APPENDIX B—FLOODPLAIN STATEMENT OF FINDINGS

Graves Creek and South Shore Road Rehabilitation, Quinault Rain Forest
Environmental Assessment
Olympic National Park
Washington

Recommended:_____
Superintendent, Olympic National Park Date

Concurred:_____
Chief, Water Resources Division Date

Concurred:_____
Regional Safety Officer, Pacific West Region Date

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

Approved:_____
Director, Pacific West Region Date

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

PROPOSED ACTION

The National Park Service is proposing to repair the South Shore Road at milepost 0.7 to 0.9, and Graves Creek Road at mileposts 1.2, 1.7, 2.3 to 2.5, 3.1, 3.4, 3.8, 4.0, and 4.5 to restore permanent access to the Quinault Rain Forest, including NPS facilities in the Graves Creek area. Emergency road repairs were completed for several locations in early 2008. Permanent road repairs are anticipated to be completed in 2009. Permanent repairs to protect the road from future wash-outs would include the installation of bank barbs and wood reinforced floodplain structures within the Quinault River and East Quinault River channels, installation of rip-rap on channel banks, installation of a low water crossing on one of the tributaries, installation of bridges on two of the tributaries, removal of damaged culverts and installation of new culvert(s) at one location, and reconstruction of the road surface. These repairs are all within floodplains of the river or its tributaries. Proposed road rehabilitation and improvements are summarized in Table 1.

TABLE 1. PROPOSED ROAD REPAIRS AND IMPROVEMENTS ON SOUTH SHORE ROAD AND GRAVES CREEK ROAD.

Location	Proposed Repairs and Improvements
South Shore Road MP 0.7 to 0.9	Installation of three bank barbs and a wood reinforced floodplain in the Quinault River. Emergency repairs already completed include placement of about 600 feet of riprap on the streambank and rehabilitation of the road surface.
Graves Creek Road MP 1.2	Installation of two bank barbs in the East Quinault River. A section of the road was realigned away from the stream channel during emergency repairs.
Graves Creek Road MP 1.7	Installation of five bank barbs in the East Quinault River. A section of the road was realigned away from the river in 2003.
Graves Creek Road MP 2.3 to 2.5	Installation of a low water crossing in an ephemeral tributary to the East Quinault River outside of the river floodplain.
Graves Creek Road MP 3.1	Installation of a new single lane prefabricated steel bridge across a tributary to the East Quinault River outside of the river floodplain.
Graves Creek Road MP 3.4	Installation of a new single lane prefabricated steel bridge across a tributary to the East Quinault River outside of the river floodplain.
Graves Creek Road MP 3.8	Road repairs and culvert protection in a tributary to the East Quinault River outside of the river floodplain.
Graves Creek Road MP 4.0	Installation of 100 feet of riprap on the East Quinault River streambank to protect the road. Possible future installation of a wood reinforced floodplain upstream of the riprap if the river changes course.
Graves Creek Road MP 4.5	Installation of culvert(s) in a tributary to the East Quinault River outside of the river floodplain.

Site Description

The proposed road repairs will:

- Reestablish two-lane vehicle access for park visitors and staff to the Quinault Rain Forest and provide access to facilities in the Graves Creek area.
- Protect the roads from future damage due to high streamflows by developing more sustainable protective measures.
- Restore and/or minimize adverse effects to important fisheries habitat.
- Protect other natural and cultural resources in the area.

The proposed action is needed to repair damage to South Shore Road and Graves Creek Road caused by a storm that started on December 3, 2007. Restoration of access to the Quinault Rain Forest roads and facilities is of vital concern to the NPS, local and regional communities, and park visitors. The Quinault Rain Forest provides a unique opportunity for visitors to explore the southernmost temperate rain forest in the United States. Facilities accessed by the South Shore Road include the Olympic National Forest Ranger Station, campgrounds, trails, and tribal and private facilities. Once the South Shore Road enters the park, visitors can choose to drive to the Graves Creek area or continue around to the north side of Lake Quinault. Graves Creek Road leads to a seasonal ranger station and campground, and the East Fork Quinault and Graves Creek trailheads. Access points to trails from this location lead to the Enchanted Valley and on to Staircase and Dosewallips. The Graves Creek area has had various facilities that served the public since at least 1928. Both the South Shore Road and the North Shore Road provide access to the North Fork area. The North Fork area includes a seasonal ranger station, a campground, the Irely Lake Trail, and the North Fork trailhead.

Floodplains

The Quinault River drains from the Olympic Mountains in Northwest Washington state. The North and East forks of the Quinault River join about 11 miles upstream of Lake Quinault. The North Fork has a drainage area of 80.3 square miles and the East Fork has a drainage area of 90.3 square miles. Quinault River flows have been measured by the U.S. Geological Survey from 1911 until present. The gage is located at the outlet of Lake Quinault, where the drainage area for the Quinault River is 264 square miles. The average annual flow of the river at this location is about 2,900 cfs. The storm event that began on December 3, 2007 resulted in a maximum instantaneous peak flow on December 4 of 41,600 cfs at the USGS gage, the sixth largest flow on record. Assuming an equal distribution of runoff from the watershed above Lake Quinault, the estimated peak flow from the East Fork of the Quinault River could have been between 18,500 and 20,000 cfs.

Settlement in the Quinault River Valley began between 1900 and 1920 (Reclamation 2005). A number of land management practices since that time have influenced the condition of the watershed and the Quinault River. The clearing of old growth forest on terraced streambanks in the channel migration zone of the Quinault River is believed to

be the most significant factor affecting river processes (Reclamation 2005). Logging occurred in the Quinault River Valley from the early 1900s to about 1950. Homesteaders, as well as others, have attempted to manage the Quinault River by removing natural logjams from the river, installing riprap for bank protection, or performing measures to redirect river flow. Road and bridge construction have also influenced river-forming processes in the valley. Previous repairs and streambank stabilization on the South Shore Road and Graves Creek Road from other storm events have contributed to both temporary and long-term disturbances to the existing quality of the environment.

The project area is within the Quinault River and East Quinault River floodplains, which have not been formally mapped. The estimated floodplain ranges from 450 feet to more than 2,500 feet wide in the project area. The floodplain of the Quinault River is well developed and clearly confined by steep slopes or bedrock terrain on either side of the floodplain in most locations. The 2-year bankfull flow of the Quinault River at the USGS gage at the outlet of Lake Quinault averaged 24,500 cfs between 1951 and 2004. The 100-year peak flow at the gage averaged 56,800 cfs between 1911 and 2002 (Reclamation 2005). The USGS determined that peak flows in the Quinault River may be about 30 to 40 percent higher upstream of the lake. Assuming an equal distribution of runoff from the watershed above Lake Quinault, the 2-year bankfull flow would be about 11,000 cfs and the 100-year peak flow would be about 25,000 to 27,000 cfs in the East Fork of the Quinault River.

Justification for Use of the Floodplains

Proposed repairs to the roads would require work in the floodplain that cannot be avoided. Relocation of these roads where they currently abut the Quinault River (MP 0.7 – 0.9) or East Quinault River (MP 1.2, MP 1.7, and MP 4.0) is not technically feasible. The road at these locations is bounded by steep bedrock outcrops and terrain unsuitable for road relocation. Short segments of the Graves Creek Road at MP 1.2 and MP 1.7 have already been shifted as far from the river as feasible during previous repairs. Excavation or blasting into the hillsides to shift the road farther is likely to result in substantial erosion, mass wasting, and environmental damage. The impact of the project on floodplains would be moderate.

Investigation of Alternative Sites

There are no other alternative sites for this project.

Hydrologic Risk

The project would be completed during low streamflow. Construction would be halted if high precipitation or high flows occur. Impacts to the floodplain during construction would be minor. Long-term adverse effects to the floodplain are not expected; however, the installation of riprap bank armor, bank barbs, and wood reinforced floodplains would reduce the width of the stream channel and result in slight changes to the channel

morphology. The changes to the floodplain would be beneficial in terms of protecting the roads and streambanks adjacent to the roads. The intent of the bank barbs and wood reinforced floodplains would be to provide structures that help maintain hydrologic function and simulate functions similar to gravel bars and logjams.

Annual peak flows during the USGS period of record (1911 to 2007) have nearly always occurred between mid-October and mid-March, and have ranged from 6,670 cfs to 50,500 cfs. Peak flows exceeding 30,000 cfs have occurred 23 times during the 93-year period of record (about 1 in every 7 years). In the 1950s and 1980s, peak flows exceeding 30,000 cfs occurred during 5 of 10 years. The storm event that began on December 3, 2007 resulted in a maximum instantaneous peak flow that was the sixth largest flow on record.

The Quinault River has a wide, aggrading channel with numerous gravel bars. There are often two to three distinct channels in the river, with four or five channels in short sections. The width of the floodplain of the East Fork averages about 1,500 feet in the area of the road damage, but is as narrow as about 565 feet and as wide as about 2,500 feet. The active channel migrates laterally on average between about 30 and 50 feet per year at the confluence of the forks.

Floods on the Quinault River occur during large frontal rainstorm events and as a result of snowmelt. Flooding of this nature can be anticipated and, therefore, the risk to visitors and park staff from flooding is small. During high precipitation or high flow events, the roads could be closed and the area within the floodplain evacuated. However, flood flows large enough to damage the South Shore and Graves Creek roads are possible in the future regardless of proposed improvements and repairs.

MITIGATIVE ACTIONS

Flood hazard mitigation would be provided by incorporating methods for protecting life and minimizing damage to the roads and natural resources through appropriate procedures. Mitigation of flood hazards to road users would be accomplished by closure of the road during periods of very high flow.

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

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

The culvert(s) and bridges would be designed to safely pass large flows, and avoid scouring, deposition, and other damage to the floodplain.

The low water crossing would be designed to carry large flows without impediments that back up stormflow or contribute to debris flow.

Placement of fill on floodplains would be minimized. Free natural drainage and natural contours would be preserved to the extent practicable when designing and completing the road improvements. Disturbed areas would be revegetated when construction is complete.

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

COMPLIANCE

The road improvements would accommodate natural streamflows, as well as flood flows. The road improvements would not change the ability of the floodplains to convey and store floodwaters, and rehabilitation of the roads would not contribute to flooding during or after construction.

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

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

CONCLUSION

The protection of people and property is of high priority to Olympic National Park. The proposed road improvements would be constructed on National Park land, and in the Quinault River floodplain within the park. The National Park Service concludes that there is no other practicable alternative for the location of the proposed project. With the roads designed to reduce future flood damage, the risk to life and property would be minimized. There would be no significant negative effects on natural or beneficial floodplain values. Installation of wood reinforced floodplains is intended to protect the road, create or protect fish habitat, and mimic naturally occurring logjams that form in the river floodplain.

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