Olympic Hot Springs Road Reroute and Rehabilitation Biological Assessment and Essential Fish Habitat Analysis

Olympic National Park

LOCATION: Clallam County, Washington

Contents

Acronyms

ACOE	Army Corps of Engineers
BA	Biological Assessment
CFR	Code of Federal Regulations
EA	Environmental Assessment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
dB	decibel
FR	Federal Register
GMP	General Management Plan
°F	degrees Fahrenheit
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
SHPO	State Historic Preservation Office/Officer
USC	United States Code
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

The Endangered Species Act of 1973 (16 United States Code [USC] 153 *et seq.*), as amended (ESA) requires federal agencies to conserve and recover listed species and to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species (50 Code of Federal Regulations [CFR] §402) on the lands they manage. The ESA directs all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) when their activities "may affect" a listed species or designated critical habitat (Section 7 consultation). The ESA also mandates that federal agencies contribute to the conservation of federally listed species by using their authorities to conserve (recover) federally listed species so that listing is no longer necessary. National Park Service (NPS) Management Policies (2006) also direct national park units to "inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible."

A species list from the USFWS Environmental Conservation Online System with species in Clallam County was reviewed for this analysis. Using this list, past analysis by the park and USFWS, and expertise from park fish and wildlife staff, it was determined which of those species had a potential to occur within the Action Area (Table 1). This Biological Assessment (BA) covers the listed species identified by both the USFWS and the NMFS as well as an analysis of essential fish habitat (EFH).

There are nine threatened or endangered species that may occur in the park. Two listed species, the streaked horned lark and yellow-billed cuckoo, do not occur in the park. Table 2 shows how these species may be affected within the action area.

Table 1: Federally Listed Species that Occur in the Action Area

Species Common/Scientific Names	Status[1]	Potential for Occurrence/Rationale for Exclusion	Critical Habitat	Habitat Description and Range
Northern Spotted Owl *Strix occidentalis caurina*	Threatened	Historically present in project area	Y*	Not currently present in project area or vicinity
Marbled Murrelet *Brachyramphus marmoratus*	Threatened	Present in project area	Y	Nests from April 1 – Sept 23 early: April 1 – August 5 late August 6 – September 23
Bull Trout *Salvelinus confluentus*	Threatened	Present in project area	Y	
Puget Sound Steelhead Trout *Oncorhynchus mykiss*	Threatened	Present in project area	Y	Spawning adults gone by early June
Puget Sound Chinook Salmon *Oncorhynchus tshawytscha*	Threatened	Present in project area	Y*	Adults present early June-early October (September peak)
Southern DPS Eulachon *Thaleichthys pacificus*	Threatened	Unlikely to be present in project area	Y*	Not found above former Elwha Dam location
Streaked Horned Lark *Eremophila alpestris strigata*	Threatened	Not present in park	N	
Yellow-billed Cuckoo *Coccyzus americanus*	Threatened	Not present in park	N	
Taylor's Checkerspot *Euphydryas editha taylori*	Endangered	Present in different habitat (higher elevation balds) above project area vicinity	N	Feeds on members of the figwort or snapdragon family, including Indian paintbrush and plantains.

Threatened; A species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
*Critical habitat does not include the park.

Table 1 also identifies federally listed species, whether critical habitat has been designated, and nesting/spawning seasons for species that are known to occur, or identified as potentially occurring, in the analysis area.

Table 2: Determination of Effect for ESA-listed Species

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely to Jeopardize the Species?	Is Action Likely to Destroy or Adversely Modify Critical Habitat?
Puget Sound Steelhead	Threatened	Yes	Yes	No	Yes
Chinook	Threatened	Yes	N/A*	No	N/A
Bull Trout	Threatened	Yes	Yes	No	Yes
Northern Spotted Owl	Threatened	No	N/A	No	N/A
Marbled Murrelet	Threatened	Yes	N/A	No	N/A
Taylor’s Checkerspot	Endangered	No	No	No	No

* Although there is currently no critical habitat for Chinook in the park, changes from the 5-year review (2020) are anticipated to include the park, including the Elwha River, as Chinook critical habitat.

Table 3 identifies the species included in Essential Fish Habitat. These three species include: Chinook salmon, Puget Sound coho salmon (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*).

There are also another four fish species considered sensitive: Puget Sound fall chum salmon (*O. keta*), coastal cutthroat trout (*O. clarkia clarkii*), sockeye salmon (*O. nerka*), and Pacific lamprey (*Lampetra tridentata*).

1.1 Purpose of this Biological Assessment

This BA analyzes the potential effects of the proposed Olympic Hot Springs (Elwha) Public Access proposal for a reroute in Olympic National Park (Olympic or park) on federally listed threatened, endangered, candidate wildlife species, and critical habitats, pursuant to Section 7 of the ESA (16 USC 1536 (c)), as amended. Federally listed threatened and endangered animal species and critical habitat meeting the following criteria are addressed in this biological assessment:

- Known to occur in the park based on confirmed sightings;
- May occur in the park based on unconfirmed sightings;
- Potential habitat exists for the species in the park; or
- Potential effects may occur to these species.

1.2 Determination of Effect

Table 3: Essential Fish Habitat

Fishery Management Plan That Describes EFH in the Project Area	Does Action Have an Adverse Effect on EFH?
Pacific Coast Salmon (coho, Chinook, and pink)	Yes

1.3 Current Management Direction

Current management direction for federally listed and proposed threatened and endangered species can be found in the following federal laws:

- ESA of 1973, as amended
- 1916 NPS Organic Act
- NPS General Authorities Act of 1978
- Migratory Bird Treaty Act of 1918
- National Environmental Policy Act (NEPA) of 1969

Current management direction for federally listed and proposed threatened and endangered species can also be found in the following NPS and park documents:

- NPS Management Policies 2006
- Olympic National Park General Management Plan (2008)
- Olympic National Park Foundation Document (2017)

USFWS and NMFS species-specific recovery plans include the following:

- Northern spotted owl (USFWS 2008)
- Marbled murrelet (USFWS 2008)
- Bull trout (USFWS 2015)
- Southern DPS eulachon (NMFS 2011)
- Puget Sound Chinook (NMFS 2005, 2007)
- Puget Sound steelhead (NMFS 2005, 2007)

Critical habitat has also been designated for five species: northern spotted owl (USFWS 1992), marbled murrelet (2008, revised August 4, 2016), bull trout (USFWS 2010), Southern Distinct Population Segment (DPS) eulachon (NMFS 2017), Puget Sound Chinook (NMFS 2005), and Puget Sound steelhead (NMFS 2016). For steelhead, this designated critical habitat does include Olympic National Park. For Chinook and the other species, the park is not included in critical habitat designations, however following the 2020 5-year review for Chinook, the park may be included in its critical habitat designation.

2.0 Consultation History

Olympic National Park has a long history of consultation with the USFWS and NMFS for a variety of emergency and ongoing management projects in the park. The following projects are the most recent:

USFWS and NMFS

- USFWS Ref. Num. 2016-F-0615 and NMFS Ref. Num. WCR-2016-4394 Olympic Hot Springs Road Failure (PEPC 63635) (2016)

Severe winter storms in November, December, and January 2015-2016 created exceptionally high flows on the Elwha River. Flooding undermined and washed out a 3-foot diameter RCP (reinforced concrete pipe) and 90-foot section of Olympic Hot Springs Road. Approximately 1,400-feet south of the washout, flooding also plugged an 18-foot CMP (corrugated metal pipe) culvert, overtopped the road, heavily eroded the road shoulders, and undermined 140-feet of asphalt on the east side of the road. Immediately north of the washout 290-feet of roadway fill slope was heavily eroded and destabilized by floodwater flowing in the former oxbow channel (which existed prior to dam installation) during the flood events. Power and phone to the valley was also lost.

Under the proposed project, a temporary bridge was installed at the Sanders Creek crossing; large woody debris was placed at the newly installed revetment; concrete and/or rock was placed along road shoulders impacted by flood waters to armor road shoulders and to protect the road; the undermined roadway was repaired and an armored spillway installed; the road was raised north of the 18-inch plugged culvert; storm debris was relocated within the floodplain; stockpiled river rock from the Glines Canyon Powerhouse was uncovered, sorted, and hauled; flood debris above the Ordinary High Water Mark (OHWM) was removed and stockpiled for future use as large woody debris (LWD); and riprap dislodged or lost along the river bank during flooding was replaced in kind at the Elwha entrance.

The USFWS consultation included: northern spotted owl, marbled murrelet, bull trout, bull trout critical habitat, and the NMFS consultation included: Puget Sound Chinook salmon, Puget Sound steelhead, and steelhead critical habitat, and Pacific Coast Salmon Essential Fish Habitat (for coho, pink, and Chinook salmon).

- USFWS Ref. Num. 2018-I-1320 (PEPC 75141) (2018)

The geotechnical investigation included approximately 22 off-road test borings and the excavation of two test pits within the potential Olympic Hot Springs Road relocation area. Access to the test boring sites required the construction of a 6 to 10-foot wide, approximately 4,800-foot long path on the forested bench east of the Olympic Hot Springs Road. Monitoring instruments were installed at the test boring sites to collect data on subsurface conditions. The data was used to determine the engineering feasibility of relocating an approximately one-mile section of the Olympic Hot Springs Road out of the floodplain. The geotechnical drilling occurred over approximately three months between September 24, 2018 and March 31, 2019. Monitoring of subsurface conditions continues to occur and may continue beyond the completion and implementation of the Olympic Hot Springs Road Long-term Access Environmental Assessment. The USFWS consultation included: northern spotted owl and marbled murrelet. The USFWS concurred with the park's determination of "may affect, not likely to adversely affect" for both species.

The NPS determined that no in-water work was necessary to conduct the geotechnical investigation and there would be "no effect" on bull trout, Puget Sound chinook (*Oncorhynchus tshawytscha*), and Puget Sound steelhead (*O. mykiss*), or bull trout and steelhead designated critical habitat in the Elwha River.

- USFWS Reference # 01EWFW00-2016-F-0615-R001 and NMFS Reference # WCR-2018-9658, Installation of two temporary bridges south of the Mabey Bridge (8-6-18).

Upon flooding that washed out two additional sections of the Olympic Hot Springs Road in 2017, the park consulted with the USFWS and NMFS regarding the potential effects of permitting road surface grading and installing two more (less robust) temporary bridges, and their abutments, and the later removal of these bridges and the Mabey Bridge. Work would require a maximum of three days in mid-June to install the two temporary bridges and abutments and three days in late August or early September to remove the bridges and abutments. The USFWS consultation included: northern spotted owl, marbled murrelet, bull trout, bull trout critical habitat, and the NMFS consultation included: Puget Sound Chinook salmon, Puget Sound steelhead and Pacific Coast Salmon Essential Fish Habitat (for coho, pink, and Chinook salmon).

The NPS determined that if low-water conditions occur and no in-water work was necessary to install and remove the temporary crossings, there would be "no effect" on Puget Sound (PS) chinook (*Oncorhynchus tshawytscha*), and PS steelhead (*O. mykiss*), or steelhead designated critical habitat in the Elwha River. If low water conditions could not be met, the proposed action could adversely affect Puget Sound Chinook, Puget Sound steelhead, and bull trout, and bull trout and steelhead critical habitat.

3.0 Proposed Management Action and Alternatives Considered

3.1 Background

The Elwha River Ecosystem and Fisheries Restoration Act of 1992 authorized the federal government to acquire the Elwha Dam (1910, 108-feet) and Glines Canyon Dam (1926, 210-feet) hydroelectric projects to study the feasibility of their removal to restore salmon fisheries. The Elwha Dam was removed by 2012, while Glines Canyon Dam removal was fully complete in 2014. Despite being in place for more than 100 years, salmon could be seen annually, close to the Elwha Dam. By 2014, three years after beginning controlled deconstruction of the dams and less than two weeks after the final charges were detonated, salmon began migrating up the Elwha River to spawn. For the Lower Elwha Klallam Tribe (LEKT), this was a seminal moment in their long journey to reestablish salmon fisheries in the Elwha River.

Following removal of the Glines Canyon Dam (2011-2014), alluvial sediments, impounded in the former Lake Mills, began to move downstream along the Elwha River, raising the elevation of the riverbed and causing the river channel to migrate within its floodplain. The sediment release resulted in a large beach being formed at the mouth of the river, contributing to the restoration of the Elwha River estuary. With the reestablishment of the free flowing Elwha River, channel migration from the heavy sediment bedload continues.

Channel migration has contributed to flooding along some of the roadway built in the Elwha River floodplain. Severe winter storms in November 2015 caused approximately 90-feet of the road to be destroyed, when an old meander channel was reactivated near Sanders Creek, just north of the Elwha Campground.

In 2015, two temporary bridges were installed, first a twenty-foot I-beam bridge, and later another temporary modular Mabey Bridge (120-feet long), formerly located over the east channel. Flooding in 2016 also resulted in catastrophic damage to two campgrounds (Elwha and Altair), which were subsequently closed. Flooding in 2017 required installation of two more temporary and less robust, bridges over new washouts. The severity and frequency of ongoing damage made it necessary to temporarily restrict road access by the public in summer 2018, preventing public road access to the Glines Canyon Spillway Overlook and other public use areas in the Elwha Valley on the Olympic Hot Springs and Whiskey Bend roads.

This repeated flooding and channel migration prompted a study of alternatives for Olympic Hot Springs Road, including possible realignment, by the park and Federal Highway Administration (FHWA). The lower road segment in the floodplain has experienced increased severity and frequency of flooding, with damage occurring every year from 2014-2018, to date.

Continued deterioration of the road within the floodplain will damage the adjacent environment by adversely affecting ESA-listed fish species and their designated critical habitat and will continue to result in high maintenance costs, loss of historic features, and hazardous driving conditions. Ultimately, continued loss of portions of the roadway threatens the ability of visitors to see and enjoy the park from important trailheads at Boulder Creek and Whiskey Bend, as well as from the Glines Canyon Spillway Overlook.

3.2 Proposed Action

Obliterate one mile of the lower Olympic Hot Springs Road through the floodplain; construct reroute (realignment) above floodplain; and rehabilitate other sections of existing roadway.

Elements That Were Described as Common to Both Action Alternatives in the EA

<u>Madison Falls Emergency Bank Stabilization</u>: Previous emergency work implemented at the park entrance is included in both action alternatives. Winter storms eroded 200 feet of the Elwha River riverbank adjacent to the road. In an emergency repair, the park placed approximately 700 cubic yards of

riprap along the east bank of the Elwha River following the loss of several trees, including a bigleaf maple that fell during high water (12,000 cfs peak with 7-8 inches of rain) on November 26-27, 2018. The riverbank at this location was 2-10 feet from the edge of the road. The riprap was placed along the eroded riverbank below the OHWM close to the park entrance sign in an area comprising approximately 12 square feet. The project required temporary road closure, including approximately 200 feet of the county road outside the park entrance. It also required monitoring by fisheries and cultural resources staff and emergency consultation with the USFWS, NMFS, Army Corps of Engineers (ACOE), State Historic Preservation Office (SHPO), and the LEKT prior to taking action.

Between the park entrance and the northernmost washout, additional bank stabilization repairs would also occur where the Elwha River has made incursions into the bank close to the road. This area is near the Madison Falls parking area. Repairs would largely consist of placing additional large woody debris ((typically 18-36 inches) and rock to protect and stabilize the bank (Figure 2-6, Appendix 1). The area would also be isolated during construction activities to ensure that no in-water work is necessary (work would be conducted 'in the dry'). LWD structures would be anchored with log pin piles (cottonwood boles and/or large rock in the embankment.

<u>Parking Area and Infrastructure Improvements</u>
Madison Falls Parking Area: This area would be modified by formalizing parking stalls and improving delineation of the parking lot within the existing disturbed areas to improve accommodation of existing parking, including some additional paving. Parking at Madison Falls may also be expanded later. Minor upgrades planned for the Madison Falls parking area include picnic table accessibility.

Glines Canyon Spillway Overlook Parking: The Glines Canyon Spillway Overlook parking area would be modified to add a "hammerhead" turnaround (a slightly expanded turnout) for safer traffic flows within the parking area (Figure 1, Appendix 1).

Boulder Creek (Olympic Hot Springs) Trailhead: The parking area at the end of Olympic Hot Springs Road would be modified within its existing footprint to formalize and delineate parking to reduce the need for visitor parking on road shoulders.

Soldiers Bridge: Minor preventative maintenance, such as bridge rail work and deck sealing would be included.

Powerlines: Powerlines along Olympic Hot Springs Road would be relocated to follow the new alignment (reroute or grade raise). For the grade raise, they would be hung on the bridge and then would continue underground to the corrals, while for the reroute they would be placed underground within the road shoulder. Remaining powerlines would be buried in the road shoulder within the road prism from the reroute/grade raise south to the Ranger Station and to the Whiskey Bend junction.

<u>*Road Rehabilitation*</u>: There are two project components proposed: 1) road rehabilitation, and 2) rerouting the one-mile section of roadway subjected to the flooding washouts.

Road rehabilitation is a mix of rehabilitation, reconstruction, restoration, and resurfacing. It includes resurfacing and other work necessary to return the roadway; including the road shoulder, culverts, bridges, and other parts to a condition of functional and/or structural adequacy. The proposed rehabilitation would occur over 7.2 miles of the Olympic Hot Springs Road, a two lane asphalt concrete roadway, with some gravel sections. The intent of the project is to improve the overall roadway condition through improved pavement or surfacing, to address flooding, and to improve roadway performance. Rehabilitation would include repair of the road base and subgrade where necessary.

The rehabilitation portion of the project would include:

- Minor alignment shifts within the existing road prism;
- Some subsurface repairs within the roadway (below the existing driving surface);

- Repair/replacement of existing walls;
- Culvert repair or replacement – including adding fish passable pipes where needed;
- Ditch cleaning;
- Slope stabilization/erosion protection;
- New guardrail and guardrail replacement;
- Limited tree removal (as needed to repair the roadway);
- New asphalt pavement surfacing or aggregate surfacing; and
- New signing and striping.

Road rehabilitation would involve work in three distinct sections: from the park boundary to the northernmost washout at the east channel (section 1); from the Elwha Ranger Station to the Glines Canyon Spillway Overlook (section 2); from the Glines Canyon Spillway Overlook to the Boulder Creek (Olympic Hot Springs) Trailhead (section 3).

Section 1 and Section 2: Approximately 2.2 miles in length, these sections would be rehabilitated with subgrade stabilization, ditch cleaning, new culverts where needed, new pavement, and minor roadway shifts to provide better separation between the river and roadway. Minor road profile changes would better accommodate high river flows in the lowland areas (i.e. near Sweets Field and a short segment of road just south of the Whiskey Bend Road turnoff that traverses a wetland). Road width would be consistent, with most work falling within previously disturbed clearing limits, however some vegetation removal would be necessary. Minor repairs would be made to existing walls and new walls would also be constructed to help stabilize the existing roadway.

Section 3: This approximately 5-mile long section would be repaved, with new culverts and minor subsurface repairs as needed. The roadway profile and horizontal alignment would be the same. Of the three segments, this portion has the lowest use and the drivable roadway is in the poorest condition. There are several locations that require either wall repair or a new wall. Although overall, this section would have minor repairs, compared to the other sections, there are locations with slope stability issues that would not be included in the proposed project due to their low cost-benefit and limited immediate risk. Work in this segment would fall entirely within the road prism (previously disturbed limits) and would include very minor disturbance outside of the current roadway surface.

Preliminary plans show a range of culvert sizes (24-, 36-, and 60-inch), including approximately 40 culverts that would be cleaned in place. About five drainage structures would be repaired and there would be approximately 43,400 linear feet of ditch reconditioning (cleaning and reshaping). Approximately 250 linear feet of guardrail would be removed and 3,750 linear feet installed in six different locations. There would also be approximately three rockery walls constructed, with lengths of approximately 100 feet at Deep Creek and Deadman's Gulch and 200 feet (at an unnamed location between stations 470 +80 and 472 +85).

Private Property Access: Private property access via road would continue to be available. Maintaining access to private property would require keeping a section of the existing roadway in the floodplain. Access to private land would require a U-turn from the reroute because the access road is approximately 1,200 feet north of where the new reroute would end. This remaining portion of the former Olympic Hot Springs Road would be maintained as an unpaved road. A new gate would be installed at the junction of the private access road.

Mabey Bridge Abutments: The abutments associated with the Mabey Bridge would be removed and the area restored. However, prior to that, during construction of the reroute, the park would temporarily replace the Mabey Bridge. The bridge would be used for access to the project area and to remove the pre-cast well house building via a crane. It could also be used to salvage the kitchen shelter, pending the completion of SHPO consultation, if this is the determined course of action. The bridge would also be used to access the existing roadway to remove pavement, recontour the existing grade, and to plant/reseed.

<u>Restoration</u>
Restoration would include:

- Removing the former Elwha Campground pump house,
- Removing the Mabey Bridge abutments,
- Removing asphalt and recontouring the former roadbed from new east channel crossing to the private property access road, and
- Revegetating the decommissioned roadway sections, including installing a logjam or other structural deflection to deter water from flowing down the old roadbed to allow it to be restored.

<u>Wetlands Mitigation</u>
Wetland mitigation for unavoidable impacts associated with road fill, ditch reconditioning and culvert repairs/replacements is needed. Under the NPS "no net loss" policy, construction or other activity on park lands that has adverse impacts on wetlands must be compensated by restoring wetlands at a 1:1 ratio. Under 33 CFR Parts 325 and 332 for a ACOE Clean Water Act Section 404 permit, it is necessary to replace (compensate) functions and values of impacted wetlands or other waters of the U.S. by restoring historic wetlands, creating new wetlands, or enhancing exiting wetlands. To offset unavoidable impacts, NPS and FHWA propose to restore and/or enhance low functioning wetlands within and adjacent to the project area, the size of which will be determined during the permitting process with the ACOE. The goal of the mitigation plan is to achieve no net loss of wetlands and to restore fish habitat where possible. Success is met when hydrology and vegetation meet criteria specified in the 1987 ACOE Delineation Manual by the end of the monitoring period established during permitting (likely 3-5 years).

Reroute Description
An approximately one-mile portion of the road would be realigned. The realignment would reconnect with the existing rehabilitated road south of the Elwha Ranger Station so that to access the ranger station and private property, vehicles would need to turn north on a section of remaining roadway. This reconstruction portion of the project is intended to improve the roadway so that flooding and flood damage would be less frequent and would not be expected to damage the realigned road.

To construct the reroute, there would be a temporary diversion of flow against the east bank of the Elwha River (east channel and any water flowing in from Sanders Creek or other hillslope seeps). The diversion would be constructed using heavy equipment. The diversion would prevent water from entering approximately 1,160 feet of the east channel and would remain diverted during construction for approximately one year. Installation and removal of the diversion would be timed during the summer (July – August), when impacts to listed fish species would be lowest. A drawdown and rescue plan would be implemented to minimize the loss of fish during the dewatering of the channel. Approximately 500 cubic yards of floodplain sediments would be removed and temporarily stored during the diversion and then replaced where possible in the engineered bank.

<u>Realignment</u>: The road would be rerouted upslope from the east channel crossing on the north end to near the Elwha Ranger Station on the south end (a distance of approximately one mile) (Figures 2-6, Appendix 1). Although the road would be located higher on the slope it would continue to be outside of wilderness. To stabilize the road on the slope above the Elwha River floodplain, road construction would affect the east channel (currently occupied by the Elwha River).

Following construction of the realignment, the existing one mile portion of the roadway within the floodplain would be removed and restored. Depending on recommendations, there would be grading to remove the dike-like effects of the road subgrade, asphalt, and concrete curb removal. Native riparian vegetation would also be added. Relocation of the road, and removal of the existing road, would remove most human impediments to the recovery of federally-listed fish, including Chinook salmon, steelhead, and bull trout in the area and improve essential fish habitat for pink, chum, and coho salmon, continuing to implement the Elwha restoration EIS.

With a paved width of 20-22 feet and 1-2 foot unpaved shoulders, the realignment would be similar in character to the adjacent roadway. There would be cut and fill walls where necessary to stabilize the road on the hillside. The road would have new culverts, short bridges, and drainage features that allow for tributary crossings, and it would be striped for two-way traffic.

Overall, earthwork would comprise approximately 50,000 cubic yards. Cuts and fills would be balanced to the extent practical, and would affect much of the realignment area because it is located on a slope. Where possible, the realignment would follow the route that was used for geotechnical drilling. After construction, disturbed areas would be revegetated with native plants and seeds. Over time, the roadway would have characteristics similar to other parts of the Olympic Hot Springs and Whiskey Bend roads.

Walls would be used where appropriate to minimize impacts on natural and cultural resources, whereas cut and fill would be used to minimize costs. Additional design features and mitigation would include channel roughening elements such as rock, root wads, and logs that would improve fish habitat and protect the roadway embankment. This would create a bank with uneven edges and channel complexity, and the slower velocity would provide more opportunities for spawning locations to develop.

Because the realignment would occur on the slope above the Elwha River floodplain, tree removal would affect approximately 42-52 Douglas-fir, bigleaf maple, western hemlock, and western red cedar trees greater than 12-inches in diameter-at-breast-height (dbh), many of these larger than 36-inches dbh. Under the current design, there would also be up to 10 walls, primarily toward the north end of the project. These would be either rockery type (cut walls) or mechanically stabilized earthen (MSE) walls and would comprise as much as 1,000 linear feet and total as much as 12,000 square feet. At the north end of the east channel, beginning slightly before the first wall and ending before the second wall, would be approximately 8,500 cubic yards of riprap to stabilize the slope beneath the road, which could include rootwads and/or other large logs.

Overall the upslope alignment would place the road in a location where cross drainages are in defined channels; and surface soils are granular rather than fine-grained, thereby resulting in a reduced risk of road failure due to perched groundwater close to the surface. The final design would include more opportunity to “thread” the road to avoid some very large trees.

3.3 Conservation Measures Incorporated into the Proposed Action

The proposed action includes the following incorporated conservation measures suggested from previous consultations with USFWS.

<u>Northern Spotted Owl</u>
(Some also apply to marbled murrelets).

- Adhere to applicable noise and work restrictions as outlined in the 2007 Olympic National Park General Management Plan Biological Opinion[1] (USWFS 2007, p 30):
    - o Within or near suitable northern spotted owl habitat during the applicable season, minimize idling of motors when power tools and equipment, including vehicles, are not in use.
    - o Muffle above ambient noise whenever possible to reduce noise impacts
- Night work would not occur until well after the early nesting season for northern spotted owls is over starting around Labor Day (early September) each year.
- Lights used for night work will be downcast to reduce light pollution and disturbance.

[1] This BO originally expired in 2012 and has been extended twice. It now expires in December 2019. The park is currently working on a revision.

Marbled Murrelet

- Night construction could occur between Labor Day and September 23. If used it will begin one hour after sunset, and will cease one hour prior to sunrise. This restriction does not apply to nighttime activities conducted between September 23 and April 1 of each calendar year.
- During the breeding season, reduce the number of days of above ambient noise activities utilizing heavy equipment at each project area in or immediately adjacent to suitable marbled murrelet habitat.
- Implement standard noise abatement measures during the project, including: scheduling to minimize impacts in noise-sensitive areas, using the best available noise control techniques wherever feasible, using hydraulically or electrically powered tools when feasible, and locating stationary noise sources as far from sensitive areas as possible.
- Minimize idling of motors when power tools, equipment, and vehicles are not in use.
- Muffle above ambient noise whenever possible to reduce noise impacts.
- Protect and preserve critical habitat features, such as potential nest trees, whenever possible.

Table 4: Sound Pressure Levels Associated with Typical Road Construction Noise Sources

Equipment	Typical Noise Level (dBA) 50 feet from source	Equipment	Typical Noise Level (dBA) 50 feet from source
Air Compressor	81 -85	Loader	80- 87
Backhoe	80 - 84	Paver	80 - 89
Compactor	80 -82	Pneumatic Tool	85
Concrete Mixer	85	Pump	77 - 85
Bulldozer	84 - 88	Rock Drill	85 - 98
Generator	78 - 84	Roller	74 - 80
Grader	85	Saw	76
Jack Hammer	85 - 89	Scraper	85 - 89

Source: In 1994 and 1995 Harris Miller, Miller & Hanson Inc. performed noise studies for the Central Artery/Tunnel project in Boston. The results of this study are summarized in FHWA Work Zone Report (and) FHWA website 2004 (*in* NPS YOSE 2008)

Fish

Best management practices and mitigations would be used to control erosion, sediment delivery and disturbance caused by instream construction activities. A plan will be in place to minimize the number of fish trapped during any dewatering of the channel. Measures will also be taken to isolate work areas, and to the extent possible, remove fish from these isolated areas.

- When in-water work occurs, the work area would be isolated with silt curtains or sand bags if feasible. Best management erosion-control practices may include, but are not limited to, silt fencing, filter fabric, temporary sediment ponds, check dams, and/or immediate mulching of exposed areas to minimize sedimentation and turbidity impacts as a result from construction activities. Use of berms, diversions, and sediment traps would be utilized to divert runoff away from cut-and-fill slopes or disturbed areas for the duration of construction and/or maintenance activities. Long-term measures for surface erosion include sediment traps, erosion blankets, and prompt revegetation of all disturbed areas.

- Turbidity would be monitored during all in-water work and turbidity generating activities as described in the water quality monitoring plan. If weather conditions during project operations generate and transport sediment to the stream channel, operations would cease until weather conditions improve. Excess materials (spoils) would be disposed of at least 300 ft. from active stream channels to prevent sediment from reaching flowing waters. To the extent possible, the severity of effects to fish would be limited to changes in behavior and would not exceed level 4 in Table 5. These effects would be temporary and limited to active periods as the diversion is created and removed. Effects should not persist for more than 2,400 feet downstream. In general, projects affecting turbidity have the highest sediment concentrations for brief periods of time following removal of in-stream diversions, when water is first introduced back into a channel.

Table 5: Severity Effects on Fish

SEV	Description of Effect
0	No
	Behavioral Effects
1	Alarm reaction
2	Abandonment of cover
3	Avoidance response
	Sublethal Effects
4	Short-term reduction in feeding rates; short-term reduction in feeding success
5	Minor physiological stress; increase in rate of coughing; increased respiration rate
6	Moderate physiological stress
7	Moderate habitat degradation; impaired homing
8	Indications of major physiological stress; long reduction in feeding rate; long-term reduction in feeding success; poor condition
	Lethal and paralethal effects
9	Reduced growth rate; delayed hatching; reduced fish density
10	0-20% mortality; increased predation; moderate to severe habitat degradation
11	>20-40% mortality
12	>40 – 60% mortality
13	>60-80% mortality
14	>80-100% mortality

Source: Newcombe and Jensen 1996 in David Evans and Associates 2016.

- Landing mats, diversion, or a small temporary crossing, would be used across the Sanders Creek terrace channel to create a low-water crossing for up to eight days during removal of the north and south bridge abutments and ramps. This would minimize disturbance of substrate, further reducing potential activation of suspended sediment, and reducing potential direct impacts to fish habitat.

- Regular site and machinery inspections, conducting any required equipment maintenance outside of the riparian area, and having a contaminant spill clean-up kit on-site would further limit the potential for impacts to water quality. To limit the duration and area of disturbance from construction activities, all construction would be limited to designated areas and construction activities would be sequenced. Vegetable-based hydraulic fluid would be used in all machinery and hydraulic spill kits would also be present at all construction sites.

- Ground and vegetation disturbance would be avoided as much as possible and contained to as small a footprint as possible, while meeting project objectives. Park landscape architect and vegetation specialists would provide direction in grading, ground sculpting, and revegetation. All areas of disturbance will be rehabilitated. Park inspection of all fill, gravel, or soil material will be required two weeks prior to import into the park. Eradication of weed source or an approved alternative source may be required. Additionally, all equipment from outside the park would be thoroughly cleaned of mud and weed seed prior to initially entering the park. To further minimize the possibility of weed contamination, only certified weed-seed free straw bales or other siltation devices would be permitted as erosion control. For revegetation/restoration activities, only plants originating from only the park would be used.

3.4 Other Alternatives Considered

List of Alternatives Considered but Eliminated from Detailed Study

- *Variations of the Grade Raise and Realignment Alternatives*

Several iterations of the grade raise and realignment alternatives were evaluated as conceptual alternatives, including variations of the realignment alternative with all bridges, all walls, or all cuts and fills; and bridges of different lengths or multiple bridges for the grade raise alternative. Because these had more impacts than other alternatives and/or were less feasible, they were dismissed from further consideration.

- *Raise the Road 1-2.5 feet as Called for in the Elwha River Ecosystem and Fisheries Restoration Plan (Elwha) EIS (FEIS 1996, SEIS 2005)*

This alternative was considered but dismissed because a 1-2.5-feet grade raise would be costly and would not be sufficient to maintain the road in its current location and allow for consistent access. The grade raise would not be sufficient to prevent flooding from overtopping the roadway during a typical storm. It would also continue to limit the river access to the channel migration zone.

- *Construct a Flood-Proof Roadway by Raising the Grade and Fortifying the Road Base*

Adding another 10-15 feet of elevation to the roadway, combined with additional bridge structures would greatly increase the impacts on the floodplain, more than doubling the amount of fill required to construct the roadway and adversely affecting acres of special status fish habitat. This alternative was dismissed because it would have far more impacts than other alternatives considered, would not necessarily achieve truly flood-proof access, and would control the Elwha River's access to the east channel by designing a specific channel for this to occur.

- *Prevent the River from Overtopping the Roadway by Controlling the River Channel*

Dredging or altering the river channel is against NPS policy and would adversely affect listed fish species. This alternative was rejected because it does not meet the NPS mission and would be unlikely to be permitted by agencies such as the USFWS and the ACOE.

- *Construct the Roadway Further Away (Upslope) from the Elwha River/Begin the Reroute Near the Elwha Boneyard (Maintenance Staging Area)*

This area was found to be too steep for road construction, based on the need to balance cut and fill slopes and avoid importation of extensive amounts of road fill. This alternative would have far greater costs and impacts than the proposed action. Based on the steepness of the terrain between the boneyard and the southern part of the reroute alignment, it is not considered feasible without extensive walls, cuts, and fills that would adversely affect more vegetation and wildlife habitat.

- *Construct a Single-Lane Reroute with Curve-widening or Turnouts*

This alternative was evaluated in response to public comments that called for the narrowest roadway with the least possible impacts. Based on FHWA analysis, constructing a single-lane roadway with either curve widening or turnouts would cost approximately 10-15 percent less, and, in general, would reduce impacts by about 10 percent. The narrower roadway would not provide sufficient area for anticipated traffic volumes associated with visitor use, and would not achieve worthwhile savings in reducing the overall impacts of construction on park resources. Traffic volume precludes a narrower roadway.

- *Construct an Aerial Tram to Take Visitors to the Boulder Creek (Olympic Hot Springs) Trailhead and/or to the Top of Whiskey Bend Road*

This suggestion arose during public scoping for both the current project, as well as during scoping for the geotechnical investigation EA. Constructing an aerial tram and getting a concessioner to run it is outside the scope of the plan. Establishing parking in the channel migration zone would have more impacts on old growth trees and the floodplain. In addition, it would add long-term adverse effects on air quality, noise, and could affect wilderness in the Elwha Valley. Routine operation of an aerial tram would also adversely affect suitable habitat for northern spotted owls and marbled murrelets during their nesting seasons. Operation of an aerial tram would also be unlikely to be feasible as a concession operation, due to high construction and maintenance costs.

- *Construct a New Road Entrance from the West Side of the Elwha River*

The west side of the Elwha River beyond privately owned property along Herrick Road and down to the Elwha River at Soldiers Bridge is within designated wilderness. Therefore, construction of a west access road is not feasible because it would require an Act of Congress to modify the wilderness boundary.

List of Actions Outside the Scope of the EA.

These could be Considered once Disposition of the Roadway has been Determined

- *Remove or Relocate Park Facilities Subject to Flooding and/or Protect Entrance Station, Ranger Station and Other Park Assets from Flooding*

This alternative was considered but dismissed because most of the facilities that could be subject to later flooding are part of the Elwha Ranger Station Historic District and moving them would adversely affect the integrity of the district, altering their eligibility for the National Register of Historic Places. Until reliable road access is restored, considering relocation or removal of the facilities is premature. Therefore this action was considered but dismissed.

- *Relocate Closed Campgrounds*

Although camping was a widely popular activity in the Elwha Valley, suitable locations for campgrounds are limited by the terrain and access to it. Until reliable road access is restored, considering new camping opportunities is premature. Therefore this action was considered but dismissed.

- *Systematically Retreat from the Area Now Occupied by the Olympic Hot Springs and Whiskey Bend Roads*

This alternative would encompass removal of non-historic NPS facilities from the Elwha Valley, including the Olympic Hot Springs and Whiskey Bend roads and existing maintenance facilities.

It was dismissed from further consideration because it does not meet the purpose and need. Two previous planning documents (the GMP and the Elwha River Restoration), both environmental impact statements, have affirmed the park's desire to retain road access. The Elwha River Ecosystem Restoration project was the largest dam removal to date in the nation's history and the second largest ecological restoration project and has been of high public interest. Closing the road would greatly reduce the opportunity for visitors to view the recovery of this ecosystem from the Glines Canyon Spillway Overlook and other areas. This alternative was also dismissed because it would have disproportionate short-term impacts on park resources from decommissioning 8.5 miles of the Olympic Hot Springs Road and 4.5 miles of Whiskey Bend Road, including from removing typical and very large culverts, remaining pavement, gabion baskets, and vault toilets with heavy equipment that would have to cross the Elwha River several times where washouts have removed the roadway. The Elwha Ranger Station Historic District includes 13 historic buildings and structures. There are also six non-historic buildings and structures that would need to be removed and/or relocated, an action that is outside the scope of this plan.

4.0 Project Area Description

Olympic National Park is in the northwest corner of the U.S. The park lies in Clallam County in Washington State. Elevations range from sea level to approximately 1,800 feet at the Boulder Creek Trailhead. The park is considered a temperate rainforest.

4.1 Climate

The Elwha River is located in the rain shadow of the Olympic Mountains, on a peninsula influenced by the mountains and maritime environment. Afternoon temperatures in the warmest summer months average from 65- to 70-degrees Fahrenheit (°F) with night time temperatures as low as 45°F. During the winter months, temperatures are in the 40s and night time readings are usually in the upper 20s to lower 30s. Most yearly precipitation (76 percent) falls during the six months between October 1 and March 31. Approximately five percent of annual precipitation falls during July and August, creating summer drought conditions.

Most storms gather moisture over the Pacific Ocean, move across the Olympic Peninsula from the southwest, and deposit rainfall in the temperate rainforest. The road project is in an area of Olympic National Park considered to be in a rain shadow that receives less rain than the southwest portion of the park. Sequim, Washington (20-air miles to the east of the Hurricane Ridge Visitor Center) records an approximate annual rainfall of 17 inches in this shadow.

4.2 Topography

The Elwha Valley is surrounded by very steep mountainous terrain rising to about 5,000 feet in elevation. From the top at the Boulder Creek Trailhead (1,800 feet), the Olympic Hot Springs Road descends through approximately five miles of mountainous terrain, with sharp turns until it reaches the Glines Canyon Spillway Overlook, where it starts to follow the Elwha River. After Soldiers Bridge, the road is within the Elwha River floodplain, which exhibits relatively flat topography all the way to the park boundary at Madison Falls.

4.3 Water Resources

Water Resources: Hydrology and Floodplains

The Elwha River basin is a large watershed on the Olympic Peninsula, covering 321 square miles, and encompassing 70 miles of river and tributaries. Most (83%) of the watershed is within the park.

Glines Canyon Dam (removed in 2014) was located approximately 3.5 miles from the park entrance (river mile 13.5). The Elwha Dam (removed in 2012) was located 8.5 miles downstream, outside the park boundary (river mile 4.9) closer to Port Angeles. Construction of the dams disrupted natural river processes, and created the former Lake Mills and Lake Aldwell, respectively. Dam construction and removal has restored natural river processes with resultant dramatic effects to the Elwha River channel and floodplain.

The Elwha River follows a steep slope down the valley. This is most apparent at the headwaters where the gradient is an average of 16%. That gradient generally decreases farther downstream after it flows through several steep, narrow, bedrock canyons. Between these canyons, the channel is less steep and has wider reaches within broad floodplains. At the outlet of the canyons, there are deltas where the channel widens, streamflow slows, and deposits are left behind by the river. In the floodplain, the river meanders, occasionally undercutting alluvial terrace and valley wall deposits (NPS 2005). The floodplain below the Glines Canyon Spillway Overlook is a largely undeveloped, relatively narrow valley confined by steep, forested hillsides where the river gradient is much lower (0.75%).

From north to south, the following tributaries drain into the Elwha River: Madison Creek (from the east), Freeman Creek and Hughes Creek (from the west), Griff Creek (from the east), Stukey Creek (from the west), Sege Creek (from the east), and Boulder Creek (from the west). After the road turns west to parallel

Boulder Creek, Deer Creek, Deep Creek, and Deadman's Gulch cross the roadway from the north. Only Freeman Creek, Hughes Creek, and Boulder Creek do not cross the road before entering the river.

From the park entrance, the Olympic Hot Springs Road parallels the east side of the river channel. The former Elwha Campground was also on the east side of the river, and along with most of the Altair Campground on the west side, was also within the 100-year floodplain. Some of the Elwha Ranger Station facilities, such as the maintenance building, have been documented to be approximately one-foot above the 100-year floodplain.

The Elwha SEIS described both the Olympic Hot Springs Road and the Elwha Ranger Station as vulnerable to loss through flooding and bank erosion following dam removal (NPS 2005). Although the Elwha River restoration plan called for monitoring bank erosion during dam removal, protecting the riverbank with large angular rock, engineered logjams, or a combination of the two, this would have been insufficient to prevent the major flood damage that occurred in November 2015 and in November-December 2016.

Since then, what was once a small, low gradient stream (Sanders Creek) has become the east channel of the river, with flows nearly evenly split between the mainstem and east channel. This east channel flows from west to east within the project area and then onto the terrace of the floodplain, where it enters an oxbow channel along the east valley wall. Beginning in 2015, this oxbow channel captured approximately half the river's flow (NMFS 2016: 36). The Elwha River is now relatively confined, compared to its historic extent in this part of the valley. Similarly, the east channel is also confined, with a width of 45-65 feet at flows around 1,000 cfs (NMFS 2016:36). During 2017 widths in the main channel were 70-140 feet at similar flows. The channel is now about 500 feet shorter. The east river channel is deeper, with a steeper gradient and higher velocities than the river (NMFS 2016:36). The Mabey Bridge abutments at the downstream end confine flow.

Since dam removal, the Elwha River has accumulated more large woody debris, which has blocked old braids in the main river channel. During flooding, the river has been forced around deposits of large wood into areas within the broader river valley, including the roadway and the east channel.

After 2015 and before capturing the Elwha River, the lower reach of Sanders Creek had a broad bank-full width and a somewhat unconstrained active channel with an average OHWM width of 35 feet with areas of high flow. Previous to that Sanders Creek was a small channel accommodated by a 36-inch culvert. The substrate was a mix of gravel, sand, and silt with scattered cobble and boulders. Juvenile salmon were observed in small pools during the wetlands survey. Good habitat included stable banks, pools, cover, woody material, tributaries, and a somewhat stable substrate. The riparian buffer was also in good condition and was dominated by big-leaf maple and red alder. Due to human use, the creek has been slightly degraded from the formerly adjacent Elwha Campground and the constriction of the channel at the Mabey Bridge. The area also has sediment accumulation due to the relatively recent removal of the Glines Canyon Dam (AECOM 2017: 10).

Sanders Creek was primarily groundwater fed during the summer. During the winter, surface flows entered the channel from the eastern hillslope via two small drainage systems (approximately 350 acres total). Three road failures were previously temporarily bridged to provide summer access and to allow the park to winterize area structures (many of them historic), prior to not having access during the proposed project under one of the alternatives.

Water Resources: Water Quality

The groundwater in the Elwha River watershed is of excellent quality, and the entire headwaters area within the park is protected. Watershed land use is primarily wilderness, recreational, and rural, but non-point source pollution from agricultural and other uses has minor influences on groundwater quality.

The Elwha River within the project area is listed as a 303(d) impaired waterbody with a Total Maximum Daily Load (TMDL) for temperature since 2008. There are presently no water quality improvement projects for this TMDL in the Elwha River identified in the EPA database. It is possible that this impairment has been mitigated through the removal of the Glines Canyon Dam and may be delisted after further evaluation.

Groundwater withdrawals by the Dry Creek Water Association (DCWA) and the Elwha Place Homeowners' Association (EPHA) are periodically tested for several contaminants, as required by the Washington State Department of Health. Well water that was tested for a variety of pollutants, including turbidity, coliform bacteria, inorganic chemicals, trihalomethane, volatile organic compounds, and pesticides, was found to be of very high quality. Volatile organic compounds were not detected in any samples. Inorganic maximum contaminant levels were not exceeded in any sample taken from the DCWA wells (2003-04) or the EPHA wells (1985–93) (NPS 2005:67). Similarly, the USGS tested water resources at the Lower Elwha Klallam Tribe (LEKT) Reservation in 1977 and found them to be of excellent chemical quality. The LEKT has sampled two of their community wells for complete inorganic and organic analysis. All parameters tested were lower than state maximum contaminant levels (NPS 2005:67).

Water Resources: Wetlands

A wetlands study in 2015 (David Evans and Associates) was made of the entire length of the Olympic Hot Springs Road. Eighteen 'natural' (non-ditch) wetlands were identified. Many of these extend outside the project area. Except for two, they would likely meet ACOE jurisdictional standards because they are connected to the Elwha River and/or its tributaries by surface water flows. This wetlands report was reviewed and ground-truthed by AECOM in 2019 and was determined to be valid and accurate.

Wetlands were characterized according to the ACOE definition, requiring "inundation or soil saturation long enough during the growing season to create an anaerobic condition sufficient to alter chemical and biological activity in the soil, soil microbes, and rooted vegetation" (ACOE 1987). In this classification system, wetlands are distinguished by a combination of three factors, including the presence of water-dependent vegetation, anaerobically altered (mottled) soils, and/or the presence of water. (Under the Cowardin classification system typically used by the NPS, only one of these characteristics must be present to classify an area as a wetland, however wetlands often have two or more of these characteristics.)

A second wetland and stream delineation was conducted (July 10-14, 2017) for the reroute/grade raise to document wetlands and other potentially jurisdictional waters, including streams, seeps, and ditches (AECOM 2017). It was also conducted according to ACOE and Cowardin classification methods. Due to site and design changes between 2017 and 2019, this area was re-delineated in 2019 (AECOM 2019) and the 2019 report supersedes the 2017 report.

<u>2015 Report</u>: This study found 30 stream-associated wetlands, 13 ditch-associated wetlands and 18 natural wetlands. Only W-13 and D-7, which were isolated from other waters were considered non-jurisdictional. Three isolated wetlands, (W-18, D-10, and D-12) which drain to uplands rather than the Elwha River, are considered to be jurisdictional only by the state.

All of the ditch-associated wetlands except D-7 were classified as palustrine emergent (PEM). D-7 has permanent water, but no wetland vegetation. Many of the non-ditch associated natural wetlands were also classified as palustrine emergent (PEM), including W-2, 3, 4 (also palustrine scrub-shrub - PSS), 5, W-6 and 7 and 8 (also PSS and palustrine forested - PFO), 9 (also PSS), 10 (also palustrine emergent scrub-shrub Cowardin), W-12, W-13 and 14 (also PFO), 15, 16.

In addition to those classified above as PEM, other single classification mixed palustrine scrub-shrub Cowardin (PSSC) wetlands were W-11, and 17.

For the ditch wetlands:

> "Within the bottom of the ditch, as shown in the paired plots throughout the study area, the presence of horsetail, coltsfoot, and salmonberry indicated the wetland boundary, whereas the rapid transition to upland (due to the well-drained soils) was characterized by a transition to swordfern, trailing blackberry, and other upland species."

Four streams (S-9, 16, 21, and 23) are considered "built" because they drain ditched wetlands. All of the other streams enter the area from upslope. Four of the streams are named: S-1 (Madison Creek), S-3 (Sanders Creek), S-5 (Griff Creek), and S-8 (Elwha River).

2019 Report: This study found 4 stream-associated wetlands (S-A, B, C, D), 2 ditch-associated wetlands (D-A, B) on the east side of the road, and 9 natural wetlands (W-A, B, C, D, E, F, G, H, and M).

S-A, B and C are tributaries to the East Channel (Sanders Creek). S-D drains a wetland (W-E). W-A and D are classified as PEM and PSS. Wetland B is PSS. Wetland C, E, F, and H are PEM, and Wetlands G and M are classified as PEM and PFO.

No wetlands are mapped by the National Wetlands Inventory within the project area (David Evans and Associates 2015), although in places the Elwha River, which is mapped as riverine, upper perennial, unconsolidated bottom, permanently flooded (R3UBH), is either part of the project area or close to it.

The OHWM on the east channel was established by locating where the fluctuations of water in the stream have created a clear, natural line on the bank indicated by changes in the soil/substrate and vegetation. OHWM demarcation was based on ACOE (Mersel and Lichvar 2014) and Washington State Department of Ecology (Anderson et al. 2016).

Fish-bearing streams include: (Madison Creek), S-1 (Stukey Creek), S-3 (Sanders Creek), S-5 (Griff Creek), S-6 (an unnamed creek), and S-8 (Elwha River). The lower reaches of Freeman Creek are also fish-bearing.

4.4 Vegetation Communities

Vegetation in the project area consists mainly of riparian and upland mature forests. Upland areas are dominated by mature and old-growth coniferous forest. Common trees include Douglas-fir (*Pseudotsuga menziesii),* grand fir *(Abies grandis),* western hemlock *(Tsuga heterophylla*), western red cedar (*Thuja plicata),* Sitka spruce (*Picea sitchensis*), and bigleaf maple (*Acer macrophyllum*) (AECOM 2017). The understory vegetation is typically sword fern (*Polystichum munitum*), and herbaceous species such as vanilla leaf (*Achlys triphylla*), pathfinder (*Adenocaulon bicolor*), wild ginger (*Asarum caudatum*), three-leaf foamflower (*Tiarella trifoliata*), enchanter's-nightshade (*Circaea alpina*), and oak fern (*Gymnocarpium disjunctum*) (AECOM 2017). Low Oregongrape (*Mahonia nervosa*), salal (*Gaultheria shallon*), bald-hip rose (*Rosa gymnocarpa*), oceanspray (*Holodiscus discolor*), osoberry (*Oemleria cerasiformis*), western serviceberry (*Amelanchier alnifolia*), and trailing blackberry (*Rubus ursinus*) are common understory shrubs.

Upland and riparian forests with restrictive drainage primarily consist of bigleaf maple and red alder (*Alnus rubra*) (AECOM 2017). Understory vegetation in these areas includes vine maple (*Acer circinatum*), salmonberry (*Rubus spectabilis*), common snowberry (*Symphoricarpos albus*), thimbleberry (*Rubus parviflorus*), and spreading gooseberry (*Ribes divaricatum*). The herbaceous layer is comprised of lady fern (*Athyrium filix-femina*), giant horsetail (*Equisetum telmateia*), stinging nettle (*Urtica dioica*), piggyback plant (*Tolmiea menziesii*), Arctic sweet-coltsfoot (*Petasites frigidus*), and coastal hedge-nettle (*Stachys chamissonis*) (AECOM 2017).

Scrub-shrub wetland vegetation predominately consists of salmonberry and vine maple, along with herbaceous species including giant horsetail, lady fern, piggyback plant, water parsley (*Oenanthe* *sarmentosa*), stinging nettle, Siberian springbeauty (*Claytonia sibirica*), and tall mannagrass (*Glyceria elata*) (AECOM 2017). Emergent wetland vegetation includes American brooklime (*Veronica americana*), tall mannagrass, skunk cabbage (*Lysichiton americanus*), Arctic sweet-coltsfoot, yellow monkeyflower (*Mimulus guttatus*), creeping buttercup (*Ranunculus repens*), coastal hedge-nettle, big-leaf sedge (*Carex amplifolia*), short-scale sedge (*Carex leptopoda*), piggyback plant, and water parsley (AECOM 2017). Forested wetlands are dominated by bigleaf maple and red alder, with similar understory species as the scrub-shrub wetlands (AECOM 2017).

Based on information provided by the USFWS, there are no federally listed, proposed, or candidate plant species likely to occur within the project area. No rare plants were identified during the wetland and stream delineation. There are two rare plants – branching montia *(Montia diffusa)* and tall bugbane (*Cimicifuga elata)* – that have the potential to occur in the project area based on the Washington Natural Heritage Program's Rare Plants and High Quality Ecosystem Dataset (WNHP 2017).

4.5 Fish and Wildlife

Wildlife

Wildlife are abundant throughout the low-lying riparian, wetland, and upland habitats in the Elwha River watershed. Small mammals common to the proposed project area include Douglas squirrels, Townsend chipmunks, deer mice, Pacific jumping mice, shrews, moles, bushy-tailed wood rats, mountain beavers, and snowshoe hares. Mammalian predators include black bear, coyote, mink, weasel, and mountain lion. The area also supports Columbian black-tailed deer, Roosevelt elk, beaver, and river otter. Several species of bats are associated with forests in the area, including little brown myotis, California myotis, hairy-winged myotis, long-eared myotis, silvery-haired bat, hoary bat, and big brown bat. Songbirds and raptors common to the area include the bald eagle, red-tailed hawk, pileated woodpecker, great blue heron, common merganser, American robin, song sparrow, black-capped chickadee, varied thrush, northern flicker, and winter wren. Seasonally ponded areas provide habitat for amphibian species such as the northern red-legged frog (*Rana aurora*), rough-skinned newt (*Taricha granulosa*), and Pacific treefrog (*Pseudacris regilla*) and these were encountered during the wetlands survey. There is also one instance of the Olympic torrent salamander (*Rhyacotriton olympicus*) recorded east of the project area near stream S-C (WDFW 2017b in AECOM 2019: 12)

Fish

Before construction of the Elwha and Glines Canyon dams, native fish used the river and its diverse habitats for spawning. Since the removal of the dams, all 10 native anadromous fish runs have shown some (or a great deal) of recovery. This also includes winter and summer-run steelhead, and sea-run cutthroat trout. Sediment formerly caught behind the dams, has washed down river to a large degree, opening up spawning grounds in the main river and its tributaries that had been unavailable for over 100 years.

The mainstem and east channels provide spawning and rearing habitat for coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*O. tshawytscha*), rainbow trout/steelhead (*O. mykiss*), sockeye salmon, (*O. nerka*), pink salmon (*O. gorbuscha*), chum salmon (*O. keta*), bull trout (*Salvelinus confluentus*), and Pacific lamprey (*Lampetra tridentata*). *N*onnative brook trout (*Salvelinus fontinalis*) are also periodically observed in the area.

4.6 Existing Developments and Uses / Management

The park is currently managed under the Olympic National Park General Management Plan (NPS OLYM 2008), which provides broad direction for management of the park for visitor experience and resource protection. The park foundation document which identifies park purpose, significance and fundamental resources and values was completed in 2017. The park completed a mountain goat management plan in 2018 to address the presence of nonnative goats and safety issues related to them. Rehabilitation of Highway 101 along Lake Crescent is also underway and nearly complete.

The Olympic Hot Springs Road provides access to several trailheads that access the park's more than 876,447 acres of designated wilderness. The road also provides the only park access to observe the former dam and lake site associated with the nation's largest dam removal project to date. The area has overlooks and interpretive exhibits for visitors. Prior to dam removal, this road averaged 70,000 visitors annually. In the summer after dam removal, there were more than 30,000 visitors in one month (July 2014). Although that number has tapered off, largely due to impaired vehicle access, there continues to be a great deal of public interest in watching area recovery. In 2015, the Elwha Valley had 130,985 annual visitor days.

Prior to the most recent road washouts along the Olympic Hot Springs Road in November 2017, the road provided vehicle access to the Glines Canyon Spillway Overlook and multiple trailheads such as Whiskey Bend and the Boulder Creek Trailhead. Average daily traffic (ADT) on the roadway was measured as approximately 350 vehicles, with seasonal volume increasing to approximately 915. One of the most popular activities was viewing the Glines Canyon gorge from the Glines Canyon Spillway Overlook or from the East/Whiskey Bend Overlook, approximately one mile up the Whiskey Bend Road. The Elwha area has nine trailheads that provide access to about 20 hiking trails (NPS 1994:3-64). In addition, rafting companies would use the former dam powerhouse site as a put-in for Elwha River trips. Camping in Altair and Elwha campgrounds was also a popular activity, with an estimated 5,000 – 8,000 participants annually (NPS 1994:3-83). Visitors also enjoyed boating and recreational fishing from below the dam.

Prior to the washouts, there were 31 campsites, parking pads, and other features associated with Altair Campground and 41 sites in the Elwha Campground. Paved roads in the campgrounds comprised 1,426 linear, 17,107 square feet in Elwha and 2,640 linear, 31,680 square feet in Altair).

With the road closed, visitors currently engage in a variety of recreational opportunities, including sightseeing, picnicking, hiking, backpacking, fishing, horseback riding, and kayaking/rafting. Visitors also use the bypass trail to hike, horseback ride, or carry their bikes around the closed roadway en route to upper roadway or trail hiking or riding.

Within the park and upstream of the project area, the Elwha River is in pristine condition and is considered eligible for designation as a wild and scenic river. Water quality, fish habitat, riparian habitat, and scenic and esthetic values have been cited as values for the potential wild and scenic designation (NPS 1994: 3-65).

When the road was in full operation it also provided vehicle access to the former Elwha and Altair campgrounds. Currently, the Olympic Hot Springs Road south of the Madison Falls parking lot is accessible to the public by foot, stock, and bicycle. The bypass trail provides access around the road washouts to the trailheads and Glines Canyon Spillway Overlook.

Access to the Elwha Valley for park staff, utility providers, and contractors is essential and time critical to maintain park operations, emergency services, employee housing, and maintenance facilities. Currently, there is no commercial power to the Elwha Valley and park facilities are vulnerable to mold impacts and damage without heat. Facilities include housing, ranger station, maintenance area, and stock operations area. Most structures in this area are part of the Elwha Ranger Station Historic District. Pack stock support maintenance and search and rescue efforts on the stock accessible portions of the park's approximately 620 miles of trails. They are also important to backcountry resource management, scientific research, and historic structure maintenance. Public access is important due to the high visibility of the Elwha River restoration and fish passage project and abundance of educational opportunities. Access is also important for private property owners that have in-holdings within the Elwha Valley.

4.7 Action Area

The action area is defined as all areas within the park that may be affected directly or indirectly, including from the effects of interrelated and interdependent actions. The action area is defined by the boundaries of all the effects of all aspects of the proposed action. The action area considered in this BA is the area within the Elwha Valley in Olympic National Park where historic, currently occupied, and suitable habitat for listed and proposed species and critical habitat exists including above and below the Olympic Hot Springs Road corridor.

5.0 Listed Species Considered and Evaluated

Table 1 indicates whether the species from the USFWS official species list are known or expected to occur within the analysis area, suitable habitat is present, or if not, why they are excluded from further analysis (with rationale). As indicated in Table 1, there are six federally listed threatened or endangered species with the potential to occur. These species will be addressed hereafter in this assessment (evaluated species).

5.1 Marbled Murrelet

Identification: The marbled murrelet is a small, chubby seabird with a very short neck. During the breeding season it has dark brown to blackish upperparts and heavily mottled white belly and throat. In winter the upper parts become gray, dark marks form on the sides of the breast and a white ring develops around the eye. Males and females are similar in appearance and size. Juveniles are similar to winter plumage adults, but with dusky mottling on the underparts. Vocalizations include a sharp keer' or low kee'.

Listed as threatened in Washington, Oregon, and northern California in 1992, the primary reasons for listing included extensive loss and fragmentation of old-growth forests which serve as nesting habitat for murrelets and human-induced mortality in the marine environment from gillnets and oil spills (USFWS 1992). Although some threats such as gillnet mortality and loss of nesting habitat on Federal lands have been reduced since the 1992 listing, the primary threats to species continue (USFWS 2010). Surveys from 2000 to 2008 documented that murrelet populations throughout the listed range have continued to decline at a rate of 2.4 to 4.3 percent per year, a population decline of 19 to 34 percent since 2000 (USFWS 2010). Since 2008, populations have continued to decline. The USFWS Recovery Plan for the marbled murrelet emphasizes maintaining and protecting occupied habitat and minimizing the loss of unoccupied suitable habitat (USFWS 1997a in USFWS 2008).

Range: The park is located in two marbled murrelet recovery zones (Puget Sound and Western Washington Coast Range). The line of demarcation between the two zones essentially bisects the park on a northwestern to southeastern diagonal. Olympic National Park habitat is located in two of six conservation zones (Puget Sound and Western Washington Coast Range) identified in the Recovery Plan for the species (USFWS 2008). Conservation Zone 1 includes all the waters of Puget Sound and most waters of the Strait of Juan de Fuca south of the U.S.-Canadian border and extends inland 55 miles from the Puget Sound, including the North Cascade Mountains and the northern and eastern sections of the Olympic Peninsula.

Threats: The primary reasons for listing include extensive loss and fragmentation of old-growth forests which serve as nesting habitat for murrelets and human-induced mortality in the marine environment from gillnets and oil spills (USFWS 1992 *in* NPS MORA and USFWS 2010). Although some threats such as gillnet mortality and loss of nesting habitat on federal lands have been reduced since the 1992 listing, the primary threats to species persistence continue (NPS MORA and USFWS 2010). Nest site predation is suspected to be the principal factor limiting marbled murrelet reproductive success. Losses of eggs and chicks to avian predators have been determined to be the most important cause of nest failure (Nelson and Hamer 1995b; McShane et al. 2004). Nest failure rates of 68 to 100 percent have been reported in some areas (USFWS 2010). The risk of predation by avian predators appears to be highest in close proximity to forest edges and human activity, where many corvid species (e.g., jays, crows, ravens) are in highest abundance (McShane et al. 2004).

Description: Marbled murrelets are long-lived diving seabirds that spend most of their life in nearshore marine waters foraging on small fish and invertebrates, but use old-growth forests for nesting. They lay a single egg on the high, large branches of old growth trees. If egg failure occurs, a second may be laid. The egg is incubated all day, with the male and female exchanging incubation duties at dawn (USFWS 2008). Hatchlings appear to be brooded by an adult for one to two days and are then left alone at the nest for the remainder of the rearing period, except during feedings. Both parents feed the chick, which receives from one to eight meals per day (Nelson 1997 in USFWS 2008). Most meals are delivered early in the morning, although about a third of food deliveries occur at dusk and/or intermittently throughout the day (Nelson and Hamer 1995a in USFWS 2008). Chicks fledge 27 to 40 days after hatching. The initial flight of a fledgling appears to occur at dusk and parental care is thought to cease after fledging (Nelson 1997 in USFWS 2008). As noted in USFWS 2008, throughout their range, murrelets are opportunistic feeders and utilize prey of diverse sizes and species. They feed primarily on fish and invertebrates in marine waters although they have also been detected on rivers and inland lakes (Carter and Sealy 1986; 57 FR 45328 [October 1, 1992]).

Breeding Season: In Washington, the marbled murrelet breeding season occurs between April 1 and September 15 (Hamer et al. 2003), but has recently been updated on the Olympic Peninsula to extend until September 23. For management purposes, the USFWS defines the marbled murrelet early nesting season as April 1 through August 5. Early nesting season behaviors include egg laying, incubation, and brooding of nestlings. The late nesting season is defined as August 6 through September 23. During the late season, marbled murrelet chicks are left unattended at the nest site until they fledge, except during feedings by the adults, with all chicks fledging by mid-September (Hamer et al. 2003). Both parents feed the chick, which receives one to eight meals per day (Nelson 1997). Most meals are delivered at dawn, while about a third of the food deliveries occur at dusk and intermittently throughout the day (Nelson and Hamer 1995a). For the purpose of analyzing activities within suitable habitat, certain management activities may occur during the early and late seasons.

Suitable Habitat: Murrelets nest in forested areas up to 52 miles inland from their saltwater foraging areas (Hamer 1995, p. 167). Murrelets do not actually build a nest, but rather create a nest depression in moss or litter on large branches (Nelson 1997). Murrelets prefer high and broad platforms for landing and take-off, and surfaces which will support a nest cup (Hamer and Nelson 1995 in USFWS 2008).

The physical condition of a tree appears to be the important factor in determining suitability for nesting (Ralph et al. 1995 in USFWS 2008); therefore, presence of old-growth in an area does not assure the stand contains sufficient structures (i.e. platforms) for nesting. In Washington, murrelet nests have been found in conifers, including western hemlock (*Tsuga heterophylla*), Sitka spruce (*Picea sitchensis*), Douglas-fir (*Pseudotsuga menziesii*), and western red cedar (*Thuja plicata*) (Hamer and Nelson 1995; Hamer and Meekins 1999 in USFWS 2008). Nests have been found in trees as small as 31.2 inches in diameter at breast height on limbs at least 65 feet from the ground and 4.3 inches in diameter (Hamer and Meekins 1999 in USFWS 2008).

Critical Habitat: The USFWS designated critical habitat for the marbled murrelet in 1996 (USFWS 1996). Critical habitat was not designated in national parks. As noted for northern spotted owls above, critical habitat within the park is assumed to be protected by virtue of its presence in the park. The primary constituent elements identified in the marbled murrelet critical habitat rule include (1) individual trees with potential nesting platforms, and (2) forested areas within 0.5 mile of individual trees with potential nesting platforms, and a canopy height of at least one-half the site potential tree height. This includes all such forests, regardless of whether or not they are contiguous (USFWS 1996). Critical habitat is designated adjacent to Olympic National Park in Olympic National Forest.

Environmental Baseline

Status of Marbled Murrelets in Olympic National Park

The park is the largest contiguous block of suitable nesting habitat remaining within the range of murrelets in the lower 48 states. Murrelets occur within all the major drainages below about 3,000 feet elevation in the park. Suitable habitat includes forests up to 3,500 feet elevation on the east side of the park, and forests up to 3,000 feet on the west side of the park (NPS 2016, p 71).

Landscape models of murrelet nesting habitat developed for the Northwest Forest Plan (NWFP) (Raphael et al. 2015) indicate over 322,000 acres of potential murrelet nesting habitat on the Olympic Peninsula are located within the park boundary (Table 6). Nesting habitat within the park represents about 43 percent of the potential murrelet nesting habitat located on the Olympic Peninsula. Most of the murrelet habitat within the park is located within designated wilderness areas.

Table 6: Summary of land ownership and distribution of potential murrelet nesting habitat on the Olympic Peninsula

Land Ownership	Olympic Peninsula	
	Total land area (acres)	Murrelet nesting habitat (acres)
Olympic National Forest	630,746	221,466
Olympic National Park	900,072	322,993
Other lands: State, Tribal, Private	1,500,106	211,398
Totals	3,030,924	755,857

Note: Marbled murrelet habitat estimates represent approximate conditions in 2012, as depicted by map data developed for the NWFP monitoring program, moderate (class 3) and highest (class 4) suitability (Raphael et al. 2015, p. 121).

Inland surveys were conducted in the park according to Pacific Seabird Group protocols in all developed areas and in a sampling of backcountry valleys from 1995 to 1999 (Hall 2000).

Murrelet presence has been documented at every site surveyed in the park. Detections indicating occupancy behavior have been documented at approximately 83 percent of sites surveyed within the park (Hall 2000). The surveys indicate that murrelet detections generally peak in July and taper off at the beginning of August. Raphael et al. (2002) used radar to count numbers of murrelets flying inland within 10 river drainages on the Olympic Peninsula. Murrelets were detected in each of the drainages monitored, and the total number of murrelets counted was strongly correlated with the total amount of nesting habitat in the watershed. The Queets, Upper Quinault, and Elwha drainages within the park had the highest counts of murrelets detected.

Based on the data presented by Hall (2000) and Raphael et al. (2002), it is likely that all suitable murrelet habitat within the park is occupied by murrelets. The density of murrelets occupying nesting habitat in the park is unknown. Raphael et al. (2002) estimated an average density of one nesting pair per 150 ha (370 acres) of habitat on the Olympic Peninsula, but acknowledged the murrelets likely occur at higher densities in some locations.

<u>Status of Marbled Murrelets in the Project Action Area</u>

GIS layers showing marbled murrelet habitat indicate that much of the Elwha River watershed should be considered suitable habitat. Although there have been fires in the last 100 years, there are many large, older coniferous trees. A preliminary project specific habitat assessment was conducted by walking the proposed clearing area. The preliminary survey and analysis followed the guidelines published by the USFWS for western Washington, including: platforms greater than 4 inches across in coniferous trees, above 33 feet in height, with suitable vertical cover by limbs or foliage, and located within an area of contiguous forest. In the vicinity of the project area, most trees in this older age class had structures that could potentially support murrelet nests, and these older trees are well-distributed in the vicinity of the proposed reroute. Audio-visual surveys have found nesting marbled murrelets occupying stands up to about 3,800 feet in elevation on the east side of the Olympic Peninsula and about 3,500 feet on the west side (USFWS 2009). Reconnaissance-level surveys conducted in 1990 indicate that the Elwha Valley (between Krause Bottom and the delta) serves as a flight corridor between nest stands and the marine environment, including along the upper reaches of the Elwha River Valley or its tributaries, where an estimated 15 pairs of marbled murrelets bred during the 1990 season (NPS 1996).

5.2 Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl was listed as a threatened species in 1990 because of widespread loss of suitable habitat across the species' range and the inadequacy of existing regulatory mechanisms to conserve the species (USFWS 1990). Many populations of spotted owls continue to decline, especially in the northern parts of the species' range.

Range: The Olympic Peninsula comprises one of four Washington State provinces in the range of the northern spotted owl. The others are the eastern and western Cascades and the western Washington lowlands (USFWS 2008). There are also five provinces in Oregon and three in central/northern California.

Threats: There are numerous threats to the northern spotted owl, including low and declining populations, limited and declining habitat, poor habitat distribution, and predation. Because of extensive habitat loss throughout much of western Washington, the Olympic Peninsula population of northern spotted owls is isolated from those in the Cascade and Coast ranges (NPS OLYM 2005). Among the most disturbing trends, in low elevation areas, is the increasing use by barred owls, rather than spotted owls. It has become apparent that competition from barred owls (*Strix varia*) poses a significant threat to northern spotted owls. Past and current habitat loss also threatens the spotted owl, even though loss of habitat due to timber harvest has been greatly reduced on federal lands for the past two decades (USFWS 2008).

Description: Northern spotted owls are long-lived, non-migratory, medium-sized birds (approximately 18-19 inches tall) that form long-term monogamous pair bonds.

Suitable Habitat: Suitable northern spotted owl habitat is generally mature or old-growth forest that has a moderate to high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; numerous large snags and downed logs; and sufficient open space below the canopy for owls to fly through (Thomas et al. 1990). Forests with these characteristics provide nesting and roosting sites for northern spotted owls and support the highest densities of northern flying squirrels (Carey 1993). In western Washington, spotted owls prey primarily on northern flying squirrels, as well as other small mammals (Forsman et al. 2001). Northern spotted owls are mostly nocturnal, although they also forage opportunistically during the day.

Territory: Spotted owls are territorial birds, however the home ranges of adjacent pairs may overlap. Northern spotted owl territories are large and encompass thousands of acres of forest habitat. In the Washington Cascades, an average spotted owl territory encompasses over 6,000 acres (USFWS 1992). Spotted owls defend their territories against other owls and avian predators, although they occasionally hybridize with barred owls. Northern spotted owls roam across their territories over the course of the year hunting for prey. Northern spotted owl monitoring has indicated that established spotted owl territories are fairly stable, and that some territories may be occupied by different pairs of spotted owls over many years (Forsman et al. 1984: 19). The actual nest-tree used within a territory may change from year to year, but alternate nest trees are usually located within the same general core area (equal to a 0.7-mile radius around an established activity center) (Forsman et al. 1984: 32). For management purposes, a 1.8-mile radius circle is used to map spotted owl territories. Within the annual home range there is a core area of concentrated use during the nesting season (Bingham and Noon 1997). Home range increases from south to north and has been linked to habitat type, availability, and abundance of prey (Zabel et al. 1995 in USFWS 2008).

Breeding Season: In Washington, for environmental impact analysis purposes, the northern spotted owl breeding season is broken into two periods: early breeding season is March 1 through July 15, and late breeding season is July 16 to September 30. For the purposes of analysis, different activities are permitted in each period.

Adult spotted owls begin territory establishment during the month of February and egg laying may begin as early as the second week of March and continue into April. Incubation may begin as early as late March and through the second week in April. Incubation takes approximately 30 days. Most fledglings on the Olympic Peninsula leave the nest, approximately 64-66 days after eggs are laid, during June. Fledglings throughout the range of the spotted owl normally remain within the nest stand through the month of September and begin dispersal in October (USFWS 2008).

Environmental Baseline

Status of Northern Spotted Owls in Olympic National Park

Extensive suitable habitat for northern spotted owls in the park is found in intact, relatively large, primarily low elevation major drainages. Many of these are naturally fragmented by high-elevation, non-forested areas of unsuitable habitat. Spotted owl habitat is also present in the coastal strip, and along the Queets River corridor, a habitat largely isolated by surrounding areas of managed forest lands. The park's interior (not including the Pacific coastal section and the Queets River corridor) contains about 494,000 acres of forested areas that are considered potential or suitable northern spotted owl habitat. This area represents approximately half of the total spotted owl habitat within the Olympic Peninsula physiographic province (Holthausen et al. 1995 in USFWS 2008).

The park encompasses the largest contiguous block of suitable nesting habitat remaining within the listed range of northern spotted owls. Although critical habitat was designated on January 15, 1992, there is no critical habitat formally designated in Olympic National Park. Critical habitat was not designated because the park's habitat is protected from adverse effects by virtue of its national park status.

Although some spotted owl habitat within the park has been lost due to the past development of roads, campgrounds, and other facilities, the greatest threat to spotted owl habitat within the park is from natural disturbances associated with windthrow or wildfire (USFWS 1992 in USFWS 2008). The park Wildland Fire Management Plan estimated that up to 800 acres of suitable spotted owl habitat could be lost due to wildfire in the park over a 5 year period[2]. The Paradise fire in Queets in 2015 may have exceeded this. The most recent major windstorm resulted in scattered areas of windthrow in December 2007 (USFWS 2008).

In cooperation with National Biological Survey staff and others, northern spotted owl surveys have been conducted in the park since 1985. The most comprehensive inventories and surveys were performed from February 1992 - September 1995. These occurred in an area of over 72,600 acres or about 10% of the forested acreage in the park. The surveys indicated that northern spotted owls were seldom found above 3,000-feet elevation on the west side of the park, or above 4,000-feet elevation on the east side of the park. In 1995, the estimated number of northern spotted owl pairs within the forested, interior portion of the Olympic National Park was 229, while an additional 15 to 20 pairs were estimated to occur within the park coastal strip and the Queets corridor (Seaman et al. 1996 *in* NPS 2004a). It includes conifer forests below 3,000 feet elevation on the west side of the park, and conifer forests below 4,000 feet on the east side of the peninsula. Most of the spotted owl habitat within the park (95 percent) is located within designated wilderness (USFWS 2008).

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[2] This will change with the approval of the park's new FMP.

Northern spotted owl survey data collected in the park has been incorporated in a range-wide data analysis every five years. The most recent analysis (Dugger et al. 2016) estimated that northern spotted owl populations across the range of the species had declined 3.8% annually between 1995 and 2013. In the Olympic study area, including sites on the park and national forest, rates of territory occupancy declined from 81% in 1995 to 21% in 2013. There is strong evidence that barred owl presence decreased spotted owl territory colonization rates and increased spotted owl territory extinction rates.

In 2018, field crews located just six territorial spotted owls at 54 monitored sites in Olympic National Park, two pairs and two single males (Gremel, pers. comm.).

Although loss of spotted owl habitat due to timber harvest has continued to occur on the Olympic Peninsula over the past decade (Pierce et al. 2005 in USFWS 2008), no significant habitat loss has occurred within the park. Nonetheless, the number of barred owls observed in the park has continued to increase (Gremel 2007 in USFWS 2008). As of 2016, barred owls had been detected within 800 meters of 94 percent of the monitored owl sites in the park (Gremel 2017).

The same study noted that spotted owl territories that have remained occupied following detections of barred owls have moved farther away and increased in elevation, relative to sites where barred owls have been absent (Gremel 2007 in USFWS 2008). This movement away from areas of barred owl activity implies that a portion of the otherwise suitable spotted owl habitat in the park is now unavailable to spotted owls for nesting and daytime roosting (Gremel 2007 in USFWS 2008). This is also true in the project area.

Status of Northern Spotted Owls in the Project Action Area

Although structurally suitable habitat for northern spotted owls is found in the immediate proximity of the reroute, park surveys have not detected spotted owl use within 1 km of the proposed reroute at any time since formal surveys began in 1992. The three known spotted owl territories in the vicinity of the project were part of the park's long-term monitoring program. Each territory was visited an average of over four times a year between 1992 and 2018. Two of these territories had core areas within roughly 2 km of the project area where spotted owls have not been detected in over 20 years. The third site was roughly 2.2 km from the project and was last found to be occupied by a pair of spotted owls in 2012, and a single spotted owl in 2015. This spotted owl was over 3 km and 3000-feet in elevation from the project area.

Barred owl detections are recorded when they are incidentally detected on spotted owl surveys. Between 2009 and 2018 barred owls were recorded at each of the three spotted owl sites in 50% of years, and many of these detections were in, or very close to, the planned reroute.

The status of spotted owls along the road in the rehabilitation section is similar. The most recent spotted owl sighting at the Madison Creek monitoring location was documented in the 1990s (Gremel pers. comm. 2018).There were also nesting spotted owls near the Boulder Creek (Olympic Hot Springs) Trailhead in the early 1990s. In recent years, however, all the spotted owl detections have been far from the road. A pair was present 800 meters from the road in 2006 near Stukey Creek, but since then only barred owls have been found in that drainage. Two sites near the trailhead have had no spotted owl responses within 1 km of the road in over 20 years.

5.3 Bull Trout (*Salvelinus confluentus*)

Identification: Bull trout may be distinguished from brook trout (*Salvelinus fontinalis*) by several characteristics: spots do not appear on the dorsal (back) fin, and the spots that rest on the fish's olive green to bronze back are pale yellow, orange, or salmon-colored. Bull trout fry eat plankton and aquatic insects. As they grow they transition to eating fish eggs and other fish. Resident bull trout tend to be small (up to 10 inches long), while migratory forms are up to 35 inches and 32 pounds.

Range: Bull trout are native to northwestern North America, including Washington, Oregon, Idaho, Nevada, Montana, and western Canada. Historically, bull trout were found in most major river systems in these areas. Although they are thought to have occurred historically in northern California, they have been extirpated. Compared to other salmonids, bull trout have more specific habitat requirements that appear to influence their distribution and abundance. They need cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees (F). They also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors (USFWS ECOS species profile). On the Olympic Peninsula, bull trout populations tend to exhibit an anadromous life history.

Threats: Bull trout are threatened by competition with introduced fish species, siltation, habitat fragmentation (dams) and degradation, hybridization with brook trout, and climate change (which may increase temperatures in critical bull trout habitat (Hoffman et al. 2014).

Description: Bull trout are char. Their habitat is characterized by clear cold water (generally below 55° F), pristine water quality, silt-free rocky substrate in riffle run areas, well-vegetated stream banks, and complex habitat with abundant stream cover, deep pools, relatively stable flow regime and stream banks, and productive fish and aquatic insect populations. Bull trout exhibit a variety of life history strategies, including resident, resident migratory, and anadromous. Resident bull trout spend their entire lives in the same stream/creek. Migratory bull trout move to larger bodies of water to overwinter and then migrate back to smaller waters to reproduce. An anadromous form of bull trout also exists in the Coastal-Puget Sound population, which spawns in rivers and streams but rears young in the ocean.

Spawning Season: Bull trout spawn from September through November in Olympic Peninsula watersheds.

Environmental Baseline

Status of Bull Trout in Olympic National Park

In Olympic, bull trout have been documented in the Hoh, Queets, Quinault, Elwha, Dungeness, and Skokomish rivers, and their tributaries. They also inhabit several of the smaller coastal streams, including Kalaloch Creek. Bull trout are not found in the Quillayute River system or in Lake Ozette. The abundance of bull trout in the park is not well understood, but the population in the North Fork Skokomish River, where surveys are conducted annually, seems to be stable.

Olympic National Park contains six "Bull Trout Core Areas" (comprising core habitat and a core population).

Impacts to bull trout are evaluated based on the timing, location, and nature of the project or action. Projects that occur during the spawning season, in-water, or that create turbidity or lead to deposition of fine sediments, or that increase water temperature could have adverse effects on bull trout.

Status of Bull Trout in the Project Action Area

Bull trout are found in the Elwha River system, with some spawning observed in the reach from the park boundary to Altair Bridge from October - November. Bull trout inhabit the Elwha River from the river mouth upstream to the headwaters and occur in tributaries. Elwha bull trout exhibit fluvial, anadromous, and possibly resident life history strategies. Migratory fish move upriver during summer months. The onset of bull trout spawning is September. Bull trout require colder water temperature than most salmonids and the cleanest stream substrates for spawning and rearing; they need complex habitats, including streams with riffles and deep pools, undercut banks and lots of large logs; and they also rely on river, lake, and ocean habitats that connect to headwater streams for annual spawning and feeding migrations. Bull trout spawning occurs in the fall after stream temperatures have dropped below 48 degrees.

5.4 Steelhead Trout (*Oncorhynchus mykiss*)

Rainbow trout and steelhead are the same species with different life history strategies. They have habitat needs similar to cutthroat trout and hatch in gravel-bottomed, fast-flowing, well oxygenated streams. Rainbow trout remain in freshwater while steelhead migrate to the ocean. Adult steelhead develop a much more pointed head, become more silvery in color and typically grow much larger than rainbow trout that remain in fresh water.

Range: Rainbow trout are native to the U.S. and Canada, west of the continental divide. Their migratory form (steelhead) occurs in coastal areas.

Threats: Rainbow/steelhead trout are threatened by widespread declines in adult abundance; competition and hybridization with hatchery stocks; declining diversity, including low summer run fish populations; reduced spatial structure and habitat quality; urbanization; and bank hardening and channelization (NMFS 2016: 16). They are also threatened by harvest, competition with introduced fish species, habitat fragmentation (dams), degradation and loss, and hybridization with cutthroat trout (Hoffman et al. 2014:189).

Description: Rainbow/steelhead trout can be resident fish, migratory within a stream or river (fluvial), and anadromous (steelhead). They eat zooplankton, aquatic and terrestrial insects, mollusks, crustaceans, fish eggs, minnows, and other small fishes (including other trout). They live up to 11 years and are sexually mature at 2-3 years. Although most fish are smaller, steelhead can weigh up to 55 lbs. and be 45 inches long (http://www.fisheries.noaa.gov/pr/species/fish/steelhead-trout.html accessed 1 November 2016).

Spawning Season: Steelhead spawn in several spawning pockets in redds in their natal stream, migrating from the marine environment. Similar to bull trout, but unlike most other salmonids, they can spawn more than one time. Winter run steelhead in the Elwha River spawn from March through June. Summer run steelhead tend to spawn in the late fall and early winter, but the spawn timing in the Elwha River is not currently known.

Puget Sound Steelhead DPS: This DPS comprises 32 populations. The DPS is currently at very low viability, with most of the 32 populations and all three population groups at low viability. Most populations within the DPS continue downward trends in estimated abundance, a few sharply so. Only three winter-run steelhead populations examined exhibited positive growth rate. Trends could not be calculated for the South Puget Sound tributaries winter-run population. Little or no data is available on summer-run populations to evaluate extinction risk or abundance trends.

Environmental Baseline

Status of Rainbow/Steelhead Trout in Olympic National Park

Steelhead are found in all the major river systems in the park (Elwha, Quillayute, Hoh, Queets, and Quinault), as well as a number of the smaller drainages (Lake Ozette, all coastal rivers, and Skokomish). With the exception of the Quillayute River basin, steelhead populations in the park warrant moderate to significant management concern due to failure to consistently meet management objectives (McCaffery and Jenkins 2018).

Status of Rainbow/Steelhead Trout in the Project Action Area

The Elwha River supports both winter and summer run steelhead, as well as resident rainbow trout. Winter and summer run steelhead are listed as threatened under the ESA, while resident rainbow trout are not. Between 2014 and 2018, the earliest date that a winter steelhead redd was observed was the first week of March. The latest observed new redd was July 7th. Actual spawn timing for winter steelhead likely extends from late-February through the end of June. Steelhead adults could be present any time of the year, due to life history characteristics (e.g., winter or summer run, kelts, etc.). Summer steelhead spawning has not been observed, but is unlikely to occur below Glines Canyon. Steelhead rear in freshwater for two years or more before going to sea. Therefore, juvenile steelhead are present in the area year-round. Resident rainbow trout are also present year-round, with spawn timing and location similar to steelhead. Rainbow trout have been observed to spawn with adult steelhead in the Elwha River.

Winter steelhead trout inhabit the Elwha River and the population is comprised of wild and hatchery stock. Elwha winter steelhead typically spawn in the mainstem river from late February through June. Additionally, spawning recently has been observed in Little, Indian, Hughes, and Cat Creeks. Spawn timing of summer run steelhead is currently unknown.

5.5 Chinook Salmon (*Oncorhynchus tshawytscha*)

Range: In the western contiguous US, native populations of Chinook salmon are broadly distributed in Washington, Oregon, Idaho, and Northern California.

Threats: Chinook are threatened by resource extraction, dams, harvest, and habitat modification and degradation (Hoffman et al. 2014:189). Puget Sound Chinook are also threatened by degraded floodplains and in-channel structures; poor estuarine conditions and loss of estuarine habitat; degraded riparian areas and loss of large woody debris; excessive fine-grained sediment in spawning gravel; degraded water quality, temperature, and near shore conditions; impaired passage for migrating fish; and severely altered flow regimes (NMFS 2016: 16).

Description: Chinook are the largest salmon, with adults often exceeding 40 pounds. They eat aquatic and terrestrial insects, crustaceans, and other fish. Depending on where they occur, they exhibit two different life history strategies: some spend more time as young in streams; some spend more time as young in the ocean.

Spawning Season: Chinook use a variety of freshwater habitats, but more commonly spawn in larger mainstem rivers or large tributaries. Juveniles migrate to marine waters after spending a few months or up to a full year in freshwater. Following 1-7 years at sea, adults return to their natal streams to spawn once before dying. Seasonal runs may occur in the spring, summer, fall, or early winter.

Puget Sound Chinook ESU: This Evolutionary Significant Unit (ESU) comprises 22 populations distributed over five geographic areas. No trend was notable for total ESU escapements; escapement trends vary from decreasing to increasing among populations. Median recruits per spawner for the last 5-year period (brood years 2002-2006) is the lowest over any of the 5-year intervals. Many of the habitat and hatchery actions identified in the Puget Sound Chinook salmon recovery plan are likely to take years or decades to be implemented and to produce significant improvements in natural population attributes, and these trends are consistent with these expectations (NMFS 2016: 16).

Recovery will be achieved when the following conditions are met:

1. All watersheds improve from current conditions, resulting in improved status for the species;
2. At least two to four Chinook salmon populations in each of the five biogeographical regions of Puget Sound attain a low risk status over the long-term;
3. At least one or more populations from major diversity groups historically present in each of the five Puget Sound regions attain a low risk status;
4. Tributaries to Puget Sound not identified as primary freshwater habitat for any of the 22 identified populations are functioning in a manner that is sufficient to support an ESU-wide recovery scenario; and
5. Production of Chinook salmon from tributaries to Puget Sound not identified as primary freshwater habitat for any of the 22 identified populations occurs in a manner consistent with ESU recovery (NMFS 2016: 17).

Environmental Baseline

Status of Chinook Salmon in Olympic National Park

Chinook are found in all of the major river systems in the park (Elwha, Quillayute, Hoh, Queets, and Quinault), as well as a number of the smaller drainages (Lake Ozette, all coastal rivers, and Skokomish).

Several chinook populations in the park warrant moderate to significant management concern due to failure to consistently meet management objectives (McCaffery and Jenkins 2018). In particular, spring Chinook populations are failing to meet management objectives.

Status of Chinook Salmon in the Project Action Area

Chinook salmon inhabit the Elwha River basin. The population is comprised of hatchery and wild stock. Chinook salmon currently spawn in the Elwha River upstream to near the Elwha headwaters. The peak of spawning occurs in September each year and 2018 surveys revealed ~85% of Chinook redds in the mainstem river and 15% of redds in tributaries.

Between 2014 and 2018, the earliest date that a Chinook redd was observed in the Elwha River was August 26th. Documented spawning activity has been observed continuing through October 5th. Actual spawn timing likely extends from mid-August thru mid-October. Adults could be present as early as late May and as late as October 15. Because Chinook rear in the river for up to a year, juvenile fish may be present year-round.

6.0 Proposed Species Considered as Part of Essential Fish Habitat

The following species are either proposed for listing or are considered sensitive. Coho and pink salmon, along with chinook are also considered under EFH.

6.1 Coho Salmon (*Oncorhynchus kisutch*)

Coho salmon inhabit the Elwha River basin. Coho are a federal species of concern (the Puget Sound/Strait of Georgia ESU) and are federally threatened in the Lower Columbia River. Coho are also a State Food Fish. Coho salmon are anadromous, rearing in the river for a full year before going to sea. Juvenile coho are present in the area year-round.

According to WDFW, "Coho salmon spawn in small coastal streams and in the tributaries of larger rivers. They prefer areas of mid-velocity water with small to medium sized gravel. Because they use small streams with limited space, they must use many such streams to successfully reproduce, which is why coho can be found in virtually every small coastal stream with a year-round flow. Returning coho often gather at the mouths of streams and wait for the water flow to rise, such as after a rain storm, before heading upstream. The higher flows and deeper water enable the fish to pass obstacles, such as logs across the stream or beaver dams that would otherwise be impassable. Coho are deposited in the gravel as eggs in the fall, emerge from the gravel the next spring, and in their second spring go to sea. Coho fry are usually found in the pools of small coastal streams and the tributaries of larger rivers."

Spawning: Coho are anadromous and spawn once in their stream of origin at two (male jacks) or three years old.

Conservation efforts include captive-rearing in hatcheries, removal and modification of dams that obstruct salmon migration, restoration of degraded habitat, acquisition of key habitat, and improved water quality and instream flow (http://www.fisheries.noaa.gov/pr/species/fish/coho-salmon.html accessed 5 October 2016). Coho are threatened by habitat degradation and loss, increasing water temperature, poor ocean conditions, and the genetic effects of hatchery stock (Hoffman et al. 2014:189).

Environmental Baseline

Status of Coho Salmon in Olympic National Park

Coho are found in all of the major river systems in the park (Elwha, Quillayute, Hoh, Queets, and Quinault), as well as a number of the smaller drainages (Lake Ozette and all coastal rivers). The status of coho populations in the park varies from healthy to poor. For example, the Hoh River coho population is in good condition, while the Queets coho population has failed to meet management objectives in six of the last 10 years (McCaffery and Jenkins 2018).

Status of Coho Salmon in the Project Action Area
In the Elwha River, coho salmon spawn from early October through January. Between 2014 and 2018, coho redds were observed as early as October 18 and as late as January 26. Adults could be present as early as September 1 and as late as February 15.

6.2 Pink Salmon (*Oncorhynchus gorbuscha*)

According to the WDFW website, "Pinks use the mainstems of large rivers and some tributaries, often very close to saltwater. Because their fry move directly to sea after emerging, the closer they spawn to saltwater the better. The shorter journey reduces predation and increases survival. Sometimes pink salmon spawn in saltwater, avoiding freshwater altogether. Pinks have a very regular life history, living for two years before returning to spawn the next generation. This is why pink runs in Washington occur only every other year; there are no one-year-old or three-year-old fish to establish runs in the other years. As mentioned, pink fry do not rear in freshwater. Immediately after emerging they move downstream to the estuary and rear there for several months before heading out to the open ocean."

Environmental Baseline
Status of Pink Salmon in Olympic National Park
Pink salmon are found in the Elwha and Dungeness Rivers, as well as in the Queets and Quinault rivers. Pink salmon prefer smaller spawning substrate than other salmon species, which limits their spawning distribution to tributaries and slower moving water in mainstem channels.

Status of Pink Salmon in the Project Action Area
Elwha pink salmon are a wild stock that spawns from late July to September. The abundance of pink salmon in the Elwha River is very low (<500 fish annually). The population crashed approximately 60 years ago, due to habitat changes associated with construction of the two Elwha River dams.

7.0 Critical Habitat

Critical habitat has also been designated for five species: northern spotted owl (USFWS 1992), marbled murrelet (2008, revised August 4, 2016), and bull trout (USFWS 2010), Southern DPS eulachon (NMFS 2017), Puget Sound Chinook (NMFS 2005), and Puget Sound steelhead (NMFS 2016).

Marbled Murrelet, Northern Spotted Owl, Chinook Salmon, and Southern DPS Eulachon*:* While critical habitat has been designated for these species, critical habitat is not present in the park's action area and will not be affected by the proposed federal action.

Bull Trout Critical Habitat*:* The Elwha River has been designated as critical habitat for bull trout. A total of 71.45 miles, including the mainstem Elwha River and accessible tributaries, have been identified within the Elwha River critical habitat subunit. Madison, Hughes, Griff, and Boulder creeks may provide feeding opportunities and limited spawning habitat. Smaller tributaries, such as Freeman, Sanders (current channel), Stukey, and Sege creeks, or any of the unnamed tributaries are unlikely to provide habitat for either feeding or spawning due to size and temperature. Further, tributaries to Boulder Creek (Deadman's Gulch, and Deep, Deer, and Cougar creeks) are located above an impassible falls and do not support bull trout.

Puget Sound Steelhead Critical Habitat*:* Puget Sound steelhead critical habitat has been designated within the action area. Designated critical habitat in the action area is within the Dungeness/Elwha Subbasin. This subbasin includes five watersheds, all occupied by this DPS.

Preliminary analyses by the Puget Sound Technical Recovery Team (2011 *in* NMFS 2016: 33) have identified one ecological zone/MPG (Olympic Peninsula) containing four winter-run populations

(Dungeness River, Elwha River, Strait of Juan de Fuca Lowland Tributaries, and Strait of Juan de Fuca Independent Tributaries) in this subbasin. Primary Constituent Elements (PCEs) are the physical and biological features of critical habitat essential to a species' conservation. Analysis of critical habitat evaluates how a proposed action may affect the capability of the PCEs to support the life-history needs of the species and provide for its conservation (75 FR 63943). According to that report, all occupied areas contain spawning, rearing, or migration PCEs for this DPS and identified management activities that may affect the PCEs, including agriculture, channel modifications/diking, dams, forestry, irrigation impoundments/withdrawals, road building/maintenance, and urbanization (NMFS 2012 *in* NMFS 2016: 33).

In the Elwha River, Puget Sound steelhead critical habitat is designated from its outlet to well into the upper reach of the river, upstream of Delabarre Creek. Critical habitat is also designated in four tributaries of the Elwha River, including Indian Creek and Little River. The action area contains critical habitat within the Elwha River. Critical habitat includes the stream channels within the basins, and includes a lateral extent as defined by the OHWM (33 CFR 319.11) (NMFS 2016: 33).

Within the action area, the road adjacent to the river as well as past effects of dams on Elwha River hydrology have reduced river sinuosity and the availability of off channel habitats. Since removal of the dams in 2012 and 2014, natural processes are being restored to the Elwha River, resulting in dramatic changes to hydrology and geomorphology. However, hydrology and geomorphology continue to be important limiting factors for Puget Sound steelhead habitat (NMFS 2016: 33).

8.0 Environmental Baseline

As defined under the ESA, the environmental baseline includes past and present impacts of all federal, state, and private actions in the analysis area; the anticipated impacts of all proposed federal actions in the analysis area that have undergone formal or early Section 7 consultation; and the impact of state and private actions that are contemporaneous with the Section 7 consultation process. Future actions and their potential effects are not included in the environmental baseline. This section, in combination with the previous section, defines the current status of the species and its habitat in the action area and provides a platform to assess the effects of the proposed action under consultation with the USFWS.

8.1 Previous and Ongoing Consultations with the USFWS and/or NMFS within the Action Area

TABLE 5. PAST CONSULTATIONS WITH THE USFWS AND DETERMINATIONS FOR ACTIONS WITHIN THE PROPOSED ACTION AREA FOR ALL FEDERALLY LISTED AND PROPOSED SPECIES

Table 7: Consultations with USFWS and NMFS

Project	Type of Project	Species Addressed	Determination	Date
USFWS Elwha River Flooding 2015	Elwha Valley Storm Damage Repair (Emergency Bridge Installation Road Reconstruction)	N. Spotted Owl Marbled Murrelet Bull Trout Bull Trout Crit. Hab.	NLAA LAA LAA NLAA	2016-F-0615 6-30-16
NMFS Same as Above	Same as Above	PS Chinook Salmon PS Steelhead Trout PS Steelhead trout Crit. Hab. Essential Fish Habitat	LAA LAA LAA Adverse effect	WCR-2016-4394 6-24-16

Project	Type of Project	Species Addressed	Determination	Date
USFWS Sweets Field Installation of Horse Corral	Maintenance	N. Spotted Owl Marbled Murrelet Bull Trout	No Effect No Effect NLAA	3-16-18
NMFS Same as Above	Same as Above	PS Steelhead Trout PS Chinook Salmon	NLAA NLAA	3-16-18
USFWS Elwha River Flooding 2017	Temporary Administrative Vehicle Access to the Elwha Valley	N. Spotted Owl Marbled Murrelet Bull Trout Bull Trout Crit. Hab.	NLAA LAA LAA NLAA	8-6-18
NMFS Same as Above	Same as Above	PS Chinook Salmon PS Steelhead Trout PS Steelhead trout Crit. Hab. Essential Fish Habitat	LAA LAA LAA Adverse effect	8-13-18
USFWS Temporary Off-road Access for Geotechnical Investigation/EA	Geotechnical Investigation	N. Spotted Owl Marbled Murrelet Bull Trout	NLAA NLAA NE	7-18-18

8.2 Past and Current Activities within the Action Area

The Elwha Valley includes a range of park operations, employee housing, visitor facilities, and maintenance facilities. Access to the area for the LEKT, park staff, utility providers, and contractors is essential and time critical. The Olympic Hot Springs Road provides access to the Boulder Creek Trailhead and to Whiskey Bend Road, both of which provide access to the high elevation reaches of the park's wilderness. Park fisheries biologists and other research scientists involved in monitoring activities associated with the Glines Canyon Dam removal project regularly enter the area to meet and fulfill requirements under the NMFS and USFWS Biological Opinions for dam removal. Geotechnical investigation drilling occurred along an approximately 4,800-foot long path on the forested bench east of the Olympic Hot Springs Road in 2018-2019. Subsurface monitoring data continues to be collected. Most park structures in the area are historic, including the Elwha Ranger Station Historic District. Without road access, park facilities are vulnerable to damage from future storms and flooding. Park facilities include housing, a ranger station, maintenance area, and corral.

Public access is important and ongoing due to the high visibility of the Elwha Ecosystem Restoration and Fish Passage project and its proximity to Port Angeles for educational opportunities. The Elwha Valley had 130,985 annual visitor days in 2015, and provides visitors access to two major trailheads and to the park's wilderness area. Access is also important for private property owners that have inholdings within the Elwha Valley. There are approximately 15 parcels of private land with approximately 11 different owners with access rights in the area.

9.0 Effects to Evaluated Species and Determinations

Effects of the proposed action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with the action added to the environmental baseline. Indirect effects are those that are caused by the proposed action but occur at a later time and have a reasonably certain chance of occurring. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

9.1 Proposed Action – Potential Impacts to Listed Species

Potential impacts to listed species are summarized below by species and the key elements of the proposed action.

<u>Direct and Indirect Effects of Proposed Action on Threatened Birds</u>

<u>Effects from Rehabilitation</u>: The rehabilitation project would result in short-term noise and visual disturbance associated with the use of heavy equipment adjacent to suitable northern spotted owl and marbled murrelet habitat. Although there is no habitat on the roadway, most of the project area, on both sides of the road comprises northern spotted owl and marbled murrelet habitat. Based on monitoring by the park, northern spotted owls are now rare in the park, including the Elwha Valley. The likelihood of nesting owls within the vicinity of the road rehabilitation project is unlikely, although it is possible that it could be within a spotted owl's large home range.

Along the Olympic Hot Springs Road corridor, which is comprised of a linear corridor 8.2 miles long, rehabilitation road work, including consistent heavy equipment use over the duration of the project (approximately 36 months) would affect trees and other vegetation. None of the trees proposed for removal during rehabilitation is considered potential nesting habitat for marbled murrelets or northern spotted owls due to the small diameter of branches and other inadequate old growth tree characteristics for nesting marbled murrelets (lack of platforms or wrong species). Therefore, no trees with nesting habitat characteristics would be removed in the rehabilitation areas. Some smaller diameter conifers, would be removed associated with rehabilitation. In other rehabilitation areas, vegetation removal would be confined to deciduous trees (such as red alder, big leaf maple, and willow), seedling and young trees, and small shrubs, ferns, forbs, and grasses along the road shoulder.

Impacts from noise and activity during construction would occur in each of the construction years from approximately March-November. Within this period, impacts from particularly noisy activities would occur outside of the marbled murrelet nesting season (September 24-March 31). Other project work during the nesting season (April 1-September 23) would occur during the day beginning two hours after sunrise and could continue until two hours before sunset.

Work on the project would involve people using a variety of construction equipment. In some cases, work would occur in a number of locations within the project area simultaneously. In other cases, work would begin at one location and systematically proceed through the project area. Other work, such as stream culvert replacement would occur during only the late summer/early fall to avoid most impacts, such as on fish spawning by bull and steelhead trout and Chinook and other salmon. Generally, noise and activity from most work could occur in any given location within the project area during the construction season and could last for hours to days in the same location.

Much of the concentrated work in the project area during rehabilitation would contribute short-term noise from the use of heavy equipment, such as excavators, to remove soil and road fill as areas beneath the travel lanes were repaired. This would result in a much louder environment than is typical for ambient noise on either section of the roadway. Milling and application of asphalt would also result in noise that moved from one end of the project area to the other. Later, graders and paving equipment, including a mixer for the asphalt-concrete mixture and rollers, would be used. Due to the need to achieve a certain temperature for the paving operations, it is likely that paving would be conducted in the late summer or early fall. As a result, it may be conducted during the nesting season.

Because of ongoing human activity in marbled murrelet habitat, there would also be short-term, indirect, adverse impacts to marbled murrelets, including from the attraction of corvids (such as crows and ravens), resulting in a potential increase in egg and/or nestling predation, impacts that would be mitigated by BMPs to limit the availability of human food sources in the project area. These impacts would also be reduced over the area's baseline conditions, due to the closure of the two campgrounds (Elwha and Altair) that used to be in the area.

Based on the information presented above, sound and activity-related disturbance to nesting murrelets would occur along Olympic Hot Springs Road from early spring through late fall (respecting the nesting season and daytime restrictions). The project area in the rehabilitation sections of the road is comprised of approximately 332,993 acres of northern spotted owl and marbled murrelet habitat.

Effects from the Reroute: Although there would be noise and disturbance similar to work in the rehabilitation sections of the roadway, it would be more consistent and louder in the same area over more time. The biggest impact, however, would be from the loss of between 42 and 52 old growth trees with marbled murrelet nesting habitat characteristics. These are trees characterized by large diameter branches with flattish tops that would allow the birds to lay their single egg within a slight depression on its open moss-covered span. These nest characteristics are often found in only the largest conifers. In addition, smaller, non-nest habitat characteristic trees surrounding these would also be removed, opening up the area to changes in microhabitat, including light penetration, air temperature, and other effects. Removal of up to 18 acres of trees in a swath of approximately one mile-long by variably 40-120 feet wide would alter the characteristics of this section of old growth lowland forest from habitat loss and degradation. Although this type of forest is common within the park, it has been greatly reduced on the Olympic Peninsula as a result of decades of logging activity that continues today outside the park.

The loss of these trees would not only remove potential nesting trees, but the opened corridor would create opportunities for increased egg and nestling chick predation in other nearby forest by corvids. It would also change habitat such as light and heating in the vicinity of the roadway, reducing habitat and habitat quality for northern spotted owls, marbled murrelets, and other species.

In addition to the habitat loss, activities that generate loud sounds in close proximity to nesting murrelets may cause disturbance responses, including flushing from the nest, aborted feeding, and postponed feedings (USFWS 2008: 102). Few studies are available that document the murrelet's vulnerability to disturbance effects. Anecdotal research observations indicate that:

> "murrelets typically exhibit a limited, temporary behavioral response to noise disturbance at nest sites and are able to adapt to auditory stimuli (Singer et al. 1995 *in* McShane et al. 2005; Long and Ralph 1998; Golightly et al. 2002 *in* USFWS 2008: 102). In general, responses to auditory stimuli at nest sites have been modifications of posture and on-nest behaviors" (Long and Ralph 1998 *in* USFWS 2008: 102).

Studies of other alcids and seabirds have documented harm from disturbance to breeding success and the maintenance of viable populations (Cairns 1980; Pierce and Simons 1986; Piatt et al. 1990; Beale and Monaghan 2004 in USFWS 2008: 102).

Further, the biological opinion (USFWS 2008) notes:

> "Based on the data presented by Nelson and Hamer (1995a), approximately 80 percent of the feedings occur during the 2 hours after sunrise and 2 hours before sunset. Approximately 20 percent of feedings occur during the day, when Park activities are not restricted, so there is a potential for some missed or postponed feedings during unrestricted hours" (USFWS 2008: 102).

Therefore, conducting other noise-generating activities during the breeding season, but adhering to timing restrictions, is unlikely to harm marbled murrelets, who receive and deliver most of their meals in the early morning and late evening.

For the rehabilitation, up to 35 acres (7.2 miles x 40 feet) in the park would be subjected to noise disturbance. Another 18 acres (3/100ths of one percent of available Douglas-fir habitat in the Elwha Valley) would be subjected to noise, human activity, and habitat loss for the reroute. The noise disturbance associated with the rehabilitation would be in areas that formerly received high levels of human activity, including along the Olympic Hot Springs Roads and area trails, while the reroute impacts would be in relatively undisturbed old growth forest. This may affect, and would be likely to adversely affect marbled murrelets. Although conservation measures would be employed, marbled murrelets could be disrupted and displaced, however there would continue to be many acres of similar old growth habitat in the vicinity of the project area.

<u>Summary of Effects on Threatened Birds (Marbled Murrelet and Northern Spotted Owl)</u>
Road Rehabilitation, Culverts, Parking Areas (Madison Falls, Glines Canyon Spillway Overlook, Boulder Creek (Olympic) Hot Springs Trailhead), and Infrastructure Improvements (Powerline Relocation): Murrelet nesting habitat at the project site is degraded by the presence of roads that receive high public use during the summer, including year-round vehicle use on some portions. There were formerly two campgrounds in the area that attracted corvids (crows, ravens, and jays) which likely increased the risk of nest predation for murrelets (Marzluff and Neatherlin 2006: 308). Although relatively few murrelet nest sites have been found near open roads or campgrounds, murrelets do occasionally nest successfully in such areas and appear to habituate to the normal range of sounds and activities associated with these areas (Hamer and Nelson 1998: 21, Bloxton and Raphael 2009: 11-12). Hall (2000) found that "no difference could be discerned between murrelet use of pristine and developed sites." Road rehabilitation and parking area and infrastructure improvement actions would minimally affect the existing roadway and adjacent shoulder. There would be no habitat tree removal and timing restrictions for nesting seasons would be followed. Therefore, actions would be unlikely to adversely affect marbled murrelets or northern spotted owls.

Removal of Roadway from Floodplain/ Temporary Installation of Mabey Bridge: Removing the remaining road within the floodplain would cause noise and disturbance, but would not otherwise affect northern spotted owls or marbled murrelets.

Bank Retention Construction: Actions to divert the river from the project area, relocate stored wood, and to excavate below the east bank of the Elwha River to install a wall comprised of riprap and engineered logjams would result in the removal of some riparian vegetation along the riverbank, including trees, shrubs, forbs and grasses, as well as excavation in the east channel riverbed. It would result in the loss of a small degree of prey habitat for northern spotted owls but would not affect marbled murrelet habitat except from noise and disturbance. Roads and large water bodies are not considered northern spotted owl habitat, making it unlikely that a northern spotted owl would utilize the area, including the immediately adjacent roadway despite nearby suitable habitat.

Reroute Construction (Habitat Loss): The proposed action would physically remove and functionally alter stands providing suitable northern spotted owl and marbled murrelet habitat, with measurable effects on the northern spotted owl prey base and availability of food resources and measurable effects on available marbled murrelet nesting platforms in old growth trees.

Based on analysis and documentation of the absence of reproduction for northern spotted owls, the ongoing demographic monitoring, and the increasing presence of barred owls [and correlated decrease in northern spotted owls (Dugger et al. 2016, p 98)] it is highly unlikely that spotted owls would nest within the action area. Direct disturbance to nesting northern spotted owls or effects through reduced prey are therefore discountable.

Loss of 18 acres of habitat, including approximately 42-52 trees with murrelet nesting habitat characteristics would permanently alter the area of the reroute for nesting murrelets. Because it is difficult to determine how many murrelets have used the subject area/trees for nesting, it is not possible to accurately determine how many birds would be affected by the proposed action. In addition, because there are numerous other very large old growth trees with nesting habitat characteristics in the Elwha watershed and this action would not affect most of them, there would continue to be suitable nesting habitat in the vicinity of the proposed reroute.

Drilling and Helicopter Use: These are the loudest anticipated noises in the proposed project area and are anticipated to occur July – September, after the northern spotted owl early nesting season (March 1 to July 15). During the late northern spotted owl nesting season (July 31 through September 30), chicks have typically fledged, are able to thermoregulate, fly short distances, and are no longer completely dependent upon the adults for daily feeding (Forsman et al. 1984: 37-38). After July 31, the foreseeable temporary, construction-related exposures to elevated levels of disturbance are unlikely to affect nest success or result in measurable effects to the growth, health, or fitness of adult or juvenile northern spotted owls.

Noise and Activity associated with the above actions: Temporary increased sound levels associated with construction are likely to exceed ambient background sound levels for some distance. Additional louder and intermittent sounds would be caused by the use of some heavy equipment (loaders, graders, pavers, jackhammers, etc.). Visual disturbance from increased human and vehicular activity in the action area would occur and are likely to cause behavior changes in wildlife, including threatened birds.

Construction of the proposed project would result in temporary increases in sound and visual disturbance for the duration of three construction seasons. The action would not construct new points of access nor increase traffic or visitor capacity over the long-term. No future development proposals or major park actions are contingent or dependent upon the action. There would be no discernible changes in the rate or pattern of land use conversion from the action. There would be no discernible changes in long-term public use or management of the area from the proposed action outside of state population growth estimates in the region. Effects on the northern spotted owl, their prey base, and habitats would include loss of approximately 18 acres of trees, shrubs, and understory vegetation.

The proposed long-term actions would result in a *may affect, likely to adversely affect* determination on marbled murrelets because there would be suitable nesting habitat removed and because work would occur during the nesting season, however, work would be conducted two hours after sunrise up to two hours before sunset to mitigate effects on marbled murrelets. There could also be night work after Labor Day and paving during the nesting season. Although up to 18 acres of structurally suitable forest would be removed for the reroute, surveys of the area since the early 1990s indicate that the action area did not have a history of northern spotted owl occupancy. Recent increases in barred owl numbers in the area have made use by northern spotted owls even less likely. For similar reasons, spotted owls are believed to be absent from forest close enough to the road corridor to be disturbed by rehabilitation noise and activities. Therefore, the determination of effect for northern spotted owls is *may affect, not likely to adversely affect*.

Direct and Indirect Effects of Madison Falls Emergency Action on Threatened Fish Species
Madison Falls Emergency Winter Repair: The emergency action included the installation of 700 cubic yards of rip-rap along 200 feet of the Elwha River during December, 2018. Emergency actions near Madison Falls did not result in any in-water work. These emergency actions resulted in *may affect*, and are *likely to adversely affect* bull trout, winter steelhead, and Chinook salmon. This determination is based on the known impacts of riprap and possible effects associated with elevated turbidity levels during construction. The mainstem Elwha River near and downstream of, the emergency action supports juvenile rearing, migration corridors, and spawning for all three listed fish species. Because both emergency actions occurred outside of the nesting season for marbled murrelets and northern spotted owls are no longer occupying this area, there are no anticipated effects from the winter road repair that occurred in December 2019.

Direct and Indirect Effects of Proposed Action on Threatened Fish Species
<u>Effects from Rehabilitation</u>
Ongoing road use could allow for pollutants from motor vehicles to be discharged into nearby water bodies during runoff, potentially affecting fish habitat quality for fish (Sandahl et al. 2007; McCarthy et al. 2008 *in* NMFS 2016). Pollutants from vehicles, including petroleum- and metal-based compounds may accumulate on impervious surfaces (roads, parking areas) and wash into waterways during rain events. High levels of suspended sediment or pollutants can cause fish to avoid or migrate out of areas with poor

water quality (Svecevičius 2012 *in* NMFS 2016). Sediment, can also fill the interstitial spaces of gravel in spawning areas, or elsewhere, adversely affecting the survival of benthic invertebrates (Birtwell 1999; Kemp et al. 2011 *in* NMFS 2016).

Because of the great volume of water during heavy rains or flooding, however, it is likely that contaminants would be diluted. Adults and larger fish could also avoid localized areas of concentrated contaminants. Although there would be short-term periods of runoff associated with heavy precipitation or flooding, contaminants may persist if they bind to the substrate. This could affect incubating eggs and young fish, potentially causing reduced growth and survival in areas closest to the road. Generally, there would be no observable effects on ecological habitat structure, productivity, abundance, or diversity of species present from maintaining the road.

Road rehabilitation actions, including culvert replacement; removal of floodplain sections; and reconstruction of the roadway, as part of the reroute would also have the potential to contribute sediment to the floodplain. Actions would also include removal of the Mabey Bridge abutments, which could have short-term adverse effects on fish habitat. Suspended sediment is a potential pollutant that, in high concentrations, makes it difficult for fish to breathe by reducing water quality. With the use of BMPs, including turbidity requirements, to eliminate or reduce sediment discharges, there would be short-term impacts on water quality, followed by long-term beneficial effects from fixing other problems (poorly placed or plugged culverts, and reducing the amount of road within the floodplain). Actions would take place throughout the project area from near the park entrance to the Boulder Creek (Olympic Hot Springs) Trailhead.

<u>Effects from Reroute</u>

Impacts would occur during construction of the east channel roadside revetment, removal of large woody debris in the east channel, and placement of new culverts along the realignment. Because logjams would be placed within the riprap revetment along the road shoulder, compared to installing only riprap, logjams would improve the complexity of habitat quality.

Approximately 15 new culverts would be installed. Placement would require excavation of approximately 360 cubic feet of soil on either end, followed by seating of a 24-108 inch CMP culvert. In areas where fish have been detected, fish passable pipes would be installed. Most recently (for the previous bridge work on the Elwha River), the ACOE in-water work window for the Elwha River was July 1 to August 15, while the WDFW suggested window was August 1 to August 15. These recommendations were developed based on information available prior to dam removal, when salmon production in the Elwha River was dominated by hatchery fish. With the intensive monitoring of salmon recovery following dam removal, new information is available regarding run-timing of both Chinook salmon and steelhead. Specifically, the peak spawn timing for steelhead is now from March-May, with limited spawning occurring into June (McMillan et al. 2015). Similarly, the run timing for Chinook salmon advanced; more of the run enters the river in June and early July, with peak entry in mid-July (Denton et al. 2015). Therefore, there is essentially no time when listed fish would not be disturbed by in-water work. It is anticipated that the time of least impact would be prior to peak entry of Chinook salmon. To the degree possible, in-water activities would be conducted outside of spawning seasons for fish in consultations with USFWS (bull trout) and NMFS (steelhead and salmon).

In the area of the revetment, the availability of overhead and instream cover for fish would be reduced by the proposed project. Direct effects would come from tree removal along the channel and from relocating LWD to remove the Mabey Bridge abutments as well as to construct bank protection. There would also be effects from constructing a logjam to reduce the possibility that the river would flow along the modified east channel bank. Along the bank, areas of riprap and to some extent, LWD would prevent the growth of riparian vegetation. Removal of flood debris above the OHWM in this vicinity would also imperceptibly reduce future woody debris recruitment in the Elwha River and the east channel. Placement of multiple engineered logjams along the east bank of the channel and in the forested floodplain would provide some habitat cover and long-term woody debris nutrient recruitment into this area (Figures 2-6, Appendix 1). In addition, several engineered log jams would be placed within the floodplain to reestablish vegetation and to allow the natural systems to restore the channel and floodplain. There would continue to be opportunities for instream LWD to increase habitat complexity, reduce sediment transport, moderate flow, trap gravel for spawning, stabilize stream channels, provide food for aquatic invertebrates, and provide stream nutrients, thereby increasing overall stream productivity (Bisson et al. 1987; Shirvell 1990; Roni and Quinn 2001 *in* NMFS 2016: 59).

Over the long-term, revegetation of the western strip between the road and the riverbank and the east side of the rerouted roadway could provide some shade/cover along the east channel. Some effects from lack of cover would also be localized to stream channels adjacent to the roadway, where culverts were installed. Long-term beneficial effects that may outweigh some of the short-term effects from potential sedimentation and long-term adverse effects of loss of cover include reconnection of the road-separated sections of the floodplain, allowing for unrestricted movement of the Elwha River within its channel migration zone. This would contribute to providing more complex floodplain habitat for fish, with unimpeded connections between off-channel habitat and the mainstem river. These “unimpeded lateral connections between main channels, secondary channels, and floodplains” are essential for maintaining habitat dynamics and species responses, including fulfillment of anadromous salmonid lifecycle requirements (Bisson et al. 2009 *in* NMFS 2016:45).

The mainstem Elwha River, adjacent to, and downstream of the action area supports juvenile rearing, migration corridors, and spawning for listed fish species. It is likely that that spawning steelhead would be present in the mainstem river adjacent to and downstream of the action area from mid-March to June. Spawning bull trout or spawning Chinook salmon are unlikely to be present in the action area during May and June. However, adult and juvenile life stages for all three species inhabit this section of river.

Effects of Emergency and Proposed Actions on Essential Fish Habitat

The emergency and proposed action would have an *adverse effect* on EFH for coho, Chinook, and pink salmon due to the diversion of the east channel, placement of rip-rap, actions occurring during spawning, and overall habitat modifications. Over the long-term, with the ability of the Elwha to move within its channel migration zone, EFH for coho, Chinook, and pink salmon would improve. With the placement of riprap in the water from both the emergency bank stabilization at Madison Falls and along the edge of the east channel, there were/could be in-water effects. Placement of riprap, could cause soils to ooze, thereby releasing some sediment. Placement of the riprap also reduces habitat complexity and limits natural channel migration. Compared to the proposed action, the emergency action prevented further bank erosion and subsequent delivery of asphalt and other debris into the river.

10.0 Cumulative Effects

“Cumulative effects” are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. No cumulative effects, other than the climate related effects discussed below, are anticipated because the action area lies completely within Olympic National Park and all actions proposed in the area would be federal actions.

10.1 Cumulative Effects of Climate Change

Scientific data and measurements have shown that the average surface air temperatures in the U.S. have risen two degrees Fahrenheit (°F) over the last 50 years. The scientific findings strongly support the conclusion that the underlying cause of these changes is the accumulation of heat-trapping of carbon dioxide, methane, and nitrous oxide, and other greenhouse gases (GHG) in the atmosphere. The planet’s average temperature is projected to continue to rise by an additional 2.0 to 11.5 °F by the end of the century if GHG emissions continue unabated. This would continue to result in extreme weather events, variable and/or inconsistent weather patterns, and changing sea levels, with serious impacts on natural environments and the vital services they provide (National Fish, Wildlife, and Plants Climate Adaptation Partnership 2012).

Observed changes to ecosystems and wildlife show the following patterns (National Fish, Wildlife, and Plants Climate Adaptation Partnership 2012):

- Species are shifting their geographic ranges, moving poleward or upward in elevation.
- The phenology of plants, such as timing of spring blooming, is changing.
- The oceans are becoming more acidic.
- Different species are responding differently to changes in climate, leading to decoupling of important ecological relationships.
- Habitat loss is increasing due to ecological changes associated with climate change.
- Declines in the population of some species are attributed to climate change.

Interrelated, Interdependent, and Cumulative Effects

Although initial actions to reroute the Olympic Hot Springs Road would be considered a may affect, likely to adversely affect determination for listed threatened fish species (bull and steelhead trout and Chinook salmon), cumulative effects would be diminished and would constitute a may affect, not likely to adversely affect determination. This is due to the removal of impediments in the floodplain of the Elwha River and its resultant ability to migrate freely within its floodplain, due to the relocation of the roadway and the restoration of areas formerly used for the Elwha and Altair campgrounds as well as other former floodplain parking areas. Effects on northern spotted owls and marbled murrelets would remain the same as above – may affect, not likely to adversely affect and may affect, likely to adversely affect, respectively.

11.0 Effect Determination

The proposed action may result in adverse as well as both short and long-term (more than 5 years) beneficial and adverse effects to threatened or endangered species. Direct impacts to marbled murrelets could occur from harassment, habitat loss, or direct mortality due to proposed actions such as maintenance work and removal of trees in occupied habitat. Direct beneficial and adverse effects could occur to listed fish from removal of the road from within the floodplain of the Elwha River. Indirect adverse impacts to individuals may also result from activities related to park operations and/or that are intended to have a long-term, beneficial impact on the species, such as a reduction in the height of the current roadway through the floodplain.

12.0 Need for Re-Assessment Based on Changed Conditions

This BA and findings are based on the best current data and scientific information available. A new analysis and revised BA must be prepared if one or more of the following occurs: (1) new species information (including but not limited to a newly discovered presence, activity area, substantial changes in habitat, or other species information) reveals effects to threatened, endangered, proposed species, or designated/proposed critical habitat in a manner or to an extent not considered in this assessment; (2) the action is subsequently modified or it is not fully implemented as described herein which causes an effect that was not considered in this assessment; or (3) a new species is listed or critical habitat is designated that may be affected by the action not analyzed herein.

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Appendix 1

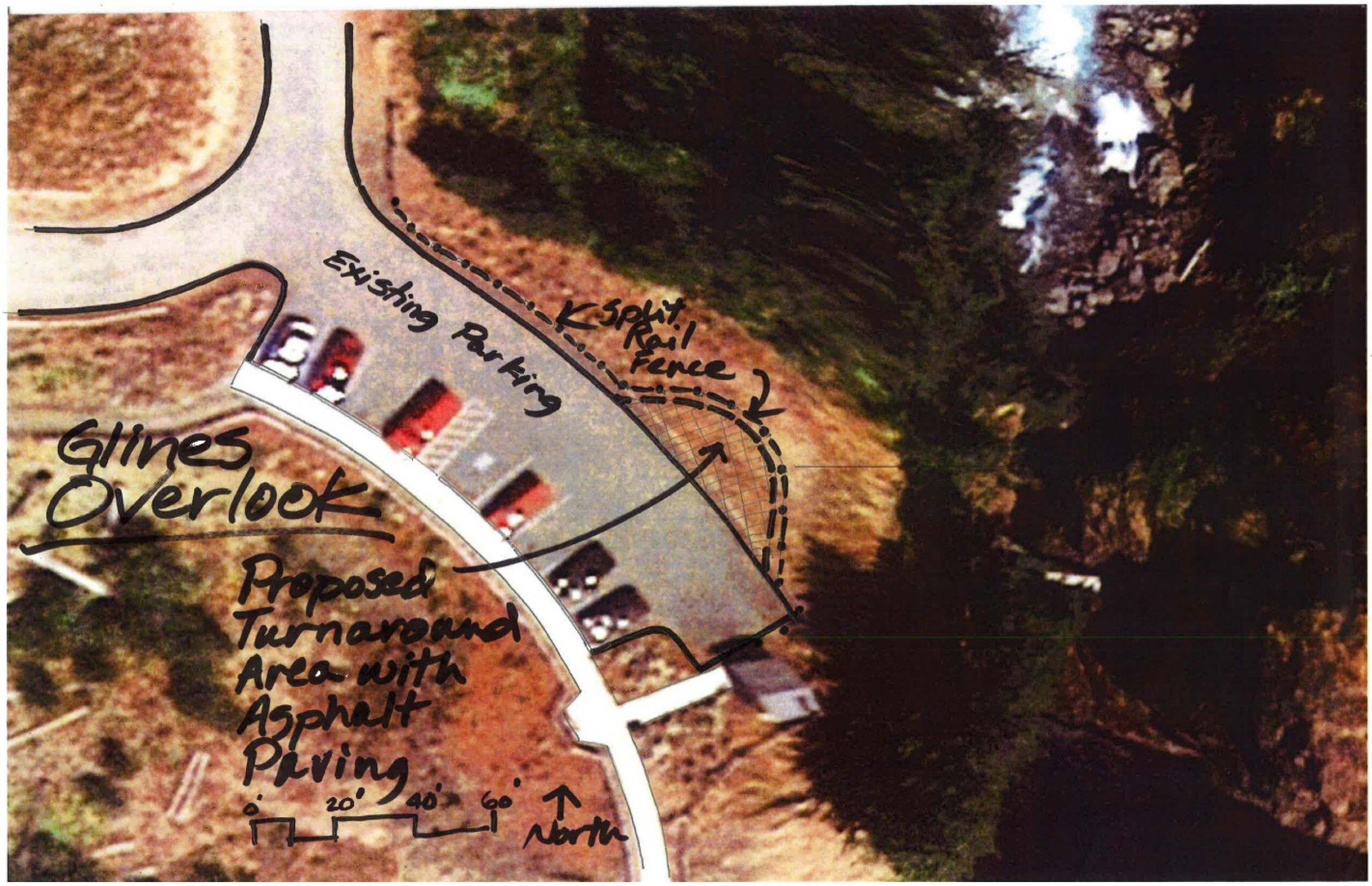

Figure 1: Glines Canyon Overlook Parking Area Turnaround Expansion

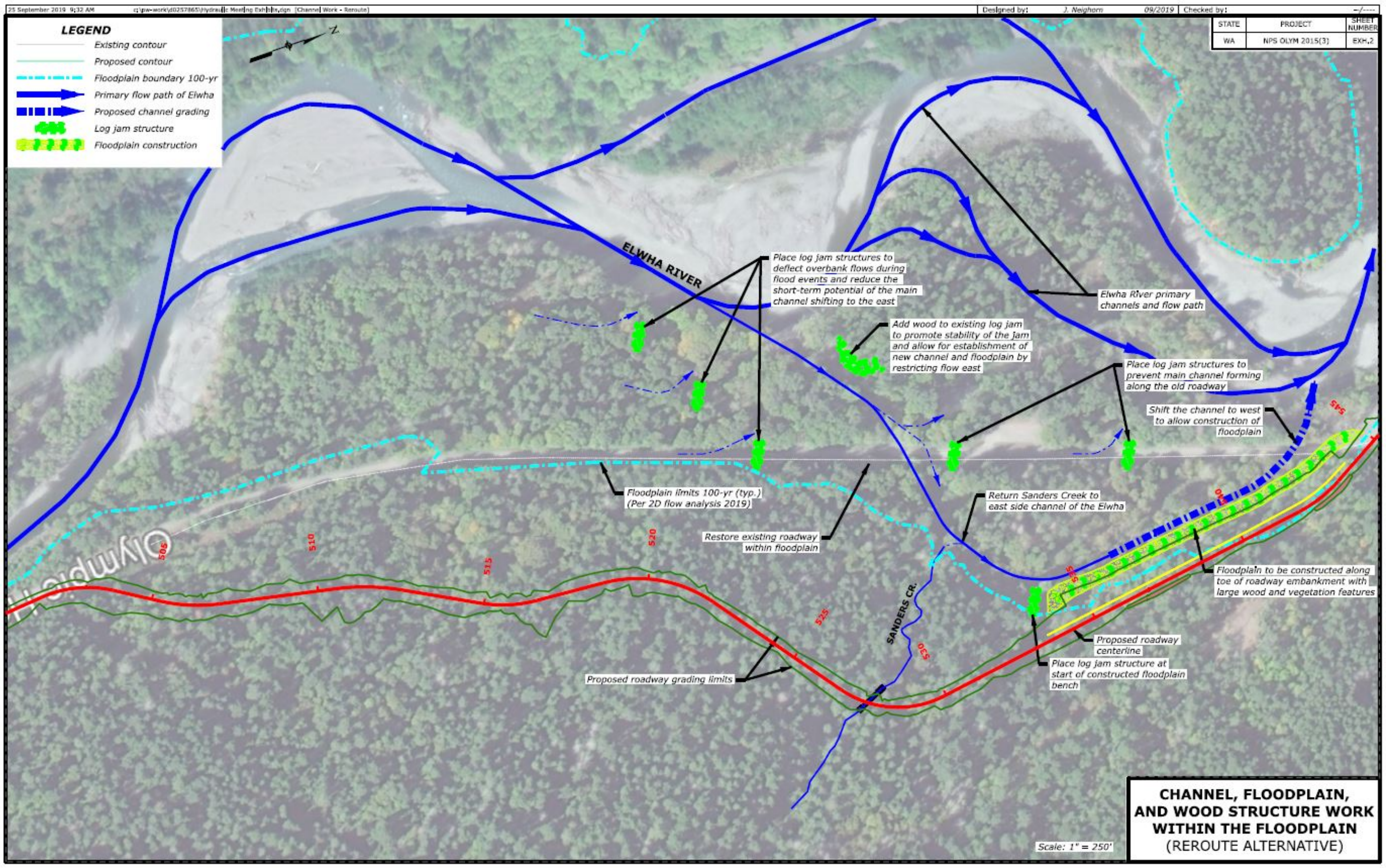

Figure 2: Reroute Floodplain Proposed Work

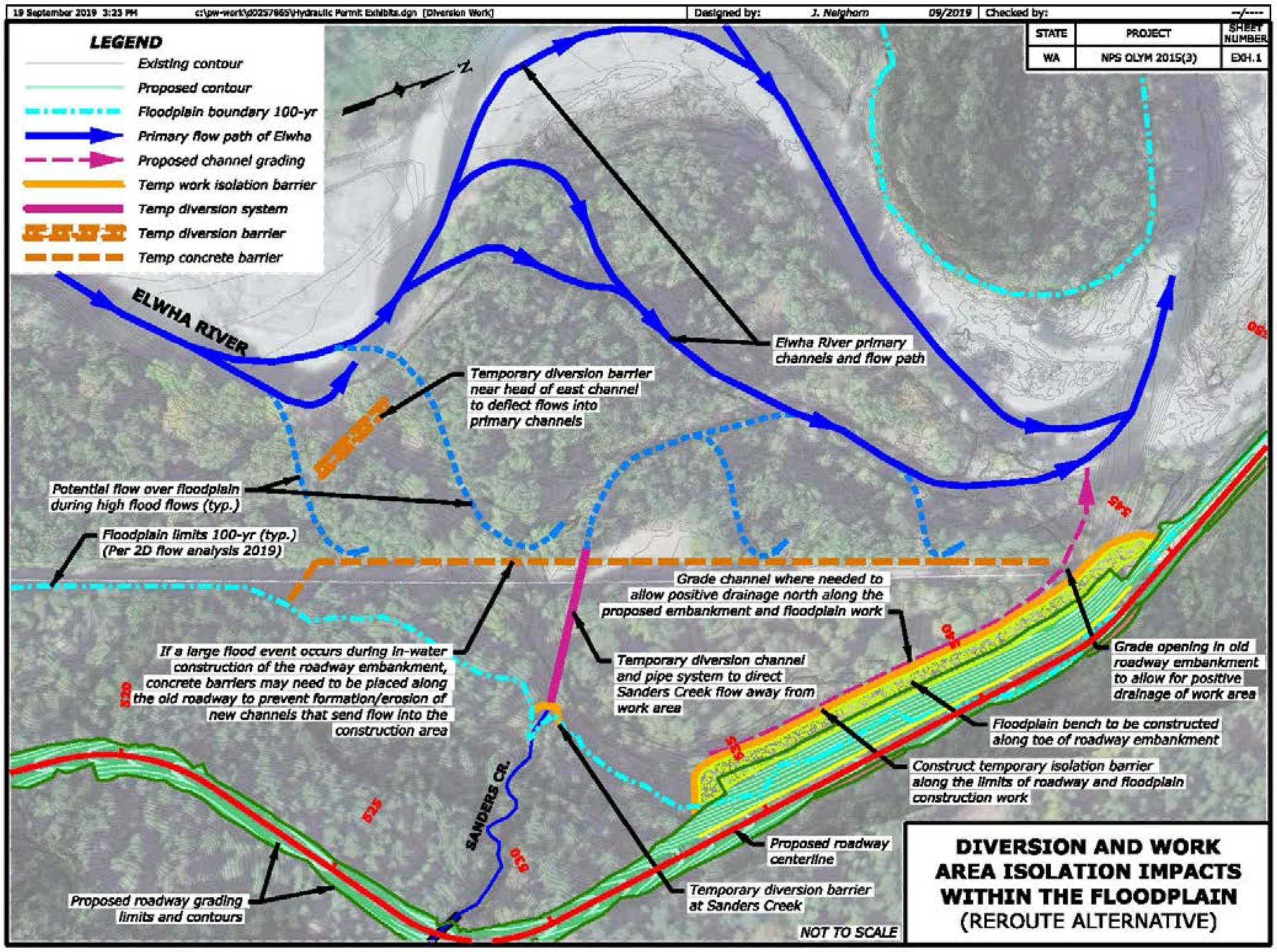

Figure 3: Reroute Diversion and Work Area Isolation Impacts in Floodplain

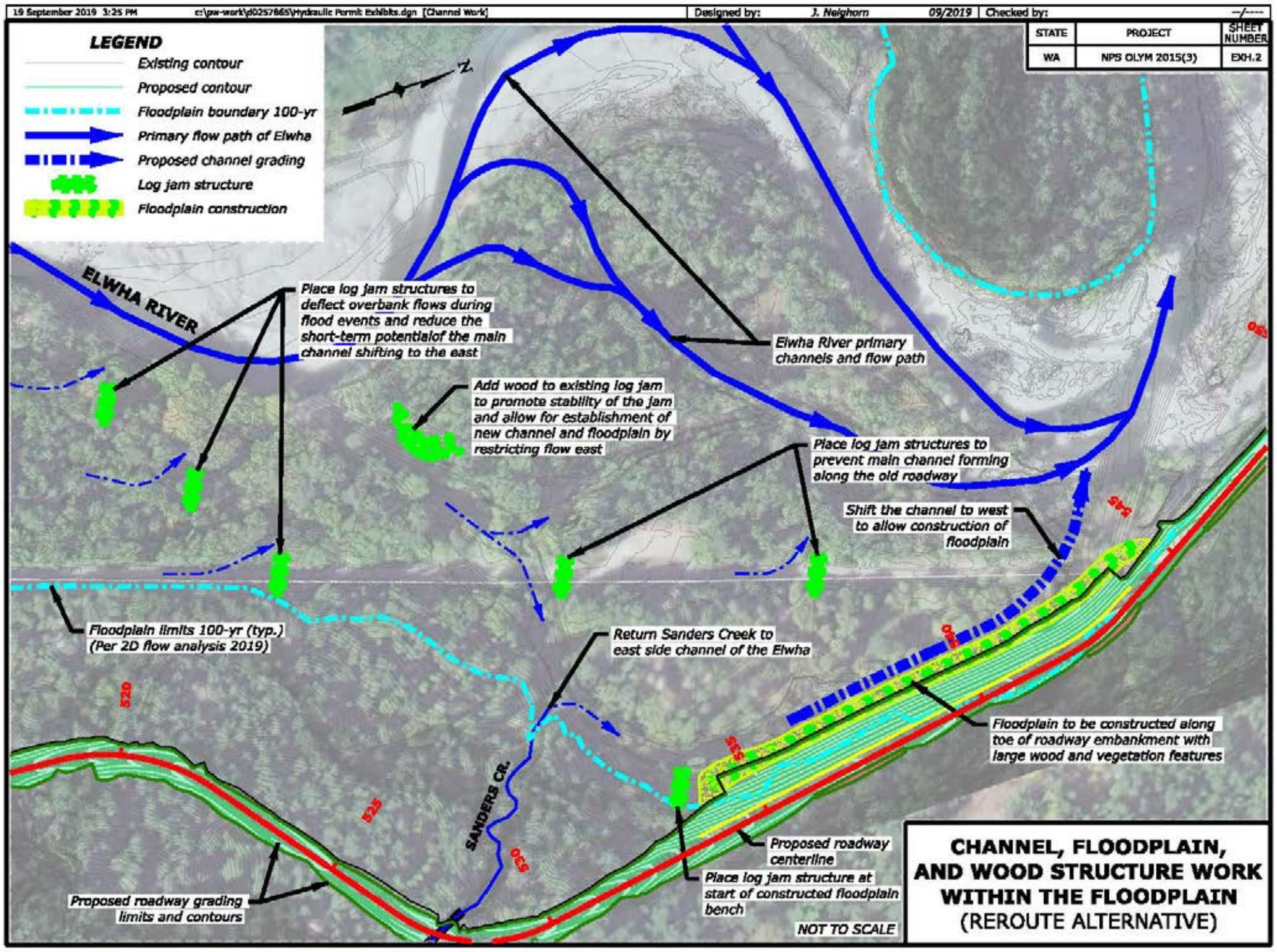

Figure 4: Reroute Channel, Floodplain and Wood Structure Work in Floodplain

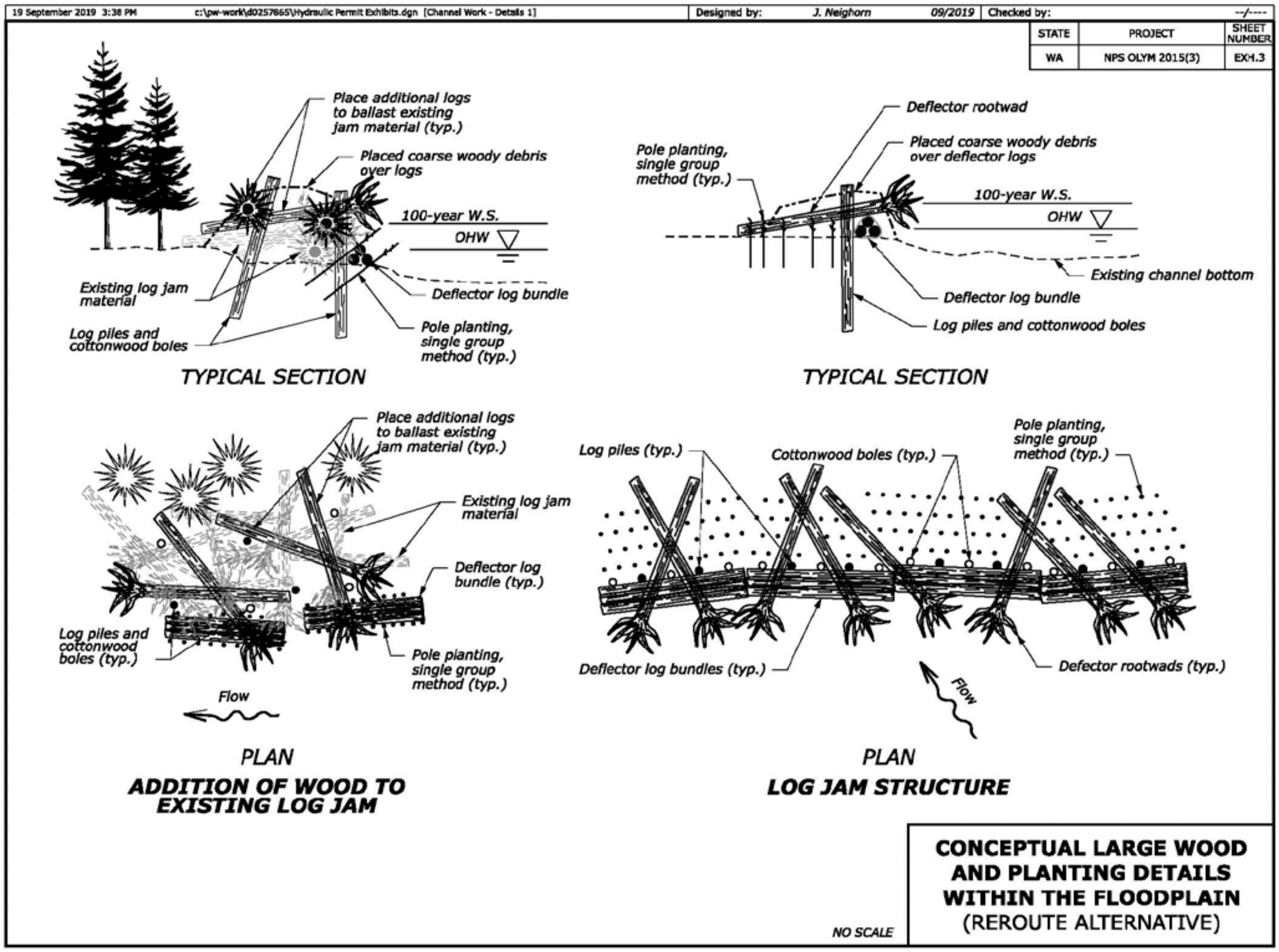

Figure 5: Reroute Conceptual Wood Structure and Planting Details

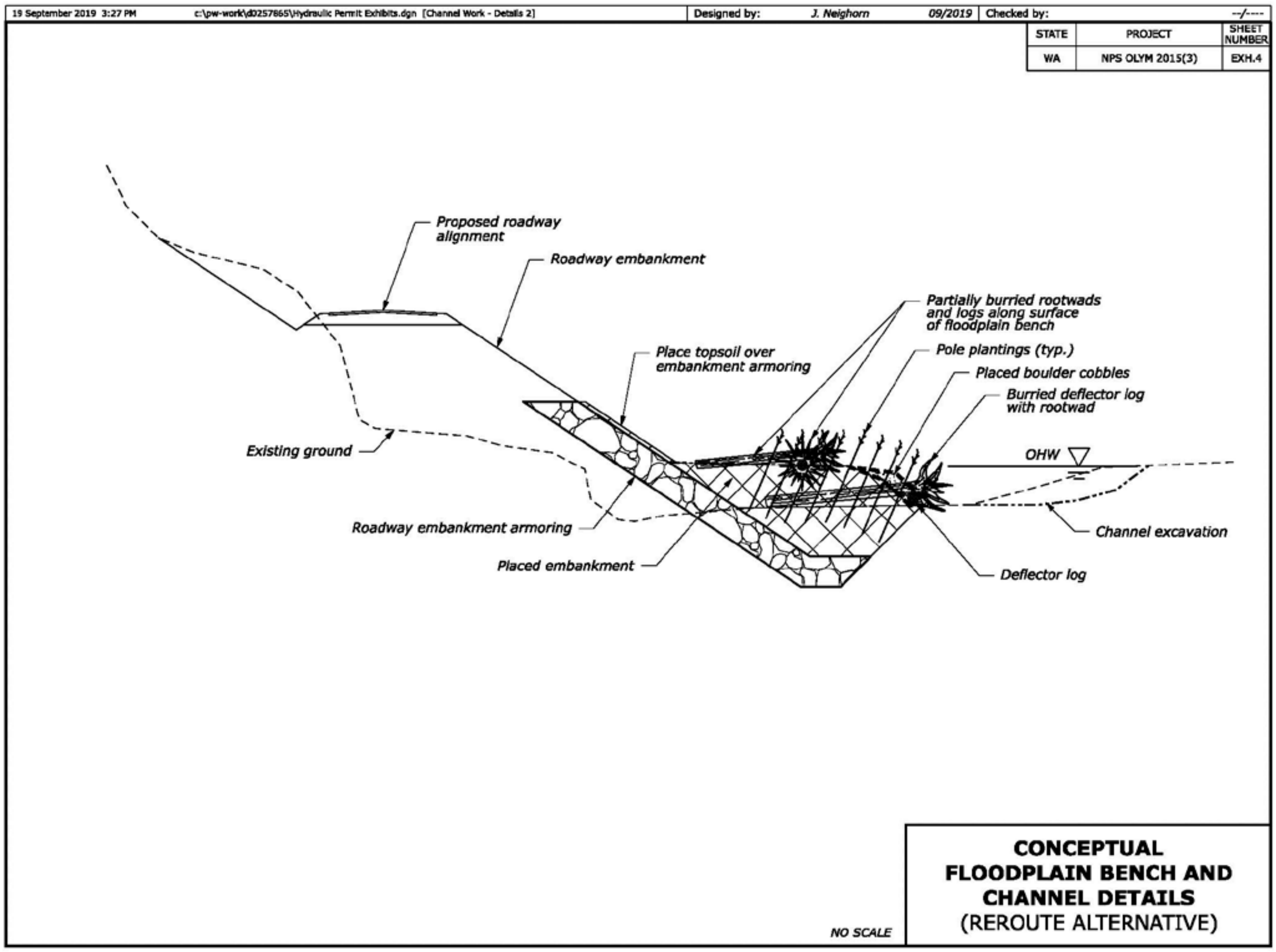

Figure 6: Reroute Conceptual Floodplain Bench and Channel Details