE B-1. PEAK DISCHARGE ESTIMATES FOR WEST TWIN CREEK AT PROPOSED BRIDGE LOCATION

Recurrence Interval	Peak Discharge (cfs)
2-year	430
10-year	680-710
25-year	800-850
50-year	900-950
100-year	1,000-1,060
500-year	1,310-1,600

Floods on West Twin Creek and the Hoh River occur during large frontal rainstorm events and as a result of snowmelt. Flooding of this nature can be anticipated and, therefore, the risk to visitors and park staff from flooding is small. However, floods larger that the bridge is designed to handle are possible on an infrequent basis and may result in damage or failure of the bridge.

MITIGATIVE ACTIONS

Flood hazard mitigation would be provided by incorporating methods for protecting life and minimizing damage to both the bridge and to natural resources through appropriate procedures. Mitigation of flood hazards to bridge users would be accomplished by closure of the road during periods of very high flow. The bridge will be designed to safely pass the 100-

year flood without over-topping, and risk to the structure itself will be tolerated during floods exceeding the design. Such floods are expected to occur rarely.

Mitigation would include sustainable design principles, appropriate elevations for the finished road and bridge, and Best Management Practices during and after construction.

Design would minimize the adverse environmental impacts on natural floodplain values and minimize potential risk to lives and property. It would prevent alteration of the natural and beneficial floodplain values and maintain the floodplain environment as close to its natural state as possible using all practicable means.

The bridge would be designed to avoid scouring, deposition, other damage to floodplains. Placement of fill on floodplains would not occur. Free natural drainage and natural contours would be preserved to the extent practicable when designing and constructing the road and bridge. The site would be revegetated when construction is complete. Minimum grading requirements would be used and compaction would be minimized.

These mitigative measures would be in accordance with the NPS floodplain guidelines and with EO 11988 ("Floodplain Management").

COMPLIANCE

The bridge for West Twin Creek would accommodate natural streamflows, as well as 100-year flood flows. There would be some localized measurable improvement in the ability of the floodplains to convey and store floodwaters, and bridge construction would not contribute to flooding.

Section 401 of the Clean Water Act requires a permit for any activity which may result in any discharge into the navigable waters of the United States. As per the U.S. Army Corps of Engineers, this project would likely fall under Section 404 of the Clean Water Act Nationwide Permit 14 (Linear Transportation Projects). Therefore, Section 401 and 404 permits would be required for this project.

Section 401 and 404 permits, plus the Environmental Assessment, this SOF for EO 11988 and Procedural Manual #77-2, and the finding of no significant impact (FONSI), when signed, would complete the requirements for the NEPA for this project.

CONCLUSION

The protection of people and property is of high priority to Olympic National Park. The proposed bridge would be constructed on National Park land, and West Twin Creek and the Hoh River flow across the park. The National Park Service concludes that there is no other practicable alternative for the proposed project. With the road and bridge designed to prevent or reduce flood damage, the risk to life and property would be minimized. There would be no significant negative effects on natural or beneficial floodplain values.

Mitigation would include good design through sustainable design principles, appropriate siting, and Best Management Practices during and after construction. The National Park Service finds the proposal to be consistent with EO 11990.

APPENDIX C—SCOPING LETTERS

Correspondence (3)

Author Information

Keep Private: No
Name:
Organization: Olympic Forest Coalition Official Rep.
Organization Type: P - Conservation/Preservation
Address:
E-mail:

Correspondence Information

Status: New
Park Correspondence Log:
Date Sent: 03/24/2007
Date Received: 03/24/2007
Number of Signatures: 1
Form Letter: No
Contains Request(s): No
Type: E-mail
Notes:

Correspondence Text

Dear Bill:

Thanks for the opportunity to comment during the scoping phase of the West Twin Creek Crossing project on the Hoh River road. We're appreciative that the Park Service has taken the responsibility of fully studying the likely effects of this project through an environmental assessment, rather than rushing through a quick fix-it job that irretrievably degrades the resource and excludes public input (as has regrettably occurred in years past). Along with the recently completed Queets EA, we sincerely hope this is a harbinger of a much more sensitive and sophisticated approach on the part of the Park Service in dealing with its floodplain road system, with full recognition of the chronic damage to watersheds and salmonids that these roads cause. In the case of West Twin Creek, we wholeheartedly encourage implementation of the most fish-friendly solution. Our initial take is that installation of a modern bridge, lengthy enough for semi-natural channel migration of the creek below it, combined with mitigation features such as anchored log assemblies for bank stabilization (in lieu of riprap) would be acceptable. Please keep us informed as this project proceeds.

Correspondence (2)

Author Information

Keep Private: No
Name:
Organization: National Parks Conservation Association
Organization Type: P - Conservation/Preservation
Address:
E-mail:

Correspondence Information

Status: New
Park Correspondence Log:
Date Sent: 03/26/2007
Date Received: 03/26/2007
Number of Signatures: 1
Form Letter: No
Contains Request(s): No
Type: Web Form
Notes:

Correspondence Text

March 23, 2007

Superintendent – West Twin Creek Crossing Scoping
Olympic National Park
600 East Park Avenue
Port Angeles, WA 98362

Email: olym_ea@nps.gov

RE: Comments on West Twin Creek Crossing Scoping

Dear Superintendent Laitner:

On behalf of the National Parks Conservation Association (NPCA) and the more than 14,000 people we represent in the Northwest, I respectfully submit the following comments on the West Twin Creek Crossing Scoping. NPCA supports the Park Service's goal of restoring public access to the Hoh Rainforest, however we have several concerns. NPCA requests that the following issues, information, and analysis be considered, addressed, and disclosed in the EA for this proposal and as part of the planning process for this proposal:

• In preparing the EA, the Park Service should disclose the amount of planned road reconstruction that will impact areas outside of the current roadway. The Park Service should also analyze impacts on habitat fragmentation and connectivity, weed invasion, increased predation, and poaching caused by road reconstruction.

• The Park Service should prepare a cumulative watershed effects analysis that discloses possible degradation of the Hoh River watershed, the level of disturbance contributed by the proposed action and proposed mitigation measures when project activities would cause degradation. The Park

Service should assess road conditions for the project area and identify maintenance and restoration needs for stream crossings. The EA should also discuss what NPS management actions would be taken to stabilize and prevent future erosion of the reconstructed road.

• NPCA is also concerned that while the conditions that led to current the washouts is not a normal occurrence, it is more than likely that events of this magnitude will occur again over the next several years – especially considering that a very recent rain event blew out the contractor's coffer dam and filled the partially installed culvert with debris leading to a delay in the reopening. NPCA feels that an alternative that addresses and suggests solutions to future road damage along the Hoh River Road should be strongly considered.

NPCA request that we be placed on the mailing list for this project and would prefer to receive future documents on CD-ROM, if possible. Please send all information to:

Correspondence (1)

Author Information

Keep Private: No
Name:
Organization:
Organization Type: I - Unaffiliated Individual
Address:
E-mail:

Correspondence Information

Status: New
Park Correspondence Log:
Date Sent: 02/24/2007
Date Received: 02/24/2000
Number of Signatures: 1
Form Letter: No
Contains Request(s): No
Type: E-mail
Notes:

Correspondence Text

Comments on considerations for the West Twin Creek Crossing EA

February 24th, 2007

I encourage ONP to consider reducing the maintained road in the Hoh River valley and relocating front-country facilities closer to the Park boundary as an alternative plan in the upcoming EA process.

As we learned at the recent conference on climate change and impacts for forest ecosystems on the Olympic Peninsula, the severity of floods in river valleys such as the Hoh is projected to increase in the future. Maintaining roads in these river valleys will only become increasingly difficult.

By relocating front country facilities to the West of West Twin Creek, and abandoning the road beyond West Twin Creek, ONP may potentially:
* Increase ability to provide year round access to the Hoh River Valley.
* Reduce long-term road maintenance costs.
* Reduce long-term ecological impact by a) reducing visitor miles driven to access facilities, b) reduce material demands of continuous road maintenance, c) restore several miles of road corridor to temperate rain forest, d) remove obstructions (road corridor) to river migration within ONP.
* Increase wilderness area inside ONP.

This alternative would require substantial initial costs including the development of new front-country facilities, removal of old front-country facilities, and restoration of the old facilities site. However, this alternative should be considered due to the increasing

likelihood that maintaining access to the existing facilities will become more difficult in the future.

I once heard one of Grant Sharpe's children say that Grant regretted opening up the Hoh River Valley as far up river as was done. This alternative provides an opportunity to honor Grant's early vision of ONP. I encourage ONP to consider this alternative in the EA process. As it concerns the bridge over West Twin Creek, this alternative asks that that bridge becomes a footbridge close to the beginning of the extended Hoh River Trail.

Olympic National Park News Release

February 22, 2007
For Immediate Release
Barb Maynes 360-565-3005

Progress Continues on Olympic National Park Road Repairs; Public Invited to Comment on Hoh Road Bridge Proposal

One by one, park roads and campgrounds are re-opening for public use after the severe storm damage of last November and December.

Olympic National Park maintenance crews, with help from the Washington Conservation Corps, local county and public utility district crews and National Park Service employees temporarily re-assigned from other parks, have succeeded in restoring access to many areas.

"We are grateful for the public's patience and understanding as we continue to clear and repair park roads and trails," said Olympic National Park Superintendent Bill Laitner. "As spring approaches, we urge people to use caution and to call our recorded hotline for current road conditions, 360-565-3131."

The status of many park trails is still unknown; more information will be gathered this spring as the snow melts and crews are able to make damage assessments.

An overview of park road and conditions is provided below.

Hoh Road

Extensive progress has been made on the Hoh Road, with a temporary one-lane bridge now crossing West Twin Creek. Before the November 6 storm, West Twin Creek flowed through a culvert (or large corrugated metal pipe) under the Hoh Road. High water and storm debris plugged the culvert and led to a large (75 feet long and 25 feet deep) washout, now spanned by the new bridge.

The temporary bridge will be in place until a permanent repair can be completed. Installation of a permanent two-lane bridge is proposed for later this year or next. The park is currently seeking initial public input on this proposal to help define the range of issues that should be considered in an environmental assessment scheduled for release this spring.

Two other sections of the Hoh Road, at Taft Creek and Snyder Creek, were also seriously damaged. A new culvert was installed last week at Taft Creek and a Port Angeles contractor was recently awarded the contract to place a new oversized culvert at Snyder Creek. The new culvert, to measure 16 feet wide by 11 feet tall, will be installed in March. After the new culvert is in place, park crews will surface the road with gravel; paving will be completed later this year.

Meanwhile, a crew from the Washington Conservation Corps has been clearing debris from the road shoulders and campground while public utility district crews are installing new electrical cable and transformers to restore power. New phone lines are also being installed. Once power is restored, park crews will restore the water system and clean buildings for use.

The Hoh Road and campground are scheduled to reopen to the public by May 1.

"We are eager to restore access to the Hoh Rain Forest," remarked Laitner. "Travel may be slightly slower than usual, with several sections of the road surfaced with gravel and short traffic delays at the one-lane bridge, but we're confident the public will still enjoy the opportunity to visit the Hoh."

More work awaits park maintenance crews on the Hoh River Trail, where 200 trees block the first five miles of the trail.

Kalaloch, Mora, Ozette

The park's coastal areas, including the Kalaloch, Mora and Ozette campgrounds, are open.

Quinault

Both the North Shore and South Shore Quinault Roads remain open and are in good condition. Both the North Fork Road and North Fork campground, which were heavily damaged by heavy rain and flooding, have recently reopened. With North Fork open, crews have turned their attention to reopening the Graves Creek area, where a massive blowdown has blocked the road.

Queets

The Queets Road is open as far as the Matheny Creek bridge and is closed beyond that point. An Environmental Assessment was released in December to examine the effects of a proposal to restore

access to the upper Queets by using Washington Department of Natural Resources and U.S. Forest Service roads to establish an alternate route by this summer.

Sol Duc

The Sol Duc Road is scheduled to reopen by March 1. Crews have worked through much of January and February to clear the road of the hundreds of trees that blocked it after windstorms in late 2006. The Sol Duc campground will be open for primitive camping (vault toilets and no running water) on March 1, with full services provided beginning on April 6.

Lake Crescent

The Lake Crescent area is open. The Spruce Railroad trail and Marymere Falls trail have both been cleared, although the lower falls viewing platform is closed.

The Fairholme Campground is scheduled to open on April 6.

Elwha

The Olympic Hot Springs Road is open to the Glines Canyon Dam and is closed beyond that point due to slumping along the road, which will be repaired later this spring. The Whiskey Bend Road is closed due to washouts.

The West Elwha, West Lake Mills, Griff Creek and Cascades Rock trails have all been cleared. The Elwha Campground is open, with Altair campground scheduled to open on May 25.

Olympic National Park Visitor Center/Heart o'the Hills

The Living Forest and Peabody Creek loop trails have been cleared. The Heart o'the Hills campground remains closed because of severe wind damage and fallen trees. A date has not yet been set for reopening this campground.

Dosewallips

The Dosewallips Road remains closed due to a washout outside the park boundary.

Staircase

The access road to Staircase (Forest Service Road 24) is closed outside the park boundary because of unstable rock and landslide hazards created by last summer's Bear Gulch 2 fire. The situation will be re-evaluated this spring by U.S. Forest Service road engineers.

How to Comment on the Hoh Road Proposed West Twin Creek Crossing

Members of the public are invited to provide input on the proposal to install a permanent two-lane bridge over West Twin Creek along the Hoh Road. Comments received during this scoping period will be used to help define the issues and concerns to be addressed in an upcoming Environmental Assessment, scheduled for release this spring.

Comments should be submitted on-line by visiting **http://parkplanning.nps.gov,** the website for the National Park Service's Planning Environment and Public Comment system.

Comments may also be sent to the following address no later than March 26, 2007.

Superintendent – West Twin Bridge Crossing
Olympic National Park
600 East Park Avenue
Port Angeles, WA 98362
Fax: 360-565-3015
Website: **http://parkplanning.nps.gov**
Email: **olym_ea@nps.gov**

Commentors should be aware that their entire comment – including personal identifying information – may be made publicly available at any time. While commentors can ask that their personal identifying information be withheld from public review, the NPS cannot guarantee that this will be possible.

For more information about this project, people may visit National Park Service's Planning Environment and Public Comment website at **http://parkplanning.nps.gov** or call the park at 360-565-3004.

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APPENDIX D—FEDERAL- AND STATE-LISTED SPECIES POTENTIALLY OCCURRING IN OLYMPIC NATIONAL PARK (SEPTEMBER 2005)

Species	Federal Status	State Status	Notes
Mammals, Birds, Reptiles, and Amphibians			
Brandt's cormorant (*Phalacrocorax penicillatus*)		Candidate	
Brown pelican (*Pelicanus occidentalis*)	Endangered	Endangered	
Cascade frog (*Rana cascadae*)	Species of Concern		
Common loon (*Gavia immer*)		Concern	
Common murre (*Uria aalge*)		Candidate	
Golden eagle (*Aquila chrysaetos*)		Candidate	
Gray wolf (*Canis lupus*)	Endangered	Endangered	Extirpated
Keen's myotis (*Myotis keenii*)		Candidate	
Long-eared myotis (*Myotis evotis*)	Species of Concern		
Long-legged myotis (*Myotis volans*)	Species of Concern		
Makah's copper butterfly (*Lycaena mariposa charlottensis*)	Species of Concern	Candidate	
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	Threatened	
Mazama pocket gopher (*Thomomys mazama*)	Candidate	Threatened	Endemic
Merlin (*Falco columbarius*)		Candidate	
Northern bald eagle (*Haliaeetus leucocephalus*)	Threatened	Threatened	Proposed for delisting
Northern goshawk (*Accipiter gentilis*)	Species of Concern	Candidate	
Northern sea otter (*Enhydra lutris kenyoni*)	Species of Concern	Endangered	
Northern spotted owl (*Strix occidentalis caurina*)	Threatened	Endangered	
Olive-sided flycatcher (*Contopus cooperi*)	Species of Concern		
Olympic torrent salamander (*Rhyacotriton olympicus*)	Species of Concern		Endemic
Pacific fisher (*Martes pennanti pacifica*)	Candidate (2005)	Endangered	Possibly extirpated
Pacific Townsend big-eared bat (*Corynorhinus townsendii townsendii*)	Species of Concern	Candidate	
Peregrine falcon (*Falcon peregrinus*)	Species of Concern	Sensitive	
Pileated woodpecker (*Dryocopus pileatus*)		Candidate	
Purple martin (*Progne subis*)		Candidate	
Stellar sea lion (*Eumetopias jubatus*)	Threatened	Threatened	
Streaked horned lark (*Eremophila alpestris strigata*)	Candidate	Candidate	
Tailed frog (*Ascaphus trueii*)	Species of Concern		
Van Dyke's salamander (*Plethodon vandykei*)	Species of Concern	Candidate	
Vaux's swift (*Chaetura vauxi*)		Candidate	
Western grebe (*Aechmophorus occidentalis*)		Candidate	
Western toad (*Bufo borealis*)	Species of Concern	Candidate	
Whulge (Edith's) checkerspot (*Euphydras editha taylori*)	Candidate	Candidate	
Fish			
Bull trout (*Salvelinus confluentus*)	Threatened		Critical Habitat; EFH*
Eulachon (*Thaleichthys pacificus*)			
Hood Canal chum (*Oncorhynchus keta*)	Threatened		EFH
Olympic mudminnow (*Novumbra hubbsi*)			
Ozette Lake sockeye (*Onocorhynchus nerka*)	Threatened		Critical Habitat; EFH
Pacific herring (*Clupea pallasi*)			Marine waters
Pacific lamprey (*Lampertra tridentata*)	Species of Concern		
Puget Sound chinook (*Oncorhynshus tshawytscha*)	Threatened		EFH

Species	Federal Status	State Status	Notes
Puget Sound/Strait of Georgia coho (*Oncorhynchus kisutch*)	Species of Concern	Candidate	EFH
Pygmy whitefish (*Prosopium coulteri*)			
River lamprey (*Lampertra ayresi*)	Species of Concern		
Rockfish (marine species)			

*EFH is essential fish habitat

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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