



## Log Cabin Resort Cabin Replacement Environmental Assessment

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## How to Comment on this Environmental Assessment

This EA is being made available to the public, federal, state and local agencies and organizations through press releases distributed to a wide variety of news media, direct mailing, placement on park websites and announcements in press releases as well as in some local public libraries and other public places.

Copies of the document may be obtained from PEPC or Olympic National Park:

*Internet:* <http://parkplanning.nps.gov/olym> (PEPC Project Number 52463)

In addition, written comments will be accepted at the above or following locations:

*Email:* [olym\\_information@nps.gov](mailto:olym_information@nps.gov)

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Note to Reviewers: Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask the NPS in your comment to withhold your personal identifying information from public review, the NPS cannot guarantee that it will be able to do so.

Responses to substantive comments on the EA will be addressed in the proposed Finding of No Significant Impact (FONSI) or will be used to prepare an Environmental Impact Statement (EIS) (if warranted).

*Note:* For more information about specific agency and staff consultation, see Chapter V: Consultation and Coordination, List of Persons and Agencies Consulted / Preparers.

## How this Environmental Assessment (EA) is Organized

**i. Executive Summary:** This section briefly recaps the contents of the EA, including the purpose and need for the project, an overview of the alternatives and other key project information.

**ii. Table of Contents:** This lists the chapters and primary sections and where they may be found within the document.

**Chapter I. Purpose and Need:** This chapter identifies the purpose and need for the proposed actions and the planning background for the project, including related laws, policy, park plans and public participation to date. It also introduces the purpose and significance of the park. *Impact Topics* describes the potentially affected resources and laws or policy related to their inclusion in this EA. It also describes why some impact topics have been dismissed from further consideration.

**Chapter II. Alternatives:** This chapter describes the alternative courses of action that may be taken, including the reasons for dismissing options that do not meet criteria for inclusion. It also identifies and provides analysis related to the selection of the Environmentally Preferable Alternative and includes an *Alternative Comparison Chart* to more easily discern the differences among the alternatives.

**Chapter III. Affected Environment:** This chapter describes the existing environment by resource category. Included are resources that may be affected (changed) either beneficially or adversely by implementation of the proposed alternatives.

**Chapter IV. Environmental Consequences:** This chapter provides a comparison of the beneficial and adverse effects associated with the alternatives including cumulative impacts. *Methodology* identifies the means by which impacts to various resources are analyzed. As in Chapter III, a comparison table is provided – *Impact Comparison Chart* – to assist in discerning the differences in projected impacts among the alternatives.

**Chapter V. Consultation and Coordination (List of Persons and Agencies Consulted / Preparers):** This chapter provides additional information about public and internal scoping, preparation and review of the EA.

**Chapter VI. References:** This section provides bibliographical information for sources cited in this EA.

### APPENDICES

#### Appendix 1: Applicable Laws, Regulations and Policies



## Chapter I. Purpose and Need

This chapter identifies the purpose and need for the proposed actions. It also introduces Olympic National Park (ONP), the project area, and the planning background for the project, including the purpose and significance of Olympic. It identifies related laws, policy, and park and other agency plans, and summarizes public participation. “Impact Topics” describes the potentially affected resources and laws and/or policy relating to their inclusion in the Environmental Assessment (EA). Impact Topics also identifies those resources that have been dismissed from further analysis because they have no or negligible to minor impacts.

### Introduction

Olympic National Park is located on the Olympic Peninsula in Washington State. The park protects nearly one million acres of glacier-capped mountains, Pacific coast and old-growth temperate rain forest.

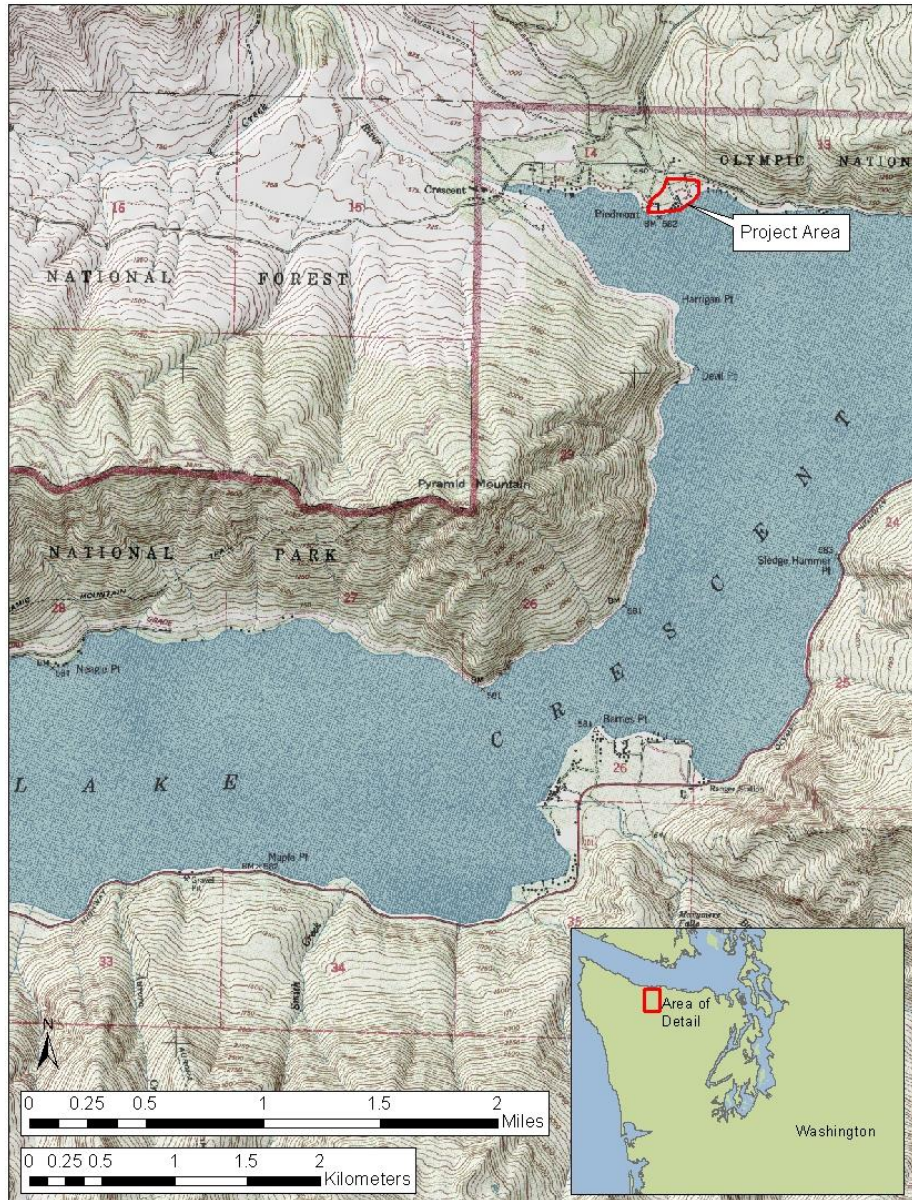
The purpose of this EA is to examine the environmental impacts associated with the proposal to construct replacement cabins and a manager’s residence and to improve public restroom facilities within Log Cabin Resort at Olympic National Park. The buildings would be constructed near the current footprint of the existing structures within an open lawn area. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council on Environmental Quality (CEQ) (40 CFR §1508.9), and the National Park Service Director’s Order (DO)-12 (*Conservation Planning, Environmental Impact Analysis, and Decision-Making*) (2004).

National Park Service’s *Management Policies*, 2006 require analysis of potential effects to determine whether or not actions would impair park resources. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service (NPS) managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. In accordance with *Management Policies*, the park manager’s determination of no impairment will be documented following the conclusion of the public review period and will be accompany the decision document for the EA.

### Background

Log Cabin Resort is located off of East Beach Road or Piedmont Road on the north side of Lake Crescent (Figure 1). The 109-acre resort, which contains approximately 14 acres of development, consists of 31 campsites (full hook-up), four tent sites, two bike-in sites, and a four tent group site, as well as a lodge, four lodge rooms, four camper cabins, eight rustic cabins, 12 chalet-style rooms, and a boat launch and two docks. Log Cabin Resort is adjacent to forest to the east, Lake Crescent to the west, and vacation residences to the north and south (along East Beach and Piedmont roads).

The lodge was designed by Cecil Doty in 1953 as part of the NPS Mission 66 program to improve visitor facilities in national parks. It was constructed by the Olympic National Park concessioner in 1955.



**Figure 1: Project Area Topographic Map**

The rustic cabins (Figure 2) were purchased from various resorts around Lake Crescent as those resorts closed and moved to the site. All of the rustic cabins have been evaluated for historic significance and none have been determined eligible for the National Register of Historic Places. In preparation for the new Concession Contract, the park began to improve facilities at Log Cabin Resort in early 2012. An Environmental Site Assessment was conducted in 2010 to identify recognized environmental conditions as practicable on the Site or in close proximity to the area that may or may not have caused and/or may cause adverse environmental condition(s) (Cherokee Construction Services LLC 2010). No hazardous materials or areas were identified by site records, database searches and investigation of the property. In 2011, an asbestos and lead survey occurred and the stairs in the A-frame chalets were rebuilt in 2011. Among the other changes that have already taken place, many related to life/health/safety improvements and meeting code requirements include reconfiguration and refinement of the campground; improvement of the A-frame chalets; replacement of kitchen facilities (i.e., stove hood, propane tank, compressor, etc.) in the lodge; and reconfiguration and expansion of the day-use parking area as well as structural repairs to the lodge and remaining rustic cabins. The manager's residence, which was in



extremely poor condition, was demolished. In all cases, estimates showed that the cost to rehabilitate these facilities was greater than the cost to replace them. In spring 2015, the docks were also replaced.

When the current Concession Contract was prepared, it called for ongoing replacement of the badly deteriorated rustic cabins and additional accessibility improvements.



**Figure 2: Rustic Cabins Proposed for Replacement**

Because Log Cabin Resort operates within the park, it falls under the umbrella of the NPS concessions management program. Concession operations are subject to the provisions of the National Park Service Concessions Management Improvement Act of 1998; NPS regulations published at 36 CFR Park 51; Chapter 10 of the NPS Management Policies; Director's Order 48A: Concession Management; and other specific guidance that may be issued under the Director's authority (NPS 2006: Chapter 10).

Section 10.2.2 of the NPS Policies 2006 further states the following regarding commercial services planning:

“A decision to authorize or expand a park concession will consider the effect on, or need for, additional infrastructure and management of operations and be based on a determination that the facility or service

- Is consistent with enabling legislation, and
- Is complementary to a park's mission and visitor service objectives, and
- Is necessary and appropriate for the public use and enjoyment of the park in which it is located, and
- Is not, and cannot be, provided outside park boundaries, and
- Incorporates sustainable principles and practices in planning, design, siting, construction, and maintenance, and
- Adopts appropriate energy and water conservation, source reduction, and environmental purchasing standards and goals, and
- Will not cause unacceptable impacts (NPS 2006:144).”

## A. Purpose and Need

The purpose of the proposal is to provide a safe, healthy, functional and efficient rental space for guests of Log Cabin Resort consistent with concession goals and objectives for the site as identified in the recently approved (October 1, 2013) 10-year Concession Contract. The proposal is consistent with current plans, including the recent General Management Plan (NPS 2008) and NPS policy.

The project is needed to improve visitor experience, especially accessibility, safety and resource protection by:

- providing a manager's residence that meets current health and safety standards and structural building codes,
- replacing deteriorated guest accommodations with guest accommodations that meet current health and safety standards and structural building codes,
- providing options for accessible guest accommodations,
- providing an accessible restroom with accessible pathways for lodge guests and day use visitors,
- decreasing congestion for both visitors and vehicles,
- resurfacing resort roadway surfaces, and
- providing an accessible route and pathways throughout the site.

The current guest accommodations (rustic cabins) are deteriorated. Most of these were moved to the site from various former resorts around Lake Crescent in the mid-1960s. Many of them contain added exterior water heaters. Inside plumbing, paneling, and ceiling finishes are deteriorated and in poor condition.

In 2012, analysis of the manager's residence resulted in it being demolished, rather than repaired. A cost-benefit analysis of needed life/health/safety repairs found that it would be less expensive to replace it, rather than to rehabilitate it. Because it was not historic, it was removed and the manager was relocated to another former guest cabin (1C).

Currently, rustic cabin guests park in front of the cabins, obstructing views, resulting in safety problems, and limiting the usefulness of the sloping lawn above the lodge for activities.

In addition, a range of other issues have been identified:

- There is no designated employee parking for the resort. Current employee parking occurs where the former manager's residence was located.
- Camper cabin guests currently must walk through one of the campsites (Campsite 5) enroute to the comfort station (restroom/shower).
- Pathways to the amphitheater, docks, and day use area are not accessible.
- Log Cabin/Piedmont Creek has two overhanging banks close to the camper cabins.
- Cabin 5C is very close to a small wetland and could be affecting its hydrologic function.
- The resort needs to be fully open during its regular season (May – September).

## Park Purpose and Significance

### Purpose

Olympic National Park (Figure 3) was "set apart as a public park for the benefit and enjoyment of the people" (35 Statute 2247, June 29, 1938). According to House Report 2247 (April 1938), the park purpose is to

preserve for the benefit, use, and enjoyment of the people, the finest sample of primeval forests of Sitka spruce, western hemlock, Douglas fir, and western red cedar in the entire United States; to provide suitable winter range and permanent protection for the herds of native Roosevelt elk and other wildlife indigenous to the area; to conserve and render available to the people, for recreational



use, this outstanding mountainous country, containing numerous glaciers and perpetual snow fields, and a portion of the surrounding verdant forests together with a narrow strip along the beautiful Washington coast.

## Significance

- Olympic National Park protects several distinctly different and relatively pristine ecosystems, ranging from approximately 70 miles of wild Pacific coast and islands, through densely forested lowlands, to the glacier-crowned Olympic Mountains.
- The ecosystems protected within Olympic National Park contain a unique array of habitats and life forms, resulting from thousands of years of geographic isolation, along with extreme gradients of elevation, temperature, and precipitation. At least 16 kinds of animals and 8 kinds of plants on the Olympic Peninsula exist nowhere else in the world.
- Olympic National Park contains some of the last remaining undisturbed, contiguous aquatic habitat throughout the range of several west coast fish species. The park protects 12 major river basins, more than 3,500 miles of rivers and streams within 13 watersheds, more than 300 high mountain lakes, and two large lowland lakes. The park also supports more than 70 unique stocks of Pacific salmonids, 29 native freshwater fish species, and one endemic fish species.
- Olympic National Park protects the primeval character of one of the largest wilderness areas in the contiguous United States.
- Olympic National Park protects some of the finest remaining stands of old-growth temperate rain forest in the United States. These forests of ancient and immense trees provide habitat for dozens of smaller plants and animals, including important habitat for a number of threatened species.
- The Olympic rocky intertidal community is considered one of the most complex and diverse shoreline communities in the United States. Olympic National Park protects about 1,400 square miles of the intertidal, island, and shoreline habitat, and when combined with the neighboring Olympic Coast National Marine Sanctuary and U.S. Fish and Wildlife Service Washington Islands National Wildlife Refuge Complex, a total of 3,600 square miles of intertidal, island, and ocean habitats is protected.
- Olympic National Park protects the largest population of Roosevelt elk in its natural environment in the world. Decades of protection from human harvest and habitat manipulation have sustained not only high densities of elk, but also preserved the natural composition, social structure, and dynamics of this unique coastal form of elk found nowhere else in the world.
- Olympic National Park protects important cultural resources with regional and national significance, including more than 650 archeological sites, hundreds of ethnographic sites, 31 cultural landscapes, and 16 historic districts. Within the park boundaries, 128 historic structures are on the List of Classified Structures.

## Park Mission Statement

Park mission statements describe conditions that exist when the legislative intent for the park is being met. The mission of Olympic National Park is:

*To preserve and protect, unimpaired, the Park's diverse natural and cultural resources and provide for the enjoyment, education, and inspiration of present and future generations.*

To fulfill this mission, park staff must understand and protect the natural processes, habitats, and life forms found within the park – from the glacier-capped Olympic Mountains, to the ancient forests, to the beaches and headlands of the wilderness coast. In addition, park staff must protect the park's cultural resources, which document 10,000 years of human occupation and reveal the region's history of discovery, exploration, homesteading, and community development, including concession-operated areas, such as Log Cabin Resort.

## **B. Legislative, Policy, and Planning Context**

A variety of laws, executive orders, NPS management policies and park planning documents guide the development of this environmental assessment. Appendix 1 has a list of some of the most relevant ones.

## **C. Decisions to be made**

This Environmental Assessment analyzes the NPS preferred alternative, other alternatives, and their impacts on the environment.

This Environmental Assessment has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), and regulations of the Council on Environmental Quality (40 CFR 1508.9); NPS Director's Order-12: Conservation Planning, Environmental Impact Analysis, and Decision-making (DO-12) (2004); Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended); and implementing regulations 36 CFR Part 800.

This EA will be used to help the NPS (Pacific West Regional Director) make the following decisions:

- What changes should be made to the Log Cabin Resort to provide benefits to park visitors while protecting natural and cultural resources?
- Should an accessible trail be provided at the site?
- Determine which of the alternatives, or combinations thereof, to select from this Environmental Assessment.

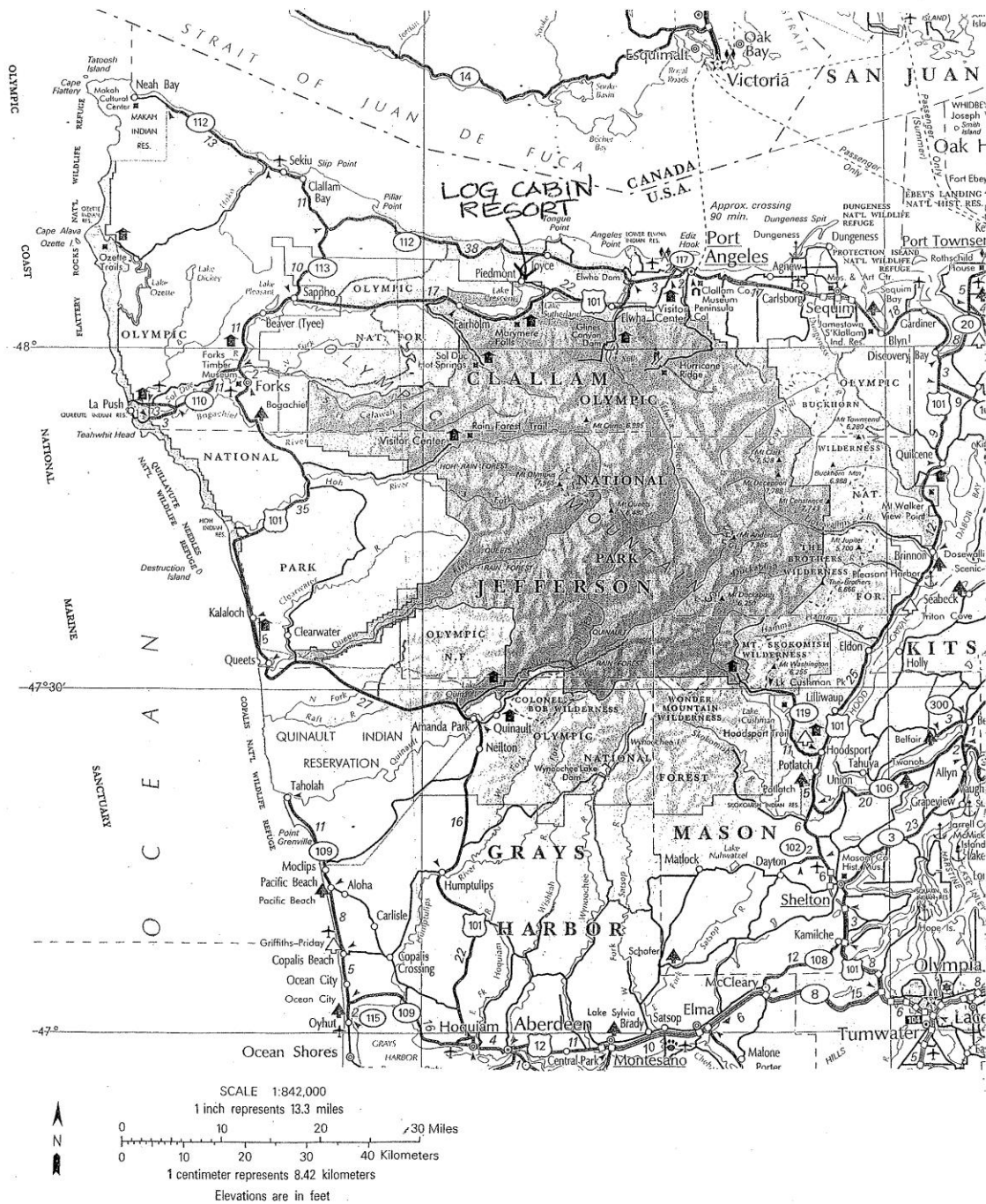


Figure 3: Olympic National Park Location Map

## D. Impact Topics Retained For Further Analysis

In this section and the following section on *Impact Topics Dismissed from Further Analysis*, the NPS takes a “hard look” at potential impacts by considering the direct, indirect, and cumulative effects of the proposed action on the environment.

Specific impact topics were developed to address potential natural, cultural, recreational, and park operations impacts that might result from the proposed alternatives as identified by the public, NPS, and other agencies, and to address federal laws, regulations and orders, and NPS policy. A brief rationale for the selection of each impact topic is given below. These impact topics focus the discussion on comparing the environmental impacts among alternatives on affected resources. Impact topics are the resources of concern that may be affected by the range of alternatives considered in this EA.

### Impact Topics Considered

Impacts of the alternatives on the following topics are presented in this EA: soils, water resources (water quality/quantity, wetlands), vegetation, wildlife, special status species, archeological resources, visitor experience (including visitor use access and visitor use opportunities).

#### Soils

Based on *Management Policies*, the NPS will strive to understand and preserve the soil resources of park units and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.

Although proposed construction of the cabins would be in an area that does not contain significant geologic features and in an area that has been previously disturbed by past construction of utilities and nearby existing cabins and other facilities at the resort, changes in topography would be required to provide a level surface on which to construct the new cabins and accessible pathways so that the roadway would be behind, rather than in front of, the cabins. As a result, excavation would disturb soils. Therefore impacts to soils have been retained as an impact topic.

#### Water Resources (Hydrology / Water Quality, Water Quantity, and Wetlands)

*Management Policies* (NPS 2006) provides direction for the preservation, use, and quality of water in national parks.

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act (CWA) of 1977, is a national policy to enhance the quality of water resources, and to prevent, control, and abate water pollution. The Clean Water Act's purpose is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The U.S. Army Corps of Engineers evaluates federal actions that result in potential degradation of waters of the United States and issues permits for these actions consistent with the CWA (Section 404). The Environmental Protection Agency (EPA) or its designee – the states – reviews permits and actions under Section 401 (water quality certification).

#### Hydrology and Water Quantity

The proposed project area is adjacent to surface waters that are part of Log Cabin/Piedmont Creek and Lake Crescent. There is also a small stream (Log Cabin/Piedmont Creek) near the project area. The NPS is the holder of existing water rights. From these, the resort uses a surface water intake system drawing from Lake Crescent to supply water for operations.

The proposed replacement of the cabins would continue to result in a continuation of the consumptive use of water in the lodge (including in remodeled or new restrooms) and in the cabins. In addition, restoration of a portion of the bank of Log Cabin/Piedmont Creek is proposed. As a result, hydrology and water quantity have been retained as an impact topic.



### Water Quality

Although impacts to water quality would be avoided or mitigated using best management practices to control sediment, this topic has been retained because of the pristine quality of Lake Crescent and surrounding water resources. In addition, there would continue to be impacts from water treatment for drinking water and from treatment of wastewater in the onsite wastewater treatment plant.

### Wetlands

The Service will (1) provide leadership and take action to prevent the destruction, loss, or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands (NPS 2006: 4.6.5).

For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas."

Executive Order 11990 Protection of Wetlands requires federal agencies to avoid, where possible, adversely impacting wetlands. Further, §404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process, discharge or dredged or fill material or excavation within waters of the United States. National Park Service policies for wetlands as stated in Management Policies (NPS 2006) and Director's Order 77-1 Wetlands Protection strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In accordance with DO 77-1 Wetlands Protection, proposed actions that have the potential to adversely impact wetlands (depending on the extent of their impacts) must be addressed in a Statement of Findings for wetlands.

There is a small wetland in the vicinity of the orchard near Cabin 5C. This topic has been retained to ensure that mitigation measures are included to avoid or minimize impacts. This project however is unlikely to require a wetlands Statement of Findings because of the small area that would be affected (less than 0.1 acre).

### **Vegetation**

The NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of plants (NPS 2006). Existing vegetation in the project area consists primarily of nonnative mowed lawns and temperate forest dominated by Douglas-fir.

Vegetation would be displaced, disturbed, and/or compacted in the areas of construction particularly in the footprint of the new buildings and along utility line corridors. Vegetation would also be disturbed and displaced with removal of the current cabins and during construction. If constructed, the new accessible trail would also disturb vegetation. Disturbed areas would be revegetated and rehabilitated following construction. Because there would be a variety of impacts to area vegetation, this topic has been retained.

### **Fish and Wildlife**

The NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of animals (NPS 2006). Approximately 54 mammals, 4 reptiles, 13 amphibians, 260 birds, 9 native salmon species, many other native fish and an unknown number of invertebrates, including insects are known to inhabit the park. In addition, there are at least 29 native populations of freshwater fish, 70 unique populations of salmonids, including two endemic species found in Lake Crescent. Natural areas adjacent to the lake are used by mammals, birds and fish. Habitat for bald eagles, deer, and other wildlife is present in the area. Lake Crescent also contains invertebrates, such as freshwater mussels and crayfish.

The proposed cabin replacement project area is a heavily used visitor services area. As a result, there is little native wildlife use, except deer, birds, small mammals, and invertebrates. Therefore, this topic has been retained.

### **Special Status Species**

The Endangered Species Act of 1973 requires examination of impacts on all federally-listed threatened, endangered, and candidate species. Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. In addition, NPS Management Policies and Director's Order-77 Natural Resources Management Guidelines require the National Park Service to examine the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species (NPS 2006). As a result, the U.S. Fish and Wildlife Service and the Washington State Department of Fish and Wildlife were contacted to identify federally- and state-listed species which may occur in or near the project area.

Among the special status species that could be affected by the proposed rehabilitation include water lobelia, Pacific fisher, tailed frogs, torrent and red-belly salamanders, marbled murrelets, Beardslee rainbow and Crescent cutthroat trout and bald eagles. Although the project would be designed to avoid impacts during sensitive seasons for fish and wildlife species, mitigation measures are necessary to ensure this. Because the project has the potential to adversely affect special status species, this topic has been retained.

### **Archeological Resources**

The National Historic Preservation Act, NPS Management Policies, and NPS Director's Orders affirm a long-term commitment to the appropriate investigation, documentation, preservation, interpretation, and protection of archeological resources inside units of the national park system. As one of the principal stewards of America's heritage, the National Park Service is charged with the preservation of the commemorative, educational, scientific, and traditional cultural values of archeological resources for the benefit and enjoyment of present and future generations. Archeological resources are nonrenewable and irreplaceable, so it is important that all management decisions and activities throughout the national park system reflect a commitment to the conservation of archeological resources as elements of our national heritage.

Because appropriate steps would be taken to protect any archeological resources that are inadvertently discovered during construction, it is unlikely that archeological resources would be disturbed. Because of the potential for disturbance, however, this topic has been retained for analysis.

### **Visitor Experience**

According to 2006 Management Policies, the enjoyment of park resources and values by people is part of the fundamental purpose of all park units (NPS 2006). The National Park Service is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks, and will maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of society. Further, the NPS will provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the parks.

Scenic views and visual resources are considered highly valued associated characteristics that the National Park Service should strive to protect (NPS 2006). Because the proposed project will affect a high visitor use area this topic has been retained for analysis.

### **Human Health and Safety**

While recognizing that there are limitations on its capability to totally eliminate all hazards, the Service and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees (NPS 2006: 8.2.5.1).

Potential future effects on human health and safety is one of the primary reasons for undertaking rehabilitation at Log Cabin Resort, namely to rehabilitate buildings that do not meet existing code requirements and which may become hazardous in the near future. As a result, this topic has been retained for further analysis.

## **E. Impact Topics Dismissed From Further Analysis**

Impact topics are dismissed from further evaluation in this EA if:

- they do not exist in the analysis area, or
- they would not be affected by the proposal, or
- the likelihood of impacts are not reasonably expected, or
- through the application of mitigation measures, there would be minor or less effects (i.e. no measurable effects) from the proposal, and there is little controversy on the subject or reasons to otherwise include the topic.

Where there would be no effect or no measurable effects, there would either be no contribution towards cumulative effects or the contribution would be low. For each issue or topic presented below, if the resource is found in the analysis area or the issue is applicable to the proposal, then a limited analysis of direct and indirect, and cumulative effects is presented.

The following topics were eliminated from detailed study because there would be no potential impacts or only negligible impacts would be expected: air quality, geology, floodplains, park operations, socioeconomics, Indian Trust Resources, designated critical habitat, ecologically critical areas, wild and scenic rivers, environmental justice, prime farmland, and Indian Sacred Sites.

### **Air Quality**

The Clean Air Act of 1963 as amended (42 USC 7401 et seq., PL 88-206) was established to promote the public health and welfare by protecting and enhancing the Nation's air quality. The act establishes specific programs that provide special protection for air resources and air quality-related values associated with NPS units.

The portion of Olympic National Park associated with actions in this EA is designated as a class II air quality area under the Clean Air Act. Class II areas allow only moderate increases in certain air pollutants, while class I areas (primarily large national parks and wilderness areas) are afforded the highest degree of protection, meaning that very little additional deterioration of air quality is permitted. A class II designation indicates the maximum allowable increase in concentrations of pollutants over baseline concentrations of sulfur dioxide and particulate matter as specified in §163 of the Clean Air Act. Further, the Clean Air Act provides that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts (EPA 2000).

Construction activities such as hauling materials and operating heavy equipment could result in temporary increases of vehicle exhaust, emissions, and fugitive dust in the general project area. Any exhaust, emissions, and fugitive dust generated from construction activities would be temporary and localized and would likely dissipate rapidly because air stagnation at Olympic National Park is rare. Overall, the project could result in a negligible degradation of local air quality, and such effects would be temporary, lasting only as long as construction. The class II air quality designation for Olympic National Park would not be affected by the proposal. Because there would be negligible effects on air quality, this topic is dismissed from further analysis in this document.

### **Geology**

Based on Management Policies, the NPS will preserve and protect geologic resources and features from adverse effects of human activity, while allowing natural processes to continue (NPS 2006).

Although the proposed project will affect soils and localized topography in the vicinity of the cabin replacement area, there is no evidence that the project would adversely affect surface or subsurface geologic formations.

### **Soundscape Management**

In accordance with Management Policies and Director's Order-47: Sound Preservation and Noise Management, an important component of the National Park Service's mission is the preservation of natural soundscapes associated with national park units (NPS 2006). Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and durations of human-caused sound considered acceptable varies among National Park Service units as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

The proposed locations for the replacement cabins and restrooms are within a developed area. All construction would occur in the developed zone. Existing sounds in this area are most often generated from vehicular traffic (visitors and employees entering/leaving the area), people, climate controls on the buildings, some wildlife (such as birds), and wind. Long-term sounds generated in the area occur from climate controls such as heating or air conditioning units and people using the buildings/area. Because the area already contains a wide variety of human sound, replacing existing structures is not expected to appreciably increase the noise levels in the general area. During construction, human-caused sounds would likely increase from noise and activity in the area, including from equipment, vehicular traffic, and construction crews. These construction sounds would be temporary, lasting only as long as the construction activity is generating the sounds, and would minimally affect area visitors and employees. As a result, this topic has been dismissed from further analysis.

### **Lightscape Management**

In accordance with Management Policies, the National Park Service strives to preserve natural ambient lightscales, which are natural resources and values that exist in the absence of human caused light (NPS 2006). Olympic National Park strives to limit the use of artificial outdoor lighting to that which is necessary for basic safety requirements.

Lighting present at Log Cabin Resort would generally be unaffected by proposed improvements. Where cabins are replaced or if a new restroom building is added, new lighting would meet NPS policies for minimal intrusion in the landscape, with all lighting directed inward and downward. No pathway lighting is proposed. As a result, this topic has been dismissed from further analysis.

### **Floodplains**

Executive Order 11988 *Floodplain Management* requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. The National Park Service under 2006 *Management Policies* and Director's Order 77-2 *Floodplain Management* will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to Director's Order 77-2 *Floodplain Management*, certain construction within a 100-year floodplain requires preparation of a Statement of Findings for floodplains.

Floodplains are areas of low-lying land that are subject to inundation by the lateral overflow of waters from rivers or lakes with which they are associated. EO 11988 (Floodplain Management) requires an examination of impacts to floodplains, including the potential risk involved in placing facilities within floodplains. It states that federal agencies must: "... take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains..."



Accordingly, agencies must determine whether a proposed action is located in or would impact the 100-year floodplain. The 100-year floodplain is designated by the Federal Emergency Management Agency (FEMA) as those low-lying areas that are subject to inundation by a 100-year flood (i.e., a flood that has a one percent chance of being equaled or exceeded in any given year). Proposed actions would not involve filling or modification of the ground surface such that people or structures would be exposed to flooding. There would be no permanent occupancy or direct or indirect modification of floodplains. The proposed actions would not adversely affect the functions of a floodplain or increase flood risk. Actions would not violate National Flood Insurance Program requirements or result in changes that would increase an existing floodway or the flood elevation level associated with the 100-year flood event. Because there are no actions that would adversely affect floodplains, this topic has been dismissed from further analysis. No Statement of Findings will be prepared because there are no unacceptable impacts to floodplains.

### **Paleontological Resources**

According to Management Policies, paleontological resources (fossils), including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research (NPS 2006). No paleontological resources are known in the area; therefore this topic has been dismissed from further analysis.

### **Ethnographic Resources**

National Park Service's Director's Order-28: Cultural Resource Management defines ethnographic resources as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. According to DO-28 and Executive Order 13007 on sacred sites, the National Park Service should try to preserve and protect ethnographic resources.

In consultation with Native American tribes, ethnographic resources are not known to exist in the proposed project area. Native American tribes traditionally associated with the park were apprised of the proposed project during public scoping and the public review period and no responses were received. Because no ethnographic resources are known in the project area, there would be no effect.

### **Historic Structures**

Consideration of the impacts to historic properties is required under provisions of Section 106 of the NHPA (1966), as amended, and the 2008 NPS Programmatic Agreement among the National Park Service, the National Conference of State Historic Preservation Officers, and the ACHP. It is also required under the Management Policies (2006). Federal land managing agencies are required to consider the effects proposed actions may have on properties listed in, or eligible for inclusion in, the National Register of Historic Places (i.e., Historic Properties), and to allow the ACHP a reasonable opportunity to comment. Agencies are required to consult with federal, state, local, and tribal government/organizations, identify historic properties, assess adverse effects to historic properties, and negate, minimize, or mitigate adverse effects to historic properties while engaged in any federal or federally assisted undertaking (36 CFR Part 800).

The term "historic structures" refers to both historic and prehistoric structures, which are defined as constructions that shelter any form of human habitation or activity. Although the Log Cabin Resort had been considered potentially eligible for listing in the National Register of Historic Places, evaluation has found that due to its low level of architectural integrity, that it is ineligible for the National Register. The SHPO concurred with this finding of non-eligibility in a letter dated May 6, 2015.

### **Cultural Landscapes**

According to NPS Director's Order-28: Cultural Resource Management Guideline, a cultural landscape is a reflection of human adaptation and use of natural resources, and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures

that are built. Because no cultural landscapes are present in the project area, this topic has been dismissed from further analysis.

### **Museum Collections**

According to Director's Order-24: Museum Collections, the National Park Service requires the consideration of impacts on museum collections (historic artifacts, natural specimens, and archival and manuscript material), and provides further policy guidance, standards, and requirements for preserving, protecting, documenting, and providing access to, and use of, National Park Service museum collections. Because there would be no impact on existing museum collections, this topic is dismissed from further analysis in this document.

### **Wilderness**

Olympic National Park wilderness was designated on November 16, 1988 (PL 100-668). Approximately 95 percent of the park is comprised of wilderness, while another 378 acres are classified as potential wilderness. There is no wilderness within or immediately adjacent to the proposed project area, therefore wilderness has been dismissed as an impact topic.

### **Park Operations**

Impacts to park operations are often considered in environmental documents to disclose the degree to which proposed actions would change park management strategies and methods and what additional costs (including staffing) are associated with the proposal. Because the project is for replacement of existing cabins and is part of a concession contract, the project would not appreciably affect park operations. As a result, this topic has been dismissed from further analysis.

### **Socioeconomics**

Because construction is proposed to occur during the off-season and would replace existing facilities in-kind, the proposed action would neither change local and regional land use nor appreciably impact local businesses or other agencies. Implementation of the proposed action could provide beneficial impacts to the economies of nearby cities and counties, such as Port Angeles and Clallam County due to minimal increases in employment opportunities for the construction workforce and revenues for local businesses and governments generated from these additional construction activities and workers. Any increase in workforce and revenue, however, would be temporary, lasting only as long as construction. Because there would be few overall impacts to the socioeconomic environment, this topic is dismissed.

### **Prime and Unique Farmlands**

The Farmland Protection Policy Act of 1981, as amended, requires federal agencies to consider adverse effects to prime and unique farmlands that would result in the conversion of these lands to non-agricultural uses. Prime or unique farmland is classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), and is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to the NRCS, the project area does not contain prime or unique farmlands (NRCS 2003). Because there would be no effects on prime and unique farmlands, this topic is dismissed from further analysis in this document.

### **Indian Trust Resources**

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources at Olympic National Park. The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Because there are no Indian trust resources, this topic is dismissed from further analysis in this document.

**Environmental Justice**

Executive Order 12898: General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. If constructed, the new facilities would be available to all guests, regardless of race or income, and the construction workforces would not be hired based on their race or income, therefore the alternatives would not have disproportionate health or environmental effects on minorities or low-income populations or communities. Because there would be no disproportionate effects, this topic is dismissed from further analysis in this document.

**Energy Consumption**

Energy consumption (including electricity, propane, wood, fuel oil, gas, or diesel) is often considered in combination with new facilities development and sustainability. The project does not include new sources of energy use. There would be short-term effects on energy use from consumption of fuels during construction and continued long-term effects from replacement of energy systems used for the cabins and restrooms.

**Executive Order 13007: Indian Sacred Sites (61 FR 26771, 42 USC 1996).**

To comply with the American Indian Religious Freedom Act (AIRFA), federal agencies must consider the effects of their actions on American Indian traditional religious practices. Based on analysis in the APE, there are no known traditional or religious use areas within the proposed project area. In addition, there are no known Indian sacred sites that would require compliance with Executive Order 13007: Indian Sacred Sites.

## Chapter II: Alternatives

The alternatives were developed by NPS staff based on collaborative interdisciplinary analysis derived from the expertise of planning team members. Internal and external scoping with Native American tribes, other city, county, state, and federal agencies, interested organizations and individuals also contributed to the development of the alternatives.

The following goals and objectives were among those that guided development of the alternatives:

- Preserve the number of rental cabins, including views from the cabins to Lake Crescent
- Improve accessibility of cabins, restrooms and pathways
- Provide at least 4-kitchen cabins as called for by concession contract
- Improve visitor safety and overall visitor experience
- Consider improvements that would help the concessioner use the resort during the shoulder or off-season
- Avoid impacts to water resources (streams and wetlands)
- Minimize number of trees removed
- Separate visitor and employee parking areas

### Overview of Alternatives

The alternatives described in this chapter include:

- Alternative A – No Action (Continue Current Management): Retain eight rental cabins and existing restaurant and day use restroom facilities.
- Alternative B – Replace eight cabins and manager’s residence, construct another cabin to replace a lodge motel unit, construct accessible indoor restroom, remodel existing lodge public restrooms, add pathways, re-gravel roads and parking area, and stabilize Log Cabin/Piedmont Creek bank.
- Alternative C – Replace eight cabins and manager’s residence, construct accessible outdoor restroom, remodel existing lodge public restrooms, add accessible loop trail and pathways, pave roads and parking area, and stabilize Log Cabin/Piedmont Creek bank.

## A. Alternatives

### 1. Alternative A – No Action (Continue Current Management)

Under this alternative (Figure 5), eight “Rustic” rental cabins, including one currently used as the manager’s residence, would be retained. Repairs to the existing deteriorating structures would continue to be made to extend their use as long as possible. These rental cabins, located at the concession-run Log Cabin Resort on Lake Crescent, were previously located in various locations, including former resorts around Lake Crescent.

Because of their deterioration and because the cabins would be retained, options for providing accessibility would remain limited. Options to improve accessibility would continue to be explored, including providing wider doorways within the cabins and accessible paths to them.

Three of the eight rental cabins, including a former one-bedroom rental cabin now used as a manager’s residence, have kitchens. Most contain one bedroom and a living room. All of the cabins have a bathroom, including a shower. Three of the cabins also have tubs. Cabin occupancy ranges from 3-6 people. Two sleep three people, two sleep four people, one sleeps five people, and two sleep six people. Most contain one or two double beds, and a twin bed or a double futon. One cabin has queen beds, two cabins have a double futon, one has a sofa-sleeper and three have twin beds.

Six of the rental cabins are located atop a grassy knoll overlooking the lodge and Lake Crescent. The access road runs in front of the cabins and the rear of the cabins is adjacent to a berm and small orchard containing a mixture of seven apple and pear trees. Picnic tables and fire pits for the cabins are located atop the knoll, adjacent to the road. There is a small wetland located behind cabin 5C. The other two rental cabins are located west of the others, above four small “camper” cabins in a wooded area above the chalets, which also overlook Lake Crescent. One of these cabins is currently used as the manager’s residence. The former manager’s residence was demolished in 2012 when it was determined to be unsafe and more expensive to fix than to replace.

There would be no changes to the following components of Log Cabin Resort in Alternative A:

- Log Cabin Lodge (Figure 6)
- Motel rooms in Log Cabin Lodge (4)
- A-frame Chalets (12)
- Rustic Cabins (7)
- Camper Cabins (4)
- 38-site campground
- Amphitheater/campfire circle
- Campground comfort station (restroom/shower facility)
- Existing manager’s residence (Rustic Cabin 1C)
- Day use parking (including for boats/trailers)
- Trash/recycling station
- Boat launch and docks

## 2. Elements Common to the Action Alternatives

In addition to mitigation measures adopted from the GMP (see end of Alternatives chapter), the following actions would be common to the action alternatives.

### Public Cabin Replacement

The Rustic Cabins (#1C-8C) would be removed (sold or demolished) and replaced with new structures atop the grassy knoll. The eight new cabins would be oriented to minimize impacts on area resources and to take advantage of views of the lake.

New pre-fabricated replacement cabins would be imported and trailered down either East Beach Road or Piedmont Road, depending on the size of the truck and whether there is construction occurring on East Beach Road. The cabins would contain sleeping space for 4-6 people, one bathroom and a living room. Decks overlooking Lake Crescent would be added or included in the pre-fabricated unit. Four or more of the new cabins would also have kitchens (small stove, refrigerator, microwave, coffeemaker and sink) or kitchenettes (small refrigerator, microwave, coffeemaker, and sink).

At least two of the replacement cabins would be accessible, and associated accessible pathways and parking meeting current standards would be provided.

A 2009 condition assessment found that numerous elements in the cabins were in poor condition. There are features that do not meet code requirements for electricity (including the need for heating and lighting and crawl space wiring modifications, and GFCI receptacles), plumbing (poor or no insulation of piping), wastewater (location of sewer vents), and fire protection (missing smoke detectors), as well as deteriorated conditions in the wood sheathing, roof shingles, flooring and foundations (rotted skirts). At the time of the inspection there were also broken elements, such as railings and unenclosed outdoor water heaters. At least one porch was also noted as being unsupported and in danger of collapse. Although the life-safety items have been corrected, the age and often poor initial construction of the cabins continues to make needed repairs expensive and persistent.

To minimize ponding of water around the cabins, there would be one dry well located near each cabin. Each dry well would be six feet in diameter by six feet deep (168 cubic feet of excavation). Each dry well would be filled to within one foot of the ground surface with clean drain rock, and filter fabric placed over the drain rock. Topsoil would then be placed over the filter fabric up to the ground surface and the area seeded to grass.

#### Manager's Residence Replacement

A replacement manager's residence (2 bedroom, 900 square foot cabin) would be constructed in the former footprint of the old manager's residence adjacent to the Log Cabin Resort entrance road. The Rustic Cabin (1C) currently being used for the manager's residence would then be removed (sold or demolished).

#### Lodge Restrooms

The existing men's and women's restrooms would be remodeled to provide for two unisex restrooms. One would be entered through the existing hallway between the lodge dining room and kitchen. The other would be entered from the corner of the dining room near the hallway. This one would be accessible. Additional public restrooms for accessibility would require converting a small office/storage room to restroom space.

#### Road and Parking Modifications

The road and parking for the rustic cabins would be relocated from in front of the cabins to the rear of the cabins, freeing an unimpeded area for activities on the lawn, including for the existing picnic tables and fire rings. Parking areas for several of the new rustic cabins would be located between the cabins, the same as the existing situation, albeit in a different configuration. Accessible parking and parking for the last two cabins would be clustered to avoid impacts to the more intact cut-bank behind the last two cabins and the small wetland area in the vicinity of existing cabin 5C.

Relocating the road from in front of the cabins to behind the cabins would also result in changing the road intersection to a point approximately 70 feet north of its current location. This road relocation would avoid the very large (approximately 48-inch) Douglas-fir located near the entrance road.

#### Accessible Pathways

Approximately 1,200 linear feet of accessible pathways (five feet wide) would be constructed throughout the site to ensure those with mobility problems could easily reach each desired area, including the lodge, the cabins, the amphitheater, the campground restrooms, the chalets, boat docks, and day use parking. In Alternative B these would be comprised of crushed rock and in Alternative C they would be paved.

From the new cabins, the trail would head toward the campground restroom/shower and then loop back around to the amphitheater/campfire circle to meet up with the walkway in front of the A-frame chalets and lodge, then skirt the edge of Lake Crescent to the accessible dock before returning to connect with the boat rental facility and the day use parking area.

Where the paths pass adjacent to Log Cabin/Piedmont Creek, a split rail or other fence would be built to keep trail users away from the overhanging bank, which is currently unprotected. Slightly further down, where the trail would pass adjacent to campsites #25 and #28, privacy screens would be installed. Similarly, screens would be provided to minimize impacts from the trail on guests at Campsite #5.

#### Employee and Public Parking

Because Rustic Cabins 1C and 2C would be removed and replaced elsewhere on the site, employee parking would be formalized in the vicinity of this area. This would replace employee parking at the site of the former manager's residence. Similarly, accessible parking in front of the lodge would be shifted east to provide access to both the lodge area and to the boat ramp/docks. Shifting the parking would also allow for the stall signs to be moved away from the lodge sign. In addition, the trail that provides access to the



boat dock/ramp would be modified for accessibility, including removing and replacing the asphalt path leading to the docks.

#### Log Cabin/Piedmont Creek Bank Stabilization

The bank approximately 50 feet north of the campground comfort station and the bank approximately 75 feet southwest of the comfort station are undermined and could collapse if not stabilized. The creek is about six feet below the overhanging bank. The proposed work is similar to stabilization of two other sections (near campsites #14 and #19) that occurred in 2013 associated with campground upgrades (Figure 4). Large diameter (5-foot) root wads would be anchored to the bank to stabilize it (allowing sediment to accumulate as it travels downstream) (Figure 7). Root wads would come from trees removed within the project area or elsewhere in the park.



**Figure 4: One Proposed Bank Stabilization Area on Log Cabin/Piedmont Creek**

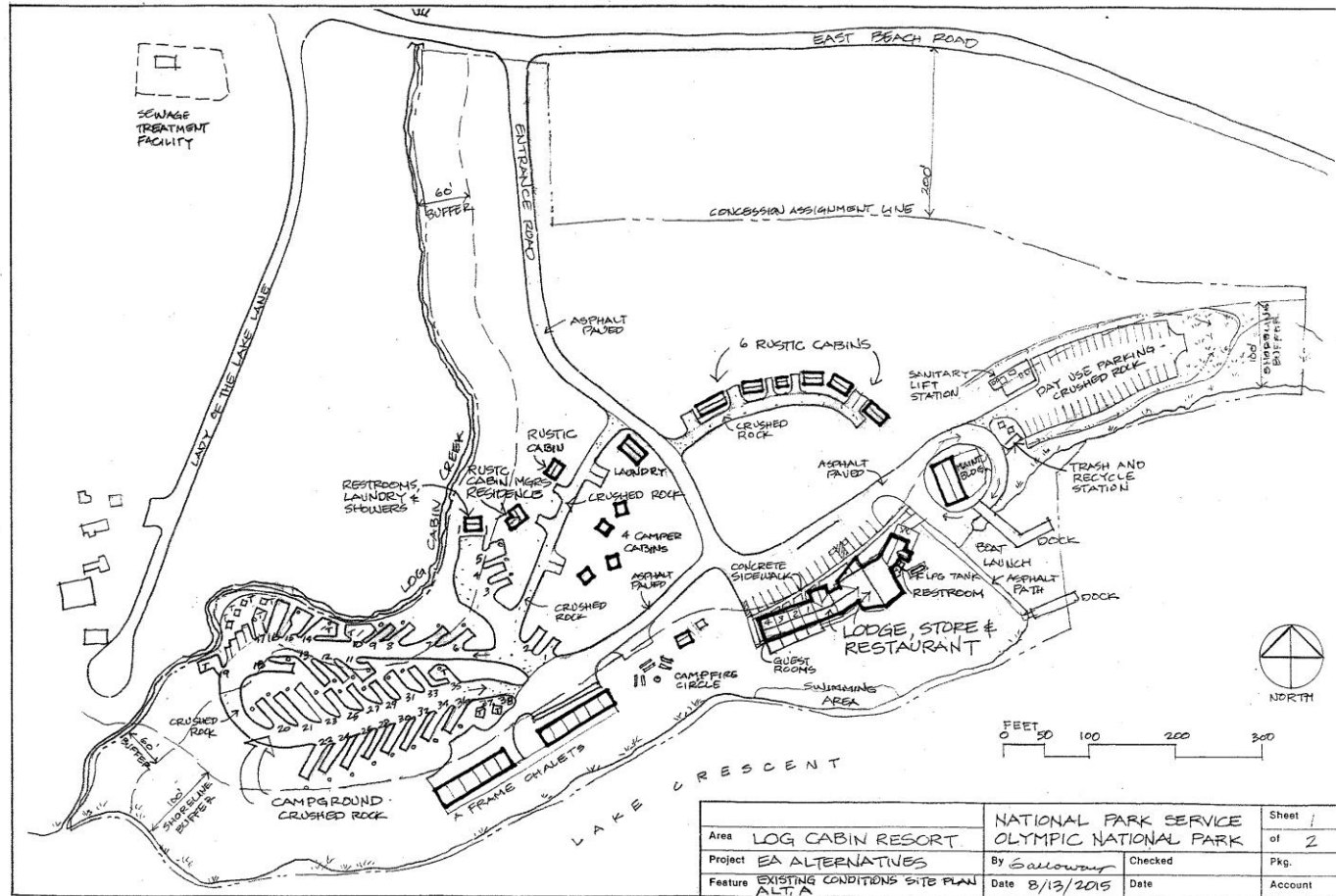


Figure 5: Alternative A (Existing Conditions) Site Plan



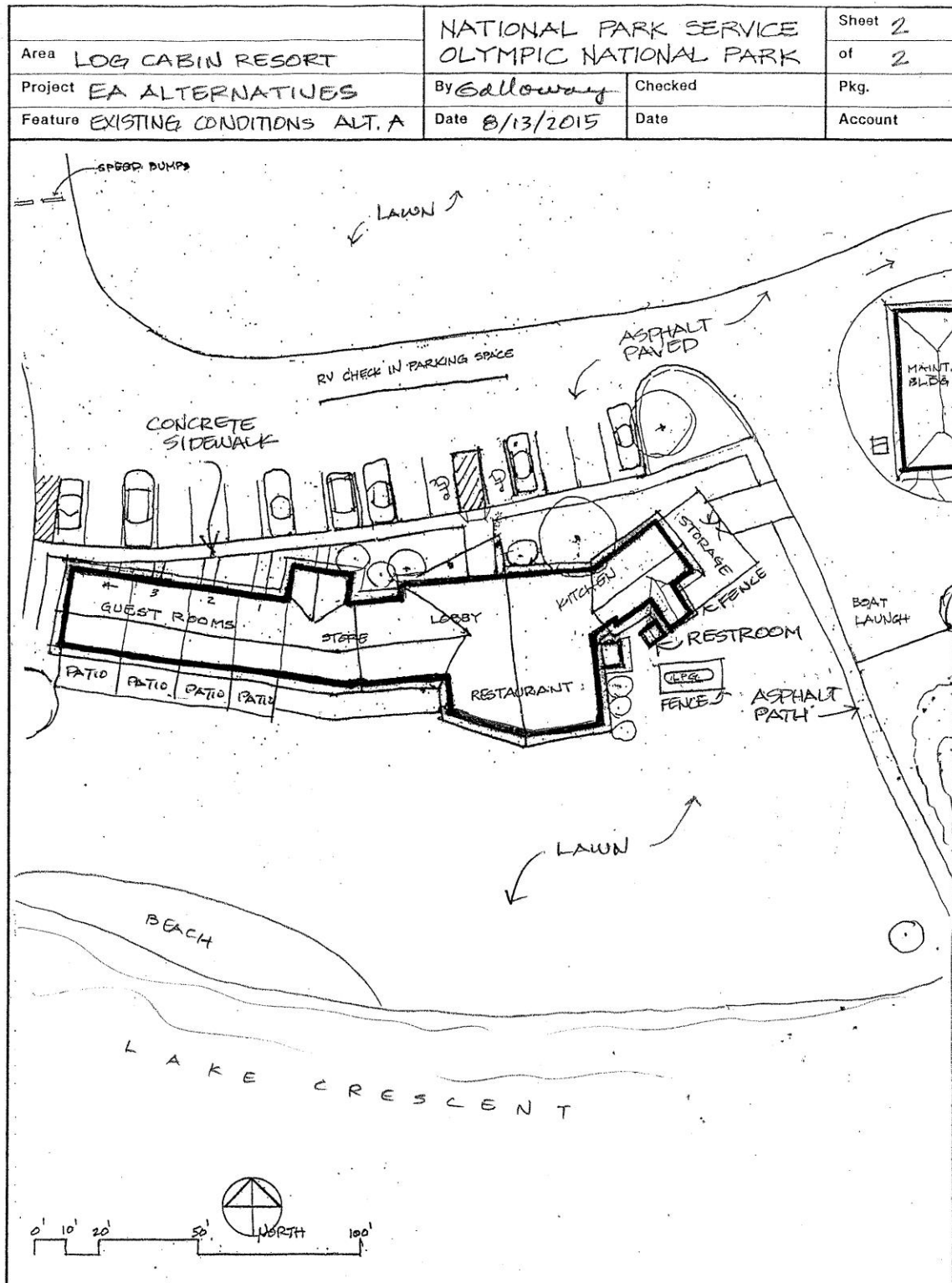


Figure 6: Alternative A (Existing Conditions) Log Cabin Lodge

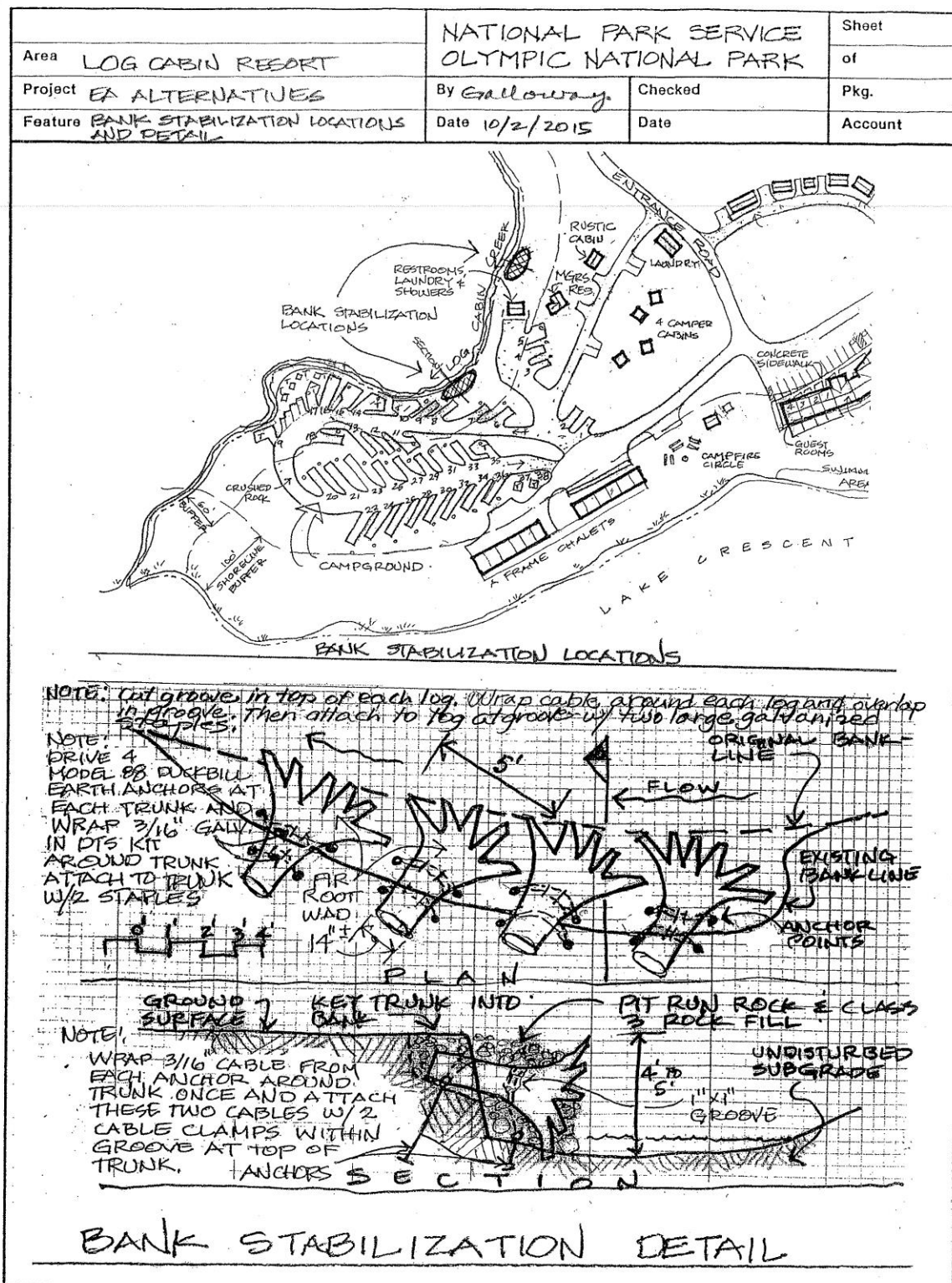


Figure 7: Proposed Bank Stabilization

### **3. Alternative B – Replace eight cabins and manager’s residence, construct another cabin to replace a lodge motel unit, construct accessible indoor restroom, remodel existing lodge public restrooms, add pathways, re-gravel roads and parking area, and stabilize Log Cabin/Piedmont Creek bank**

In addition to the modifications proposed under Elements Common to the Action Alternatives (ECAA), the following modifications would be made to Log Cabin Resort (Figure 8).

#### Accessible Day Use Restrooms

In addition to the improved lodge restrooms (Figure 9), there would also be new day use restrooms created in the existing manager’s office within Log Cabin Lodge (Figure 10). The exterior wall of the lodge would be extended approximately five feet to provide for separate men’s and women’s restrooms that would be accessed from within the gift shop. Relocating the exterior wall would allow the compressor to be enclosed. The remodel would also require eliminating approximately five feet of retail space in the gift shop to provide a second entrance to the restrooms (one door is already present).

#### Motel Unit #1 Modifications

Because the manager’s office would be used to create the restrooms, the manager’s office would then move to Motel Unit #1 within the lodge and another new cabin would be constructed to replace the motel lodging unit. Guests who stay in this unit often complain of the noise associated with the day-to-day operations of the lodge. This is potentially associated with the recent move of the front desk and retail cashier to that side of the store.

#### Additional Cabin Constructed

The ninth cabin would then likely be constructed in the place of Rustic Cabin 1C, where the existing manager’s residence is located. As with the other cabins proposed for replacement, it would likely be prefabricated and moved to the site and would be approximately 400 square feet. Depending on cost considerations, it could have a kitchenette or kitchen.

#### Accessible Pathways

Actions would be the same as in ECAA. In this alternative, the pathway surface would be comprised of a combination of concrete and crushed rock.

#### Summary of Alternative B

Therefore there would be changes to the following components of Log Cabin Resort:

- Log Cabin Lodge men’s and women’s restrooms and manager’s office
- Guest room (motel unit) in Log Cabin Lodge (#1 of 4)
- Rustic Cabins (8)
- Existing manager’s residence (Rustic Cabin 1C)

As in Alternative A, there would be no changes to the following other components of Log Cabin Resort:

- 38-site campground
- Amphitheater/campfire circle
- Campground comfort station (restroom/shower facility)
- Day use parking (including for boats/trailers)
- Trash/recycling station
- Boat launch and docks

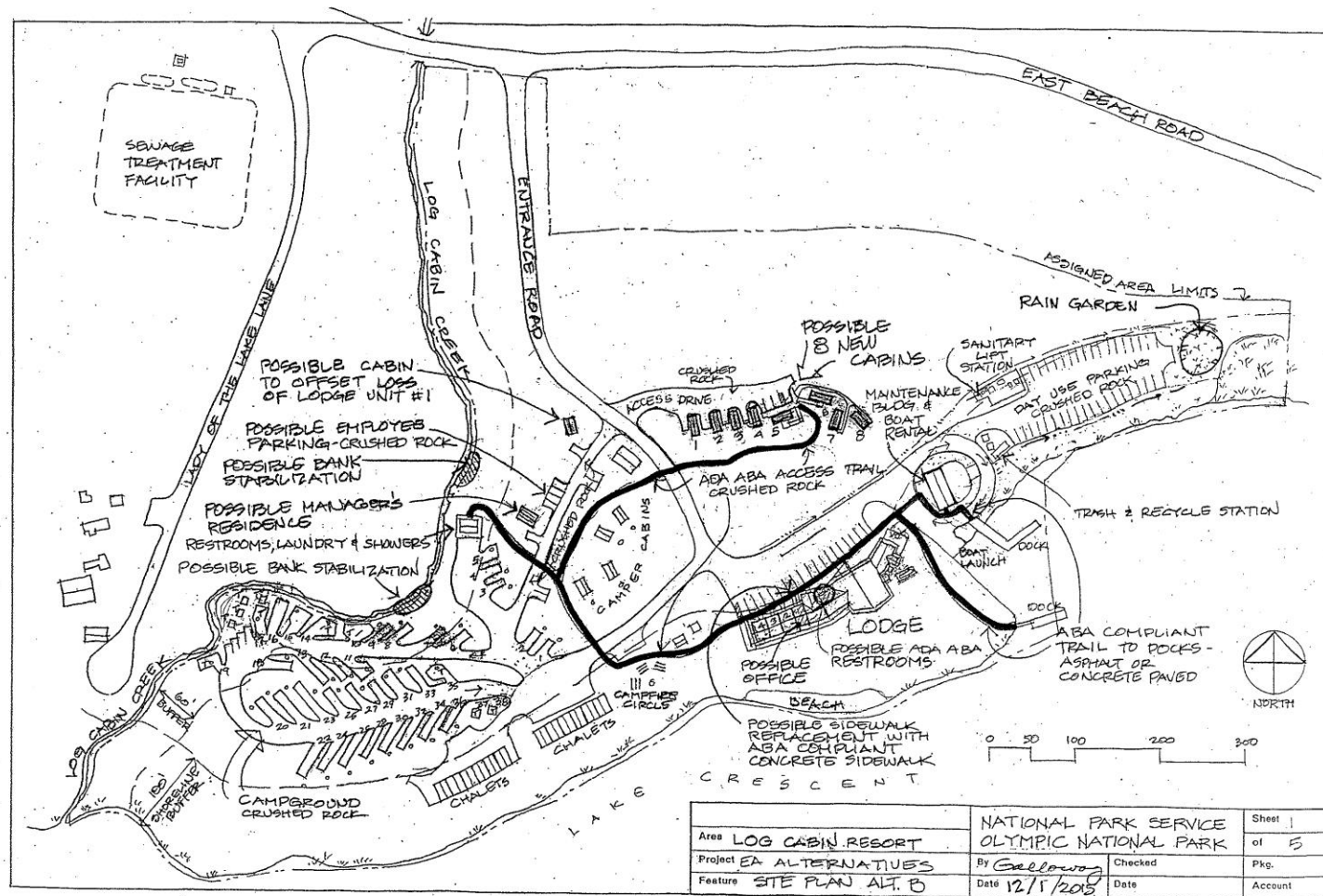


Figure 8: Alternative B Site Plan

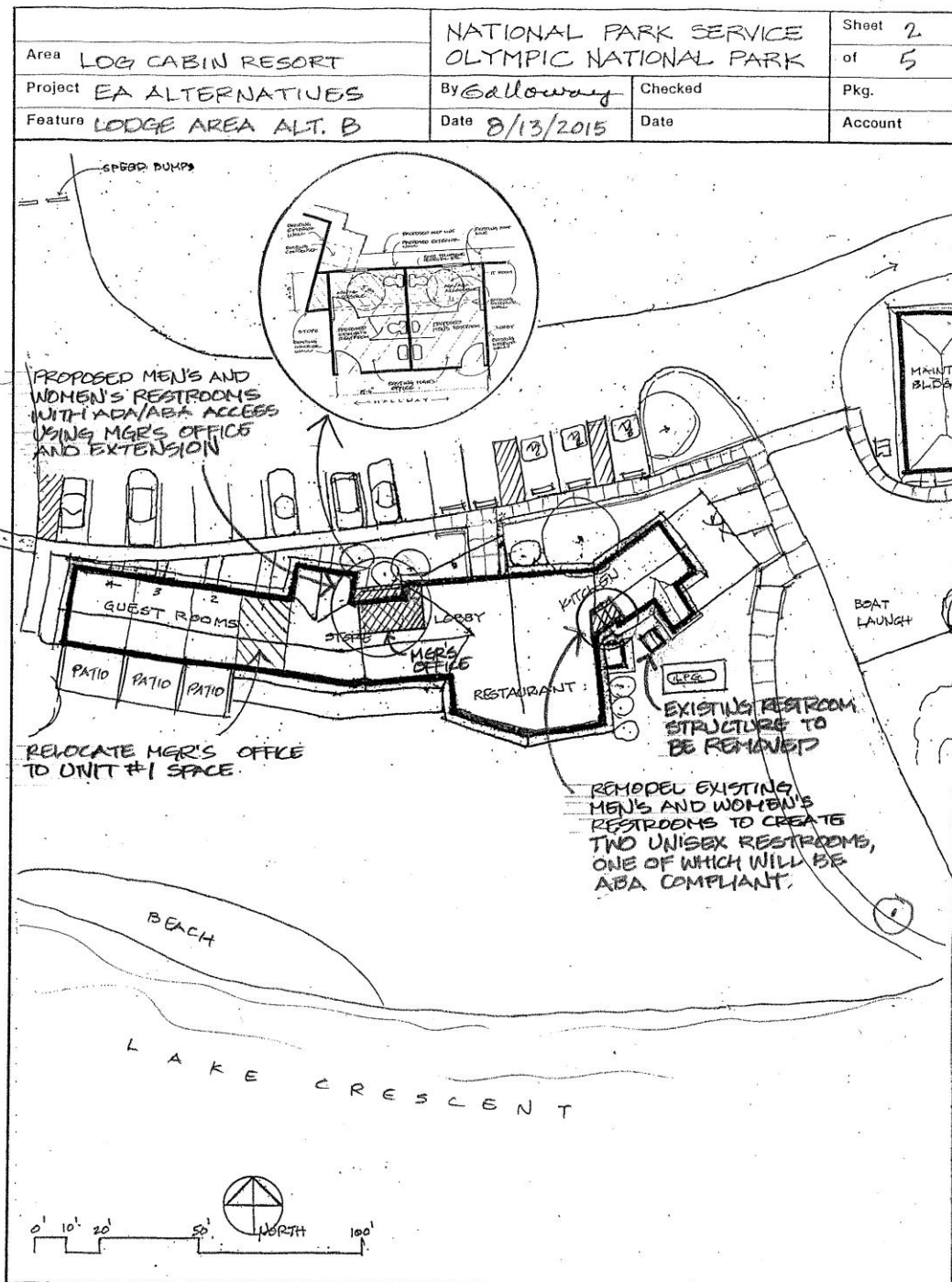


Figure 9: Alternative B Log Cabin Lodge Remodel

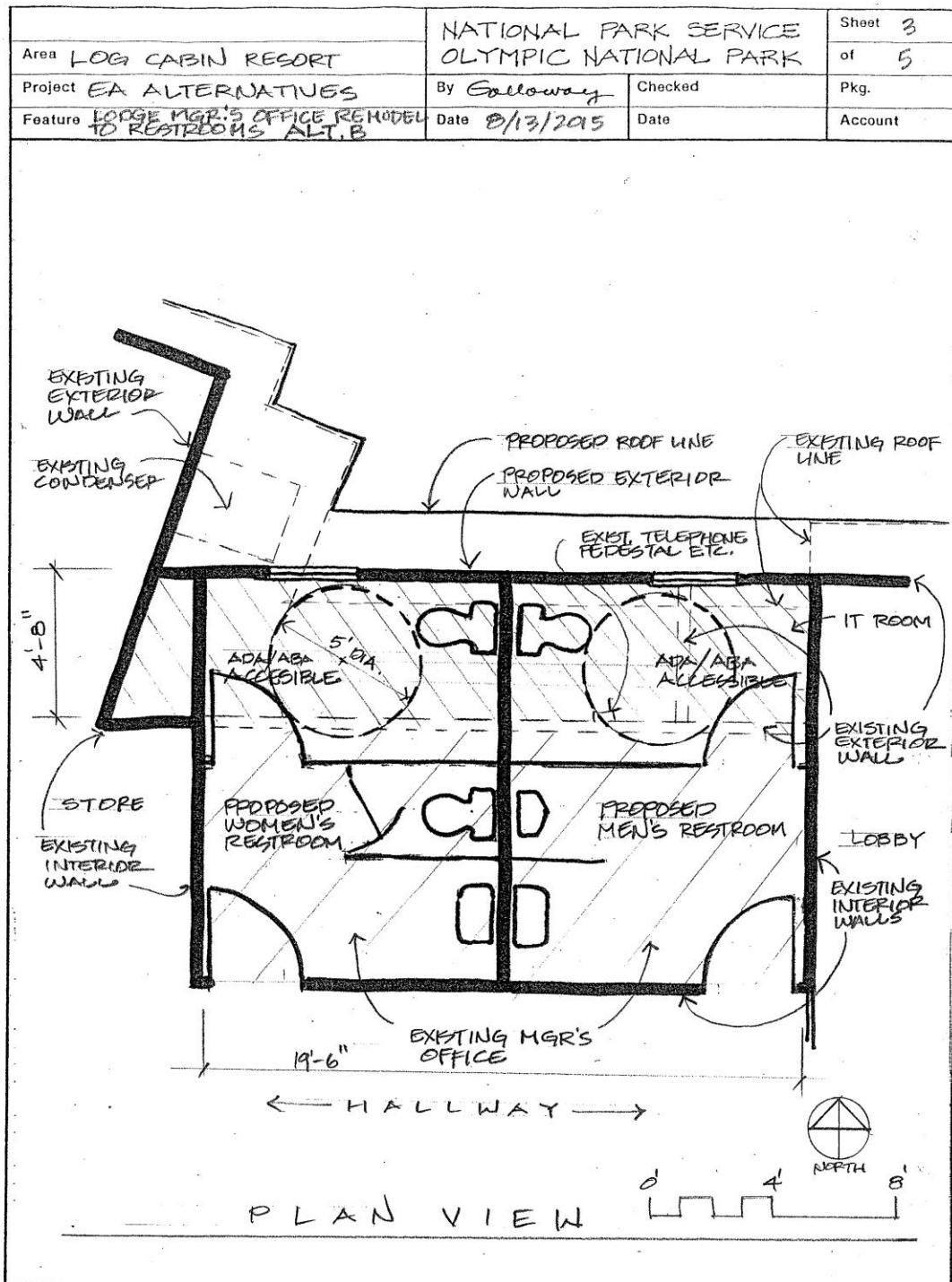


Figure 10: Alternative B Public Restrooms

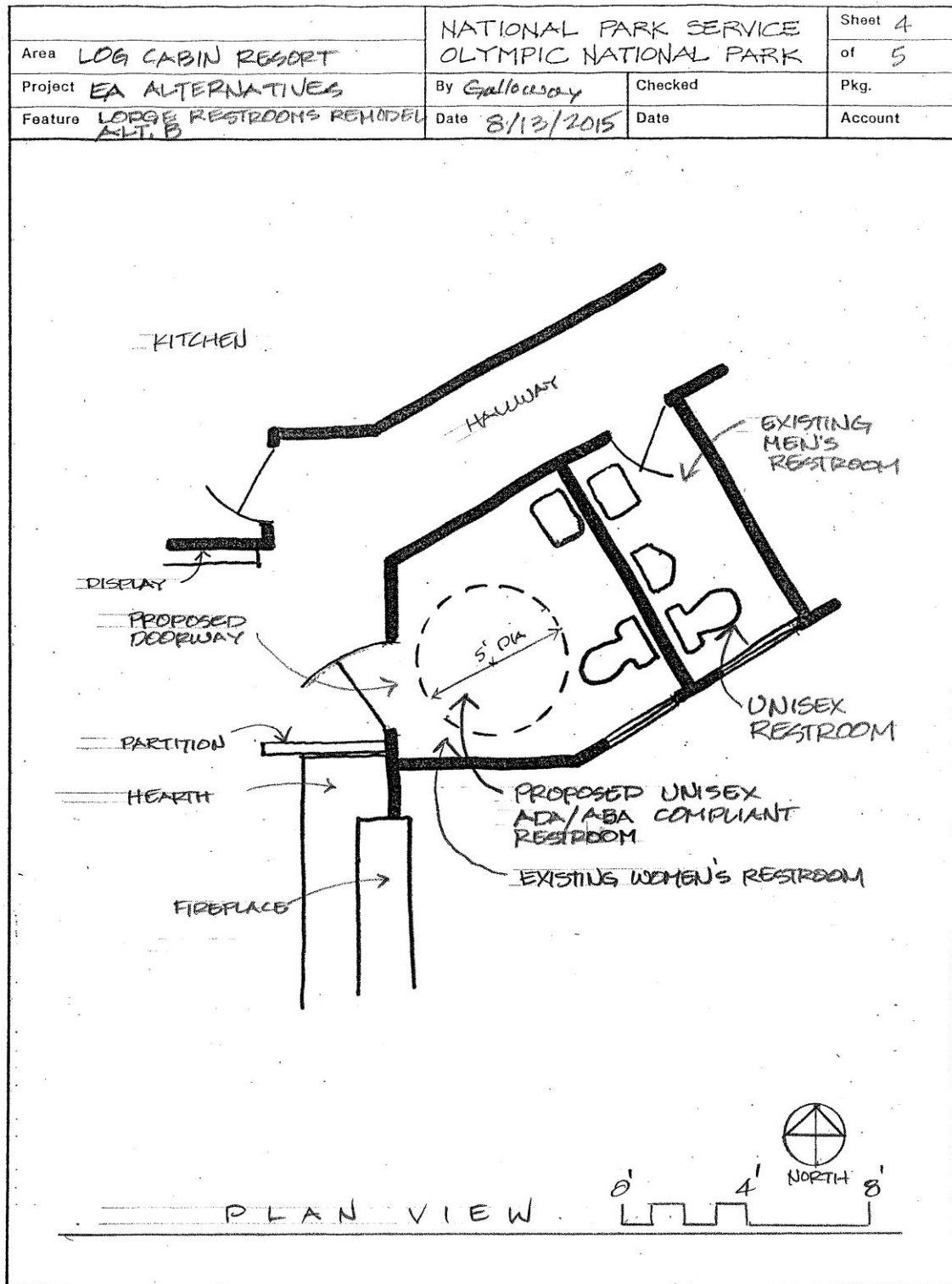


Figure 11: Alternative B Log Cabin Lodge Restrooms



#### **4. Alternative C (Preferred)– Replace eight cabins and manager’s residence, construct accessible outdoor restroom, remodel existing lodge public restrooms, add accessible loop trail and pathways, pave roads and parking area, and stabilize Log Cabin/Piedmont Creek bank**

In addition to the modifications proposed under Elements Common to the Action Alternatives (ECAA), the following modifications would be made to Log Cabin Resort (Figure 13).

##### Accessible Day Use Restrooms

The accessible restrooms in the lodge (one accessible unisex and one other unisex) would be the same as in ECAA. In addition, a new restroom building (approximately 550 square feet) would be constructed behind the lodge (Figure 14). This new structure would be available to both lodge guests (via an accessible pathway) and day use visitors coming from the beach/lawn, public parking and the boat docks.

##### Accessible Pathways

Actions would be the same as in ECAA. In addition, an accessible route would be constructed from the lodge to the new day use restrooms. In this alternative, the pathway surface would likely be a combination of concrete and asphalt.

##### Accessible Loop Trail

In addition to the accessible pathways routing visitors to key components of Log Cabin Resort, a short, accessible loop trail would be constructed as a spur linking the day use parking area with the new cabins on the hill and the pathway extending across the resort entrance road (Figure 12).



**Figure 12: View of a Section of Proposed Trail**

The trail would begin at the day use parking area and would continue toward the entrance road linking up with the accessible pathways. The trail would be approximately 0.4 mile long and would traverse the natural area between the day use parking area and East Beach Road. While the path would be intended for walking, because it would be paved, it would also be suitable for wheelchair users and strollers.

A multiuse spur and crosswalk would connect the loop trail with East Beach Road and access to the Spruce Railroad Trail.

New Paving: Approximately 45,000 square feet (1.03 acres) of roadway and parking areas would be repaved and an additional approximately 20,000 square feet (0.46 acres) of roadway and parking areas would have pavement added. This includes 5,000 square feet adjacent to the chalets and 15,400 square feet for the day use parking area. A rain garden would be added to the east end of the day use parking lot. It would be approximately 50 feet in diameter (approximately 2,000 square feet) and would be intended to capture runoff from the parking lot paving.



Therefore there would be changes to the following components of Log Cabin Resort:

- Rustic Cabins (8)
- Log Cabin Lodge
- Existing manager's residence (Rustic Cabin 1C)

As in Alternative A, there would be no changes to the following other components of Log Cabin Resort:

- Guest rooms (motel units) in Log Cabin Lodge (4)
- 38-site campground
- Amphitheater/campfire circle
- Campground comfort station (restroom/shower facility)
- Camper Cabins (4)
- Day use parking (including for boats/trailers)
- Trash/recycling station
- Boat launch and docks



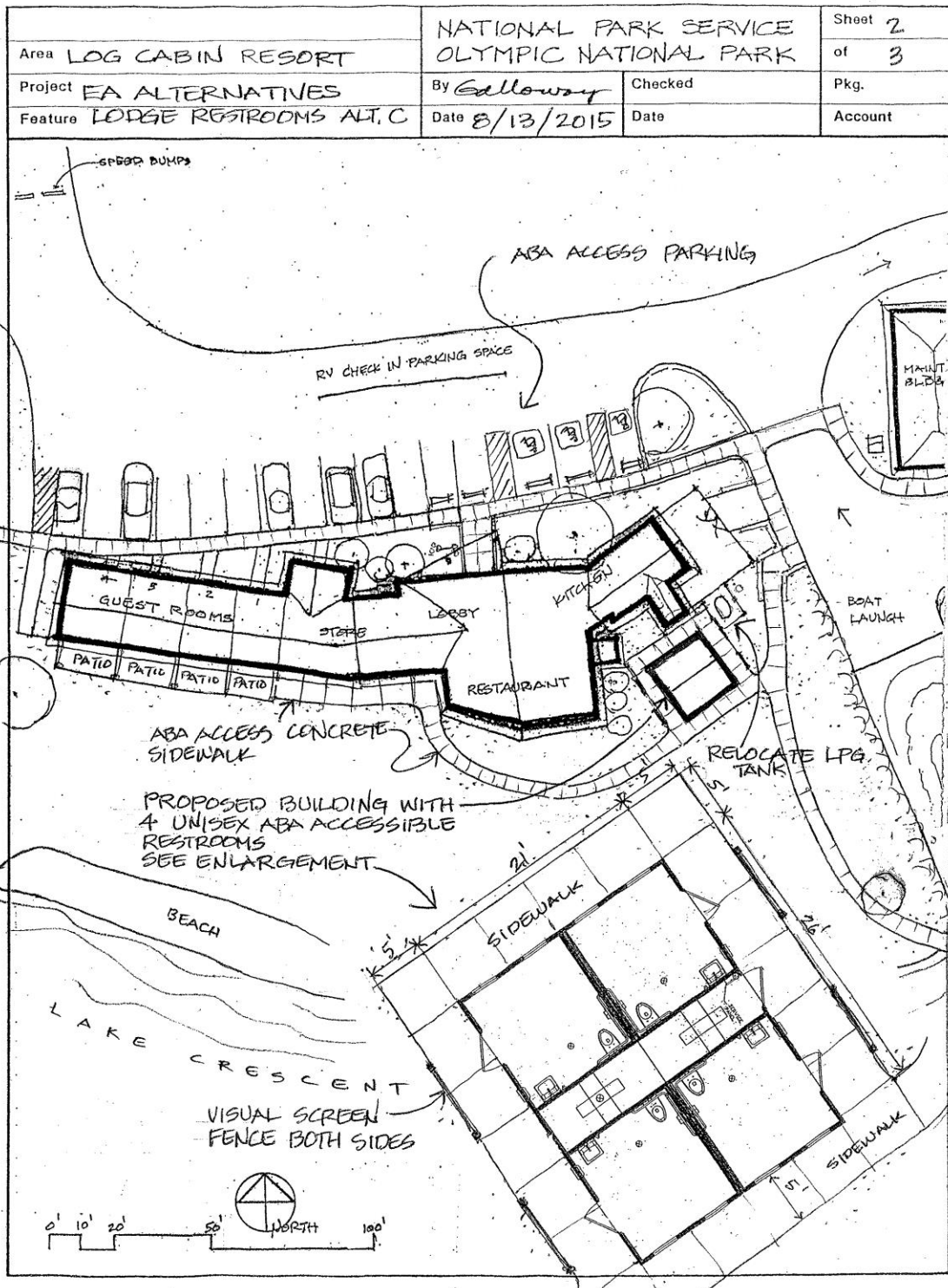


Figure 14: Alternative C Public Restrooms

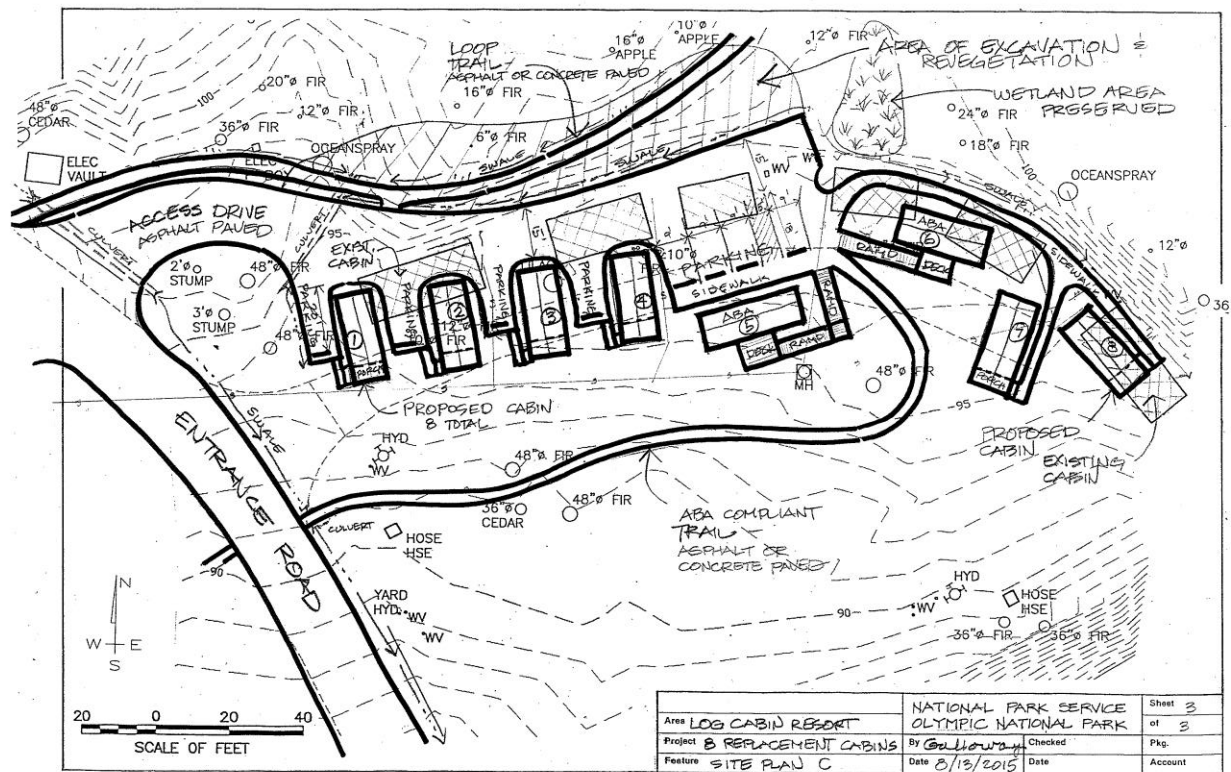


Figure 15: Alternative B and C Rustic Cabin Site Plan

**Table 1: Alternative Comparison Chart**

<b>Component</b>	<b>Alternative A (No Action)</b>	<b>Alternative B</b>	<b>Alternative C</b>
<b>BUILDING MODIFICATIONS</b>			
<b>New Cabins</b>	8 deteriorated (moved from several former resorts)	9 new cabins	8 new cabins
<b>Demolished or Removed Cabins</b>	N/A	8 plus former manager's residence	Same as Alternative B
<b>Manager's Residence</b>	In Cabin 1C	Near entrance	Same as Alternative B
<b>Restaurant Restrooms</b>	Two: small, non-accessible men's and women's	Remodel lodge restrooms to create a two unisex restroom (one accessible)	Same as Alternative B
<b>Public Restrooms</b>	Same as above plus outdoor portable toilet.	Remodel lodge office to become men's/women's accessible public restrooms	Construct new restroom building behind lodge with four-single unisex restrooms
<b>Accessible Restrooms</b>	In campground comfort station	In campground comfort station and in lodge (two locations)	Same as Alternative B plus behind lodge (three locations)
<b>Lodge Manager's Office</b>	In lodge near entrance	In motel unit #1	Same as Alternative A
<b>Motel Unit #1</b>	Used for guests	Lodge office	Same as Alternative A
<b>Accessible Cabins</b>	0	2	Same as Alternative B
<b>ROAD AND PARKING MODIFICATIONS</b>			
<b>Cabin Road</b>	In front of cabins	Behind cabins	Same as Alternative B
<b>Cabin Parking</b>	In front of cabins	Behind cabins, centralized	Same as Alternative B
<b>Employee Parking</b>	At site of former manager's residence	Near new manager's residence	Same as Alternative B except that with no additional cabin there may be more room for parking
<b>Visitor Parking Area</b>	Crushed rock	Same as Alternative A	Paved
<b>Public and Administrative Roads</b>	Combination of crushed rock and asphalt paving	Same as Alternative A	Paved
<b>TRAILS AND PATHWAYS</b>			
<b>Accessible Pathways</b>	There is an accessible sidewalk (which is somewhat deteriorated) between the lodge and the motel units	Add an additional 1,200 linear feet of accessible pathways, including a path from the new cabins to the lodge, and from the lodge to the amphitheater/ campfire circle and to the boat docks.	Same as Alternative B
<b>Accessible Loop Trail</b>	N/A	Same as Alternative A	New paved accessible loop trail
<b>Spur trail access to East Beach Road</b>	N/A	Same as Alternative A	New accessible path and crossing constructed
<b>Benches</b>	N/A	In orchard	Same as Alternative B
<b>ADDITIONAL COMPONENTS</b>			
<b>Propane tank behind lodge</b>	Existing location	Existing location	Relocated to accommodate new restroom building
<b>Bank Stabilization Near RV Sites</b>	N/A	Proposed	Proposed

## B. Mitigation Measures

### Mitigation Measures Incorporated into the Action Alternatives

The impact avoidance, minimization and mitigation measures listed under each resource section in *Environmental Consequences* have been developed to lessen the potential adverse effects of the action alternatives. In addition, there are a range of mitigation measures identified in the GMP that would be used to lessen impacts. Among these are the following:

- Air Quality: Implement a dust abatement program. Standard dust abatement measures could include the following elements: water or otherwise stabilize soils, cover haul trucks, employ speed limits on unpaved roads, minimize vegetation clearing, and revegetate with native species.
- Soundscape: Implement standard noise abatement measures during park operations, including: scheduling to minimize impacts in noise-sensitive areas, using the best available noise control techniques wherever feasible, using hydraulically or electrically powered impact tools when feasible, and locating stationary noise sources as far from sensitive uses as possible.
- Soundscape: Minimize idling of motors when power tools, equipment, and vehicles are not in use.
- Soundscape: Muffle above ambient noise whenever possible to reduce noise impacts.
- Hydrologic Systems including Wetlands: Time projects adjacent to or in waterways to occur during the dry season (late summer).
- Hydrologic Systems including Wetlands: Implement erosion control measures, minimize discharge to water bodies, and regularly inspect construction equipment for leaks of petroleum and other chemicals to prevent water pollution.
- Hydrologic Systems including Wetlands: Minimize the use of heavy equipment in a waterway.
- Hydrologic Systems including Wetlands: Integrate runoff control systems into the designs of larger parking areas near water resources to minimize water pollution.
- Hydrologic Systems including Wetlands: Develop sediment control and prevention plans for projects that could impact water quality.
- Hydrologic Systems including Wetlands: Delineate wetlands and apply protection measures during projects. Perform project activities in a cautious manner to prevent damage caused by equipment, erosion, siltation, etc.
- Soils: . . . Minimize soil erosion by limiting the time that soil is left exposed and by applying other erosion control measures, such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies. Once work is completed, revegetate construction areas with appropriate native plants in a timely period.
- Vegetation: Develop revegetation plans for disturbed areas and require the use of genetically appropriate native species. Revegetation plans should specify species to be used, seed/plant source, seed/plant mixes, site specific restoration conditions, soil preparation, erosion control, ongoing maintenance and monitoring requirements, etc. Salvaged vegetation should be used to the extent possible.
- Vegetation: Implement a noxious weed control program. Standard measures could include the following elements: use only weed-free materials for road and trail construction, repair, and maintenance; ensure equipment arrives on site free of mud or seed-bearing material; certify all seeds and straw material as weed-free; identify areas of noxious weeds pre-project; treat noxious weeds or noxious weed topsoil before construction (e.g., topsoil segregation, storage, herbicide treatment); when depositing ditch spoils along the roads, limit the movement of material to as close as possible to the excavation site; scrupulously and regularly clean areas that serve as introduction points for invasive plants (campgrounds, staging areas, maintenance areas, and corrals); revegetate with genetically appropriate native species; inspect rock and gravel sources to ensure these areas are free of noxious weed species; and monitor locations of ground-disturbing operations for at least three years following the completion of projects.
- Fish and Wildlife: Employ techniques to reduce impacts on fish and wildlife, including visitor education programs, restrictions on visitor and park activities, and law enforcement patrols.

- Fish and Wildlife: Implement a wildlife protection program. Standard measures would include project scheduling (season and/or time of day), project monitoring, erosion and sediment control, fencing or other means to protect sensitive resources adjacent to project areas, disposing of all food-related items or rubbish, salvaging topsoil, and revegetating.
- Special Status Species: Locate and design facilities/actions/ operations to avoid or minimize the removal of rare, threatened, and endangered species habitat. If avoidance is infeasible, minimize and compensate for adverse effects as appropriate and in consultation with the appropriate resource agencies.
- Special Status Species: Plan work in areas in or near suitable threatened and endangered bird habitat as late as possible in the summer/fall.
- Special Status Species: Conduct work outside of critical periods for the specific species when possible.
- Special Status Species: Develop and implement restoration and/or monitoring plans as warranted. Plans should include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.
- Special Status Species: For projects in or near streams, employ appropriate best management practices.
- Special Status Species: Implement measures to reduce adverse effects of nonnative plants and wildlife on rare, threatened, and endangered species.
- Special Status Species: Carry out surveys and monitoring for special status species.
- Special Status Species: Protect and preserve critical habitat features, such as nest trees, whenever possible.
- Archeological Resources: Archeological surveys would precede any ground disturbance required for new construction or removal of eligible historic properties. Known archeological resources would be avoided to the greatest extent possible. If national register-eligible or-listed archeological resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with the state historic preservation officer and associated American Indian tribes.
- Archeological Resources: If unknown archeological resources are discovered during project work, work in the immediate vicinity of the discovery would be halted until the resources could be identified, evaluated, and documented and an appropriate mitigation strategy could be developed, if necessary, in consultation with the state historic preservation office and associated American Indian tribes.
- Socioeconomics: During the future planning and implementation of the approved management plan for Olympic National Park, the National Park Service would pursue partnerships with tribes, local communities, and county governments to further identify potential impacts and mitigating measures that would best serve the interests and concerns of both the National Park Service and the local communities.
- Sustainable Design and Aesthetics: Sustainable practices would be used in the selection of building materials and sources and building location and siting. Design standards specific to the park would be developed in all repair, rehabilitation, and construction projects.
- Projects would use sustainable practices and resources whenever practicable by recycling and reusing materials, by minimizing materials, by minimizing energy consumption during the project, and by minimizing energy consumption throughout the lifespan of the project.

## C. Alternatives and Actions Considered but Dismissed

Under the National Environmental Policy Act (NEPA) and NPS policy, alternatives may be eliminated from detailed study based on the following reasons [40 CFR 1502.14 (a)]:

- Technical or economic infeasibility.
- Inability to meet project objectives or resolve need for the project.

- Duplicate other less environmentally damaging alternatives.
- Conflict with an up-to-date valid plan, statement of purpose and significance, or other policy; and therefore, would require a major change in that plan or policy to implement.
- Environmental impacts too great.

The following alternatives were considered during the design phase of the project but because they met one of the above criteria they were dismissed from further consideration:

- Replace eight cabins in existing footprints.

This alternative was dismissed because constructing stick built cabins would have greater impacts on Log Cabin Resort operations than importing prefabricated structures. Because the resort operates successfully only during the short summer season, the effects of taking cabins out of service during a longer construction operations period would result in loss of revenue and additional impacts to guests. The proposed project has been designed to minimize operation season impacts by completing as much site work (site grading, utility installation, drainage, foundations, ramps, decks, etc.) as possible during the off-season.

- Replace cabins with soft-sided units such as tents or yurts.

Replacing the cabins with less robust structures would not meet the contract requirements stipulated for operation of the resort, including for structures that fit into the resort landscape, and therefore would not meet the purpose and need. For the purposes of contractual requirements, these types of structures, which are moveable, are also considered personal property, rather than resort “real” property. Over time, despite their lower lifecycle costs, it is likely that they would have higher overall costs because they don’t last long in the wet environment, are more subject to rodent infestation, and may be constructed of less sustainable materials.

- Construct one or two units rather than eight or nine new cabins.

Multiplex units were briefly considered, however these would provide a different visitor experience than is intended at the resort – that of cabins on a lake rather than a motel on a lake. Multiplex units would also be more expensive to construct and would not meet contract requirements for cabin replacement. Therefore, a multiplex would also not meet the purpose and need.

- Construct the manager’s residence in another location.

Two locations were initially considered for the manager’s residence, however because replacing the residence in its former location on the site would have fewer impacts and would provide for greater site security, the location in the forest was dropped from further consideration.

- Relocate trash recycling station.

This action was briefly considered but based on feasibility and access was dismissed because it would be cumbersome to manage and would not accomplish project objectives to improve visitor experience and minimize impacts to park operations/costs. It is easier to access in its current location.

- Use existing footprint of manager’s office space in the lodge to construct new public restrooms (without extending wall).

This was briefly considered but would not meet accessibility guidelines and therefore would not meet the purpose and need/scope.

- Provide a separate septic system for the new manager’s residence.

This action was considered but dismissed because a separate septic system was determined to be unnecessary. Under a connected action, the new wastewater treatment system would need to be able to function well even in times of low use (such as if the manager’s residence was the only building occupied during the off-season).



## Chapter III: Affected Environment

Information in this section is derived from a comprehensive review of existing information pertaining to the project area within the park. It includes information from the General Management Plan (NPS 2008), various natural and cultural resources management plans and other park planning documents.

Information in this section has been gained from management, research and analysis throughout the history of Olympic National Park. Information below has been gathered from the GMP and from the Spruce Railroad Trail Environmental Assessment (NPS OLYM 2012) as well as from other sources where noted.

The following are the park resources that may be affected by actions in this plan: geology, soils, water resources (including hydrology, water quality, and wetlands), vegetation, wildlife, special status species, archeological resources, and visitor experience (including visitor access and visitor use opportunities).

### Geology

Olympic National Park is located on the western edge of the North American continental plate, in an area of mountain building and glaciation. The scenic beauty of the Olympic Peninsula is derived from the forces that elevated the Olympic Mountains. Glaciation, earthquakes, subsidence, and erosion have further shaped the topography (NPS 2008:175). Glaciers created characteristic U-shaped valleys and left behind glacial deposits. The park's landscapes are continually being modified by landslides, river erosion, deposition, and uplift (NPS 2008: 175).

Geologically, the Olympic Mountains are made of a core of sedimentary and low-grade metamorphic rocks that are surrounded by volcanic rock on the north, east, and south sides. The outer belts are comprised of basaltic flows and breccias of the Eocene age, as well as altered basalts, pillow lavas, and flow breccias deposited in the Mesozoic era and Paleocene epoch. The lowlands are glacial outwashes, while the western and southern portions are marine terraces and glacial outwash fans (NPS 2008:176).

At up to 624 feet, Lake Crescent is the second deepest lake in Washington. After glaciers retreated from the area, modern day lakes Crescent and Sutherland were connected. Both lakes emptied into Indian Creek and then into the Elwha River. Approximately 7,000 years ago, a large landslide separated the two lakes, causing Lake Crescent to rise until it formed a new outlet via the Lyre River. The slide occurred near the northeast corner of Lake Crescent and originated from the north valley wall where Highway 101 now crosses from the Elwha to the Lyre watershed (NPS 2012: 101).

The Lake Crescent watershed is situated within a unique geologic formation called the Crescent Formation, so named because of the horseshoe-shaped band of marine basalt that comprises the northern and eastern perimeters of the Olympic mountain range. Inside the configuration, the predominant geologic materials are sedimentary in origin. The northwestern portion of the watershed is comprised mainly of basalt, with the southwestern portion comprised of sandstone, shale, and conglomerate (NPS 2012: 100).

### Topography

Log Cabin Resort is situated on the northeast side of Lake Crescent at an elevation of approximately 600 feet above mean sea level. From East Beach Road, the resort area slopes from east to west, down toward Lake Crescent. On the east, a steep slope descends toward the day-use parking area. In the center, the access road descends toward Log Cabin Lodge, with branches toward the rustic cabins and day use parking area on the east and the former manager's residence, and camper cabins, comfort station and campground on the west. The area on the west side of the access road is occupied by a natural area adjacent to Log Cabin/Piedmont Creek. Within the site, there are several natural and human-constructed plateaus where key features of the resort are located, including the campground, the rustic cabins and the lodge. The site has been highly developed over the years, beginning with the construction of the original Piedmont Hotel (also called the Log Hotel) in 1895, which burned down in 1932. NPS architect Cecil

Doty designed the current lodge in 1953 and it was constructed in 1955 atop a grassy knoll that descends gently toward the lake. The campground exists on a flat at the west end of the site near Log Cabin/Piedmont Creek, while the A-frame chalets overlook the lake on a level with the lodge. Within the woods are the camper cabins, a comfort station with showers, employee parking and the current manager's residence. A berm/cut-bank currently separates the former orchard from the rustic cabins.

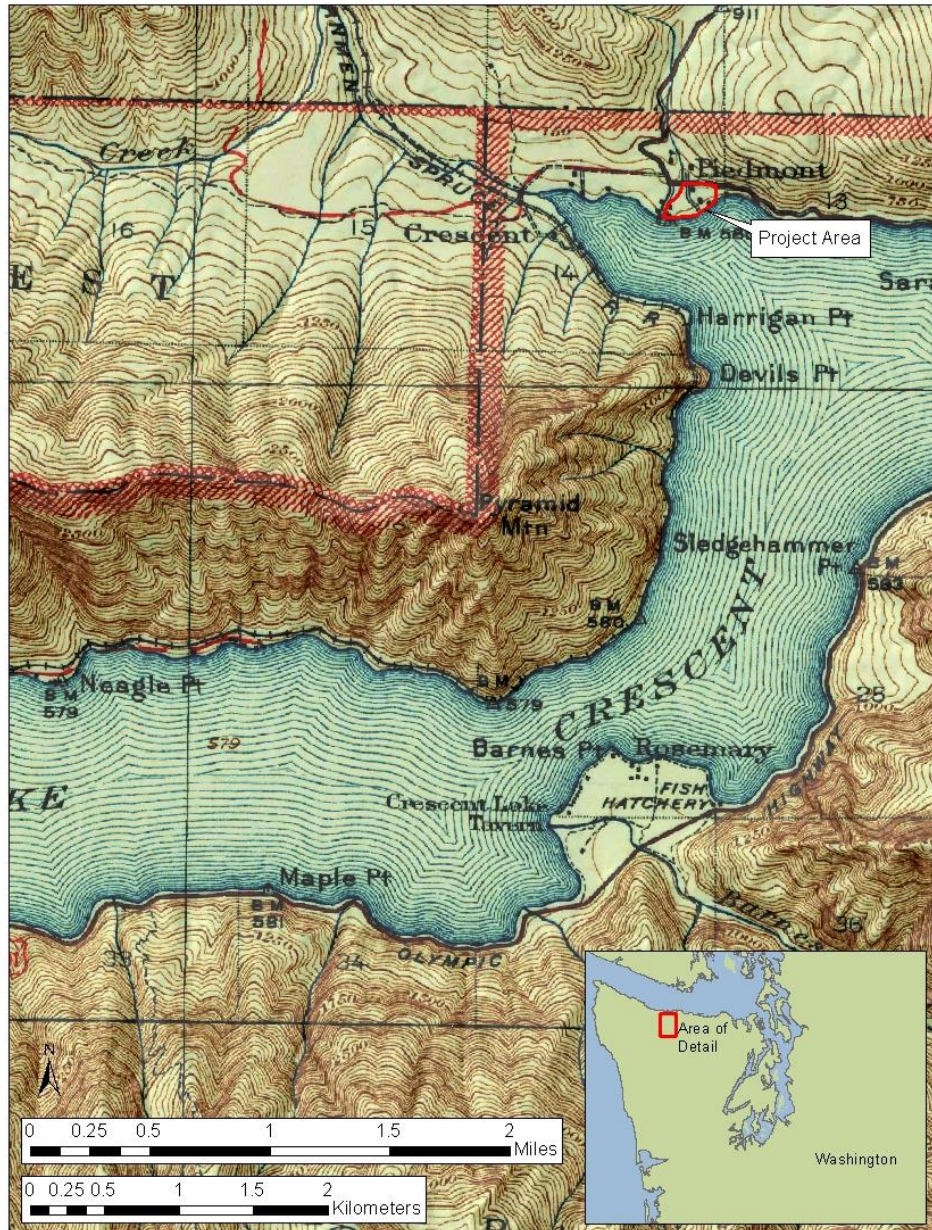


Figure 16: 1922 Topographic Map

## Soils

Soils in the park have formed from a variety of geologic and plant materials, including volcanic basalts, and metamorphic rocks from uplift, and sedimentary rocks of glacial origin, as well as humus from decayed plant materials. No official soil classification or mapping has been conducted within Olympic National Park, however, some generalizations about soil characteristics have been made based upon



mapping and classification conducted by the Washington State Department of Natural Resources and the U.S. Department of Agriculture's Natural Resources Conservation Service for areas adjacent to Olympic National Park that contain the same parent material (NPS 2012: 102).

In general, area soils tend to be thin and poorly developed due to glacial scouring of the bedrock of the northern foothills belt (Brown and Grower 1960 in NPS 2012:102). Subsoils strongly resemble original bedrock material. Upland soils are typically well drained, with low to moderate water retention and very high infiltration rates. Soils along the lakeshore contain greater amounts of clay and are poorly drained.



**Figure 17: Lake Crescent Soils**

Sensitive soils are associated with steep slopes, incised stream channels, unstable bedrock, and water seepage areas. There is evidence of mass slope failure within the watershed; four areas of landslide deposits have been mapped by the U.S. Geological Survey. Rock fall along U.S. Highway 101 occurs frequently during the wetter months. In fall 1995, a bridge on Camp David Junior Road (North Shore Road) washed out when a landslide occurred during a period of heavy rain. As a result, the potential for ongoing mass-wasting (slope failures) is high (NPS 2012: 102).

As shown in Figure 17, the two broadly defined soil groups comprising the shoreline of Lake Crescent, including the U.S. Highway 101 corridor are Terbies-Louella-Elwha (WA171) and Solleks-Snahopish-Makah (WA 172). At Log Cabin Resort, soils are from the Terbies-Louella-Elwha group. Soils along the north shore of Lake Crescent are comprised of glacial till, outwash and glaciofluvial debris deposited from continental and local alpine glaciers (Brown et al. 1960 in Rooke and Cooper 2013).

Terbies-Louella-Elwha (WA171) is characterized as:

Deep and very deep, well drained, moderately steep to extremely steep soils; on mountainsides.

This map unit is in the southeastern and south-central parts of the survey area. Slope is 10 to 90 percent. The vegetation is mainly conifers and shrubs. Elevation is 200 to 2,000 feet. The average annual precipitation is 30 to 70 inches, the average annual air temperature is 46 to 48 degrees F, and the average growing season (at 28 degrees) is 210 to 260 days.

This unit makes up about 8 percent of the survey area. It is about 45 percent Terbies soils and 40 percent Louella soils. The remaining 15 percent is components of minor extent.

Terbies soils are deep. These soils are steep to extremely steep and are on mountainsides in the southcentral part of the survey area. The soils formed in residuum and colluvium derived from sandstone, siltstone, and conglomerate. The surface is covered with a mat of organic material. The surface layer is very gravelly sandy loam. The subsoil is very gravelly, extremely gravelly, and extremely channery [containing fragments of rock] sandy loam. The substratum is extremely channery sandy loam. Fractured sandstone is at a depth of 45 inches.

Louella soils are very deep. These soils are moderately steep to extremely steep and are on mountainsides in the southeastern part of the survey area. They formed in residuum and colluvium derived from basalt and flow breccia. The surface is covered with a mat of organic material. The surface layer is gravelly loam. The subsoil is gravelly clay loam and gravelly loam. The substratum is gravelly sandy loam.

Of minor extent in this unit are small areas of well drained Schnorbush soils on hills and somewhat excessively drained Dystric Xerorthents, bouldery, in hilly areas of landslide debris. Also of minor extent are small areas of Rock outcrop[s] consisting of basalt, conglomerate, and sandstone.

This unit is used mainly as woodland. Steepness of slope restricts access for other uses (Hallowin 1987: bracket comments added).

Elwha is characterized with other soils (Elwha-Clallam-Catla) as:

Shallow and moderately deep, moderately well drained, nearly level to steep soils; on hills.

This map unit is in the eastern part of the survey area. Slope is 0 to 35 percent. The vegetation is mainly conifers and shrubs. Elevation is 40 to 2,000 feet. The average annual precipitation is 16 to 45 inches, the average annual air temperature is about 48 degrees F, and the average growing season (at 28 degrees) is 210 to 260 days.

This unit makes up about 13 percent of the survey area. It is about 55 percent Elwha soils, 30 percent Clallam soils, and 10 percent Catla soils. The remaining 5 percent is components of minor extent.

Elwha soils are on hills. These soils are moderately deep. They formed in glacial till. The surface is covered with a mat of organic material. The surface layer is gravelly sandy loam. The subsoil is mottled gravelly sandy loam. Compact glacial till is at a depth of 33 inches. . .

. . . Of minor extent in this unit are moderately well drained Cassolary, Clallam Variant, and Yearly soils. Also of minor extent are small areas of poorly drained Bellingham, McKenna, and Mukilteo soils in depressional areas and drainageways.

This unit is used mainly as woodland. It is also used for homesite development. The Clallam soils are also used for hay and pasture.

The main limitations of this unit for homesite development and septic tank absorption fields are wetness, steepness of slope, and depth to compact glacial till. The main limitation of the Clallam soils for hay and pasture is droughtiness (Hallowin 1987:8).

Rooke and Cooper (2013) state that the reason much of the area surrounding Lake Crescent remained undeveloped into the early 20<sup>th</sup> century is because the nutrient poor soils were stony and difficult to farm.

## Water Resources

### Hydrology

The topography of the Lake Crescent watershed is one of extremes. Lake Crescent is enclosed by steep ridges on all sides. Elevations range from approximately 575 feet at lake level to roughly 1,500 feet on the northern ridge, and 4,500 feet on southerly ridges. Evidence of the underlying rock formations can be seen in the depth of the stream channels on the major north and south slopes and in the lake as well as in the drive along U.S. Highway 101.

Streams on the north side of the watershed are underlain by harder basalt which is resilient to down cutting. Over time, this resistance to erosion has produced a fairly even slope with relatively shallow stream valleys. The south slope, which is formed in a softer sandstone base typically has much deeper and more numerous stream channels (NPS 2012: 101-2). Barnes Creek is the largest tributary to Lake Crescent, however additional inflows are also provided by La Poel, Log Cabin/Piedmont, Eagle, Smith, Cross and Aurora creeks. Most of the streams are steep but stable and are not influenced by glacial runoff. Tributary flows depend on snowmelt and rainfall and therefore are subject to variable seasonal changes in discharge. The only outlet for Lake Crescent is the Lyre River, which drops approximately 576 feet over 5.5 miles en route to the Strait of Juan de Fuca.

The lake is 11 miles long with a surface area of eight square miles (5,119 acres). Its watershed comprises 39 square miles or approximately 24,960 acres. Lake Crescent's elevation is approximately 579 feet, with a mean depth of 332 feet and a maximum depth of 624 feet (off La Poel Point) (NPS 2012: 103).

Surface water temperatures between June and September typically range from 57° F to 68° F, with the lowest temperatures recorded off La Poel Point. Approximately 50 percent of Lake Crescent is deeper than 312 feet. The Lyre River exits the lake at its northeast corner (NPS 2012: 103). Highway 101 along the lake's south shore, and East Beach Road and the historic Spruce Railroad grade along the north shore bisect several riparian areas, which flank inlet perennial and intermittent creeks.

Groundwater levels in the Lake Crescent vicinity approximate the lake level. This level varies with the seasons and is somewhat higher in the winter because of abundant rainfall (NPS DSC 1981:12). In unusually dry (rainfall and/or snowfall) years, such as 2014-2015, the groundwater level may be lower.

Many of the park's developed areas contain main roads, visitor contact stations, employee housing, campgrounds, and trails in the floodplains of major drainages. In protecting these areas, the park has often used large rock (riprap) to harden river banks and protect facilities. These historic and more recent channel modifications have resulted in unnatural conditions in several drainages throughout the park (NPS 2008: 179).

### Water Quality

The deep clear waters of Lake Crescent originated from huge ice sheets that once covered the area. Because the lake is nutrient poor, depths of up to 60 feet can be seen in some places. This clarity also gives the lake its deep blue-green color.

All streams within the park are classified as class AA (extraordinary) under the state implementation of the Clean Water Act. The Washington State Department of Ecology uses Lake Crescent as a reference lake in its ongoing study of freshwater lakes in Washington, due to its pristine water quality (NPS 2012: 103).

Several water quality studies (Lake Crescent Water Quality Status Report 1984-1989 and Trophic Status and Assessment of Non-Point Nutrient Enrichment of Lake Crescent, 1991) were conducted to establish

a baseline for future water quality testing within the Lake Crescent watershed. Conclusions derived from these studies indicate that the lake water quality is in extraordinary condition. Lake Crescent has been characterized as an oligotrophic lake with no problems requiring any form of mitigation (NPS 1991a in NPS OLYM 1998). Oligotrophic lakes are naturally low in nutrients, thereby limiting the growth of algae.

Contaminants that may affect the lake include drain fields and septic tanks on public and private property along the shoreline of Lake Crescent as well as potential fuel release from burned or unburned fuel from motorized water craft. The park also has a wastewater treatment plant (better than secondary treatment) at Log Cabin Resort. The treatment plant is an activated sludge plant, which allows liquids to settle out through several chambers, while solids settle into a 20,000 gallon tank, which is periodically pumped. If future increases in the number of people using the resort were to be proposed, the wastewater treatment system would need to be upgraded. It is also slated for rehabilitation within the next five years due to the expected need for improvements, but is currently permitted and adequate to serve the existing and planned future improvements to Log Cabin Resort identified in this plan (Turecek pers. comm. 2015).

Although drain fields and septic tanks close to the shoreline are at risk of exposure as a result of erosive forces associated with extreme winter storms, studies completed the late 1980s found no indication of pollution in the lake from septic systems (NPS 2012: 103). More recent work with the USGS in 2006-2007 found that diesel trucks are a contributor to nitrogen levels in the lake. . . "In contrast, contribution of nitrogen compounds from onsite septic systems appears to be relatively minor related to the other sources identified" (Moran et al. 2012). Other potential sources of water pollution include unburned fuel released from two-cycle engines, spills or leaks from gas pumps, and gas tanks on motorized watercraft. Runoff from parking lots is also a potential source of non-point pollution. The GMP notes that expansion or construction of parking facilities, unless adequately designed to treat and store surface runoff, may result in increased amounts of these pollutants into Lake Crescent. Unexpected events such as hazardous material spills from vehicles along U.S. Highway 101 are also a concern (NPS 2012: 103).

Some limnological (lake study) work has been conducted on Lake Crescent, including a sampling program, two studies on septic systems (one in draft) and another on the lake nutrient budget (Crain pers. comm. 2015). Most studies, however, have focused on fish, including of the landlocked kokanee, and the endemic cutthroat and rainbow trout. Only recently has attention turned toward long-term monitoring of water quality and acquisition of basic limnological data such as seasonal physical/chemical profiles in the deep basins, seasonal and inter-annual nutrient dynamics, and plankton and algal dynamics (Meyer and Fradkin 2002 in NPS 2012: 103). As a result, the GMP calls for a Lake Crescent shoreline protection/management plan to be developed that would focus on water quality and shoreline issues, including issues associated with wastewater treatment and development (NPS 2008: 153).

Water for Log Cabin Resort is pumped from the lake and is treated to meet existing drinking water standards.

As improvements have been made to NPS facilities along the lakeshore, specific measures have been undertaken to reduce the potential for adverse impacts to the lake's pristine water quality. Among these include a sediment berm and vegetated swale to capture runoff from the rehabilitated day use parking area at Log Cabin Resort.

## Wetlands

For regulatory purposes under the Clean Water Act (CWA), the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (CWA Section 404, <http://www.epw.senate.gov/water.pdf>).



Wetlands are the lands between terrestrial and deep-water habitats, and isolated areas, where the water is at or near the surface. The presence of certain soil types, plant species, and water define wetlands. Wetlands are found in the interior portions of the park and along the coast and serve important functions including flood protection, erosion protection, sediment filtration, and water storage for release during droughts. They also provide habitat and food for a variety of animals including mammals, fish, birds, insects, and microscopic organisms. Wetlands can also provide other benefits such as opportunities for recreation, education, and research.

According to NPS and U.S. Army Corps of Engineers standards, wetlands are identified by hydrophytic soil types, hydrophytic vegetation, and hydrology (wet soil characteristics, wetland dependent vegetation and the presence of water). Park wetlands are characterized first by what kind of water they are associated with and then the by type of vegetation or substrate. Park wetlands generally fall into one of three categories: palustrine (wet vegetated areas), riverine (river or stream channels) or lacustrine (associated with a lake). Typically wetlands are classified according to the system developed by the USFWS (Cowardin et al. 1979).

Freshwater wetland ecosystems in the park include ponds, marshes, seasonally flooded meadows, and riparian areas (NPS 2008: 180). Lakes and wetlands are catalogued as water bodies in the park's geographic information system (GIS) database. According to this database, there are about 650 lakes and wetlands, including more than 300 high mountain lakes, totaling 13,978 acres in Olympic National Park. This number is derived, in part, from data associated with the National Wetlands Inventory, and is likely an underestimate because mapping did not include many of the forested wetland areas of the park (NPS 2008: 180).



**Figure 18: Small Sedge Wetland near Rustic Cabins**

The shoreline of Lake Crescent is considered a lacustrine wetland. Lacustrine wetlands are large, open, water-dominated systems. Lacustrine wetlands also include deep standing or slow moving waters. According to Cowardin et al. 1979, lacustrine wetlands are deepwater habitats situated in a topographic depression or dammed river channel. Lacustrine wetlands have less than 30 percent cover of trees, shrubs, persistent emergent (plants that grow out of water), mosses or lichens.

Log Cabin/Piedmont Creek is within a deeply incised channel as it moves through the resort area. A short- split-rail fence is proposed to keep resort guests from further trampling its overhanging bank. The creek itself is a riverine (open moving water) wetland and has adjacent palustrine (riparian) wetland. Riverine wetlands include all wetlands and deepwater habitats contained within a channel, except for wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens and those near salt water. Water is usually, but not always flowing in the channel (the creek is perennial, but may occasionally flow underground) and these wetlands may also be surrounded on their floodplain by other kinds of palustrine wetlands [such as riparian areas] (Cowardin et al. 1979). Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens, and some saltwater wetlands. Palustrine wetlands are associated with persistent groundwater and include those areas called marshes, bogs, fens and prairies as well as shallow permanent or intermittent ponds. Palustrine wetlands are further classified as forested, emergent wetland persistent, and scrub-shrub wetlands (Cowardin *et al.* 1979).

There is one small (1,600 square feet) wetland in the project area behind Cabin 5C that is also a palustrine wetland. This wetland was identified because of the presence of water (a spring) and because it exhibits wetland vegetation, which includes the following species: slough sedge (*Carex obnupta*), red alder (*Alnus rubra*), and salmonberry (*Rubus spectabilis*). Log Cabin/Piedmont Creek, which is proposed for bank stabilization is also a wetland. The banks of Log Cabin/Piedmont Creek contain a variety of species, including Douglas-fir, western red cedar, salal, serviceberry, Oregon grape, and sword fern.

## Vegetation

Five major terrestrial vegetation communities are found in Olympic National Park (Buckingham 1995 in NPS 2008). These are the:

- Temperate Rain Forest Zone: Westside forests of Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*).
- Lowland Zone: Lower elevation forests of Douglas-fir (*Pseudotsuga menziesii*), western hemlock and western red cedar (*Thuja plicata*).
- Montane Zone: Mid-elevation to upper slope forests of Pacific silver fir (*Abies amabilis*) and western hemlock.
- Subalpine Zone: The area between continuous forest and timberline. Tree clumps of mountain hemlock (*Tsuga mertensiana*) and subalpine fir (*Abies lasiocarpa*) mixed with meadows.
- Alpine Zone: Areas above tree line, mainly in the northeastern section of the park and on higher peaks.

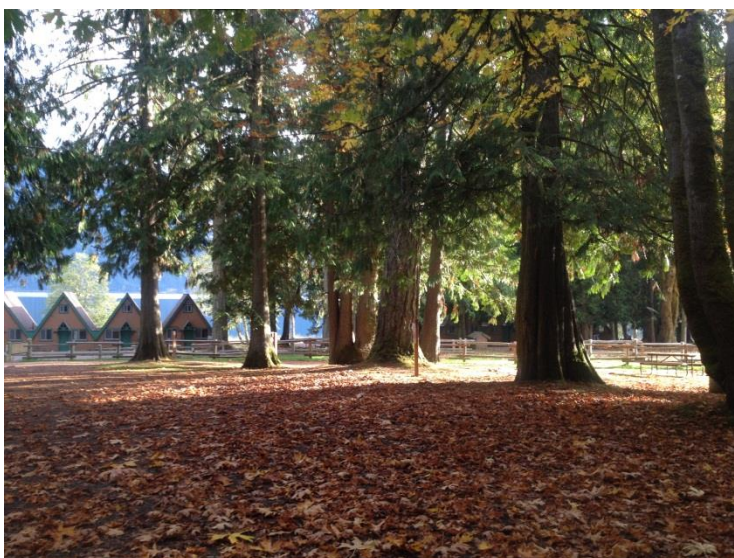
Lake Crescent is primarily located in the Temperate Rain Forest Zone and the Lowland Zone.

### Sitka Spruce /Temperate Rainforest Zone:

This zone occurs on the wettest sites in the most humid regions in the west side of the park. The Hoh, Queets, Quinault, and Bogachiel rain forest valleys are included in this zone, as is the entire coastal strip. Common shrubs include salmonberry (*Rubus spectabilis*), salal (*Gaultheria shallon*), vine maple (*Acer circinatum*), red huckleberry (*Vaccinium parviflorum*) and Alaska huckleberry (*Vaccinium alaskaense*).

Western Hemlock / Lowland Forest Zone: This is the most widespread zone in the park. Located inland and at higher elevations than the Sitka spruce zone, climatic extremes are somewhat greater here. Western hemlock is the climax dominant; however, much of the area is populated by sub-climax Douglas-fir resulting from past fires or other disturbance. Common shrubs include salal, vine maple, Oregon grape (*Mahonia nervosa*), red huckleberry, Alaska huckleberry, salmonberry, and rhododendron (*Rhododendron macrophyllum*).

Overall, the park is habitat for an estimated 1,195 species of vascular plants, including seven endemic species.



**Figure 19: View of Lack of Understory in Resort Area (chalets in background)**

The proposed project area is within the Western Hemlock/Lowland Forest Zone. Native trees present include: Douglas-fir, western red cedar, western hemlock, big-leaf maple, willow, red alder, and vine maple. Native shrubs include serviceberry (*Amelanchier alnifolia*), snowberry, salal, wild rose, red huckleberry, salmon berry, Oregon grape, and ocean spray. A variety of native forbs and bryophytes were also observed, including: bracken fern (*Pteridium aquilinum*), sword fern (*Polystichum munitum*), and a variety of mosses. Other species, particularly grasses and forbs, in the project area are nonnative (see below). The project area also includes native and nonnative landscaping, including a small apple and pear orchard, containing approximately seven trees, as well as nonnative blackberry, above the rustic cabins.

There is an especially large Douglas-fir (approximately 48 inches in diameter-at-breast height [dbh]) near existing rustic cabin 3C. At least one other large (approximately 36 inches dbh) Douglas-fir tree (near rustic cabin 2C) is also present. Between the cabins are several smaller trees (also Douglas-fir) and shrubs.

### Nonnative Species

Approximately 313 nonnative plant species are found in the park. Some of the most ecologically harmful nonnative plants include Scot's broom (*Cytisus scoparius*), English holly (*Ilex aquifolium*), English ivy (*Hedera helix*), reed canarygrass (*Phalaris arundinacea*), Canada thistle (*Cirsium arvense*), and herb Robert (*Geranium robertianum*).

Most nonnative plants within the park are perennial species, which are also the most persistent and difficult plants to control or eradicate. There have been some successful attempts to limit species invasion by hand-pulling, use of approved herbicides, and other techniques in some areas of the park. Most nonnative plants are found in disturbed frontcountry sites and near park roads, however, nonnative plants occur throughout the park (NPS 2008: 184-185). An invasive plant management plan has been identified as a park planning need.

Nonnative species in the project area include: lilac (*Syringa* sp.), Scot's broom, blackberry, Canada thistle, herb Robert, clover, daisy fleabane, ox-eye daisy (*Leucanthemum vulgare*), and pasture grasses such as meadow ryegrass (*Lolium perenne*).

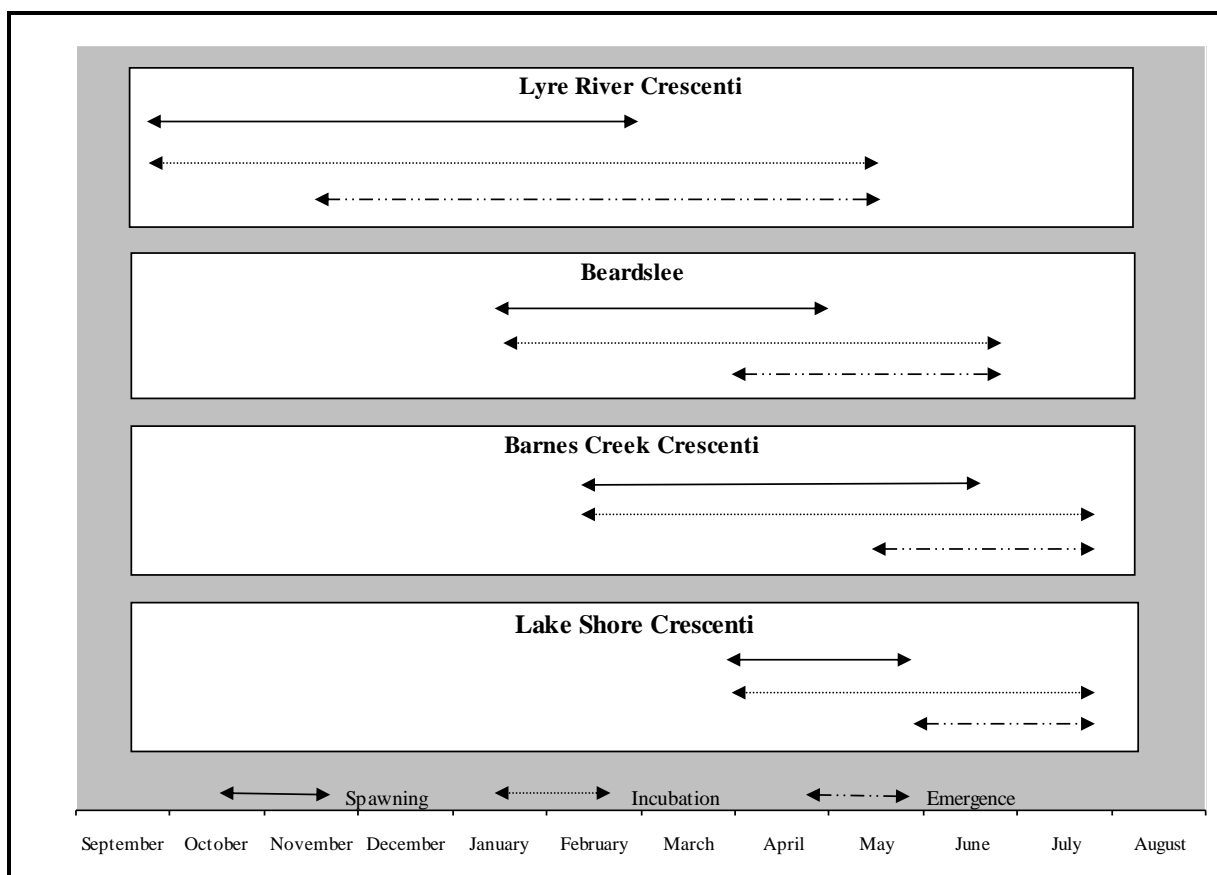
### Fish and Wildlife

A very diverse wildlife population exists in Olympic National Park. According to the NPSpecies database used by all national parks, there are an estimated 260 bird, 66 mammal, 13 amphibian, 4 reptile, and 93 fish (including 24 freshwater, 58 marine and 13 anadromous) species present and/or probably present in the park (<https://irma.nps.gov/App/Species/Search> NPS certified species list - park status view; accessed September, 2015). The number of invertebrate species is unknown, but likely to be very large (NPS 2008: 185).

More than 3,500 miles of the park's rivers and streams are habitat for freshwater fish species, 55 unique populations of Pacific salmon and steelhead, three endemic fish species. The endemic fish include the Olympic mudminnow and two trout, Beardslee rainbow, *Oncorhynchus mykiss beardsleei*, and Crescenti cutthroat, *Oncorhynchus clarki crescenti*, as well as approximately six nonnative species. Other fish in Lake Crescent include kokanee salmon (*Oncorhynchus nerka*), prickly sculpin (*Cottus asper*), pygmy whitefish (*Prosopium coulteri*), and perhaps Pacific lamprey (*Lampetra tridentata*) (Meyer and Fradkin 2002 in NPS OLYM 2012:112).

Kokanee salmon are the primary food source for both Beardslee and Crescenti trout. Kokanee form small schools which can be seen rippling the surface of Lake Crescent, similar to herring in salt water. The kokanee appear to spawn primarily along the southern shoreline from late October through January. The exact location of spawning and the abundance of the fish are unknown. In the Log Cabin Resort area, spawning, incubation and emergence times should be avoided for any in-water work (Figure 20).





*Kokanee Trout and Pygmy Whitefish are not shown on this figure. Kokanee spawn on the south shoreline of the lake from October through mid-January. Spawn timing for Pygmy Whitefish is believed to occur during the winter months at a significant depth (>100 feet). In-water work along the south shore of the lake should be limited to August and September, in order to accommodate emergence of Crescenti fry from the gravel. As Crescenti spawning has not been observed in the eastern area of the lake, in-water work could occur as early as July 15, east of La Poel.*

**Figure 20: Lake Crescent Fish Populations Spawning, Rearing, and Emergence Timing**

Very little is known about the pygmy whitefish population in the lake. However, there is video of pygmy whitefish spawning at depths of over 100 feet along the south shore of the lake. Eggs incubate in the gravel for several months after spawning.

Large native mammals found within the project area include Roosevelt elk, Columbia black-tailed deer, black bear, and cougar. Nonnative mountain goats, which were introduced into the park in 1925 and 1929, are occasionally observed at higher elevations within the watershed. Columbia black-tailed deer are frequently seen in clearings and forest margins around the lake, while Roosevelt elk are rarely seen, usually in the western and southern portions of the watershed. Black bear are common throughout the area. Mountain lions are occasionally seen near Lake Crescent and elsewhere in the park. River otters inhabit the lake and can sometimes be seen swimming and playing along the shore. Fishers were recently reintroduced in the park, and several have established home ranges around Lake Crescent (NPS OLYM 2012:110).

Douglas squirrels and chipmunks are common residents along the lake, and Pacific Townsend's big-eared bats occupy the two Spruce Railroad tunnels. A variety of other small and medium-sized mammals, such as snowshoe hares, mountain beaver, flying squirrels, spotted skunks, raccoons, voles, and mice may be less readily noticed by visitors. Several species of amphibians and reptiles occur in the area, including the rarely seen rubber boa and alligator lizard (NPS OLYM 2012:110).

Resident bird species found in lake and riparian habitats of the Lake Crescent area include pied-billed and western grebes; great blue and green herons; wood duck; green-winged teal; mallard; northern shoveler; northern pintail; hooded, common, and red-breasted mergansers; American coot; osprey; and belted kingfisher (NPS OLYM 2012:111). Canada geese also nest at the lake, and increasingly large flocks that forage on maintained lawns occasionally are a nuisance. Riparian habitat along Barnes Creek and other tributaries is used by a variety of wildlife species, including river otter and hooded mergansers. Rare harlequin ducks and the American Dipper, or water ouzel, nest along the banks of Barnes Creek each spring (NPS 2012: 103). A pair of mallards is often present at the Sledgehammer Point turnout.

Expected year-round woodland residents include sharp-shinned, Cooper's, and red-tailed hawks; northern goshawk; merlin; sooty and ruffed grouse; killdeer; band-tailed pigeon; western screech, barred, great horned, northern pygmy, and northern saw-whet owl; red-breasted sapsucker; downy, hairy, and pileated woodpecker; northern flicker; gray and Steller's jay; American crow; common raven; black-capped and chestnut-backed chickadee; bushtit; red-breasted nuthatch; brown creeper; Bewick's and winter wrens; American dipper; golden-crowned, savannah, and fox sparrows; red crossbill; pine siskin; and evening grosbeak (NPS OLYM 2012:111).

Migratory birds breeding in the Olympic lowlands, including Lake Crescent, include common nighthawk; rufous hummingbird; western wood-pewee; willow, Hammond's, Pacific-slope, and olive-sided flycatcher; tree, violet-green, northern rough-winged, cliff, and barn swallow; Swainson's thrush; solitary and warbling vireo; yellow, orange-crowned, yellow-rumped, Townsend's, black-throated gray, MacGillivray's, and Wilson's warbler; western tanager; blackheaded grosbeak; white-crowned sparrow; brown-headed cowbird; and American goldfinch (NPS OLYM 2012:111).

Non-breeding migrants coming through the Lake Crescent area include trumpeter swan; turkey vulture; solitary and spotted sandpipers; glaucous-winged gull; ruby-crowned kinglet; Townsend's solitaire; and hermit thrush (NPS OLYM 2012:111).

## Nonnative Species

The European starling and house sparrow are introduced species, found in developed areas throughout the watershed, and domestic turkeys have been released near the area and are occasionally seen in or near the park (NPS OLYM 2012:111). According to NPSpecies, the park has approximately 16-17 nonnative vertebrates, including five nonnative fish, five birds, and 6-7 mammals.

## Special Status Species

### Plants

Based on information provided by the USFWS, there are no federally listed, proposed, or candidate plant species likely to occur within the project area. There are, however, several federal species of concern and several state listed species listed by the Washington State Natural Heritage Program that may have habitat within the project area (Table 2). Of these, only water lobelia is known from near the project area.

**Table 2: Rare Plants with Potential Habitat in Project Area**

<i>Species</i>	<b>Common Name</b>	<b>Federal Status / State Status (Washington Natural Heritage Database)</b>	<b>Distribution</b>
<i>Agoseris elata</i>	Tall agoseris	State sensitive	Present in Clallam County. Not known from project area
<i>Astragalus australis</i> var. <i>cottonii</i>	Cotton's milk-vetch	Federal species of concern State threatened	Present in Clallam County. Not known from project area

<i>Cimicifuga elata</i>	Tall bugbane	Federal species of concern State sensitive	Present in Clallam County. Not known from project area
<i>Montia diffusa</i>	Spreading miner's-lettuce Branching montia	State sensitive	Found outside the park a few miles from Lake Crescent but not within the project area. See more detailed information below.
<i>Polemonium carneum</i>	Royal Jacob's-ladder	State threatened	Present in Clallam County. Not known from project area
<i>Lobelia dortmanna</i>	Water Lobelia	State threatened	Found within/adjacent to the project area in Lake Crescent. See more detailed information below.

Spreading Miner's Lettuce / Branching montia (*Montia diffusa*): This plant has been found within a few miles of the Lake Crescent watershed (outside of the park) but surveys for this species as part of the nonnative invasive plant survey conducted within a nearby project area (U.S. Highway 101) did not locate it. This species is listed by the Washington Natural Heritage Database as "sensitive" (i.e., vulnerable or declining with the potential to become endangered or threatened).

Water Lobelia (*Lobelia dortmanna*): Water lobelia is an evergreen, perennial aquatic plant which is usually submerged except for some flowering stalks. The leaves consist almost entirely of a basal rosette. The plant is found in shallow water on the edges of lakes and ponds. The species occurs in nutrient-poor water bodies with exceptionally clear water. The basal leaves of water lobelia may be harmed by sediment because they can't photosynthesize if they are covered. Water lobelia is also susceptible to damage from application of herbicides to control aquatic weeds, as well as from shoreline development, water pollution from recreational equipment, and trampling (Washington Natural Heritage Program Field Guide to Selected Rare Plants (<http://www1.dnr.wa.gov/nhp/refdesk/fguide/htm/fgmain.htm>, viewed June 22, 2011 in NPS OLYM 2012: 107).

Water lobelia is found along the shoreline of Lake Crescent adjacent to the project area.

## Wildlife

Several wildlife species listed by the U.S. Fish and Wildlife Service and/or the State of Washington as threatened or endangered inhabit the park. Other species are not listed but have been identified as federal species of concern, state sensitive species, or park species of concern (Table 3).

**Table 3: Special Status Wildlife Species Found in or near the Project Area**

Species	Federal Status	Washington State Status	Notes
<b>Mammals</b>			
Pacific Fisher <i>Pekania pennanti</i>	Proposed Threatened	Endangered	Reintroduced to park in 2008. The USFWS reopened a public comment period on a proposal to list the fisher as threatened in 2015 (with a public comment deadline of May 14, 2015). The deadline for the USFWS to make a final decision is April 7, 2016. The deadline was extended to gather additional information about toxicants and rodenticides used at marijuana grow sites and other information.

			<a href="http://www.fws.gov/cno/es/fisher/">http://www.fws.gov/cno/es/fisher/</a> accessed 6-10-15.
Long-legged myotis <i>Myotis volans</i>	n/a	Monitored	
Western Long-eared bat <i>Myotis evotis</i>		Monitored	
Pacific Townsend's Big Eared Bat <i>Plecotus (=Corynorhinus) townsendii townsendii</i>	n/a	Candidate	Known from the Spruce Railroad tunnels
<b>Birds</b>			
Short-tailed Albatross	Endangered	Candidate	Known from coastal areas within the park.
Marbled Murrelet <i>Brachyramphus marmoratus</i>	Threatened	Threatened	See detailed information below.  Although critical habitat has been designated, none is in the park, however the park contains high-quality habitat considered vital for marbled murrelet recovery. Murrelets have been observed foraging on Lake Crescent.
Northern Spotted Owl <i>Strix occidentalis caurina</i>	Threatened	Endangered	See detailed information below.  Although critical habitat has been designated, none is in the park, however the park contains high-quality habitat considered vital for northern spotted owl recovery.
Streaked Horned Lark <i>Eremophila alpestris strigata</i>	Threatened	Endangered	See detailed information below.  Although critical habitat has been designated, none is in the park.
Yellow-billed Cuckoo <i>Coccyzus americanus</i>	Threatened	Candidate	See detailed information below.  There is a proposed critical habitat designation for this species that does not include the park.
Western Grebe <i>Aechmophorus occidentalis</i>	Bird of Conservation Concern	Candidate	Rare at Lake Crescent
Short-eared Owl <i>Asio flammeus</i>	Bird of Conservation Concern	n/a	Not in project area
Bald Eagle <i>Haliaeetus leucocephalus</i>	Delisted Bird of Conservation Concern	Sensitive	See detailed information below.  Protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.
Peregrine Falcon <i>Falco peregrinus anatum</i>	Bird of Conservation Concern	Sensitive	
Black oystercatcher <i>Haematopus bachmani</i>	Bird of Conservation Concern	Monitored	Known from coastal areas in the park
Caspian Tern <i>Hydroprogne caspia</i>	Bird of Conservation Concern	Monitored	Known from coastal areas in the park
Short-billed Dowitcher <i>Limnodromus griseus</i>	Bird of Conservation Concern	n/a	Rare – possible in lake delta
Black Swift <i>Cypseloides niger</i>	Bird of Conservation	Monitored	Dependent on old-growth forests. Nest in the area.



	Concern		
Olive-sided flycatcher <i>Contopus cooperi</i>	Bird of Conservation Concern	n/a	Occurs in project area
Willow flycatcher <i>Empidonax traillii</i>	Bird of Conservation Concern	n/a	Occurs in project area
Rufous Hummingbird <i>Selasphorus rufus</i>	Bird of Conservation Concern	n/a	Occurs in project area
Fox Sparrow <i>Passerella iliaca</i>	Bird of Conservation Concern	n/a	Occurs in project area
Purple Finch <i>Carpodacus purpureus</i>	Bird of Conservation Concern	n/a	Occurs in project area
<b>Amphibians</b>			
Olympic Torrent Salamander <i>Rhyacotriton olympicus</i>		Monitored	Found in swift, cold streams feeding into Lake Crescent
Van Dyke's Salamander <i>Plethodon vandykei</i>		Candidate	Terrestrial salamanders associated with springs and seeps
Tailed Frog <i>Ascaphus truei</i>		Monitored	Found in swift, cold streams feeding into Lake Crescent
Western T(= Bufo) Toad <i>Anaxyrus boreas</i>		Candidate	Found in shallow lakes and ponds
<b>Fish</b>			
Beardslee Rainbow Trout	n/a	n/a	Subspecies endemic to Lake Crescent. See detailed information below.
Crescent Cutthroat Trout	n/a	n/a	Subspecies endemic to Lake Crescent. See detailed information below.
<b>Invertebrates</b>			
Western floater (freshwater mussel) <i>Anodonta kennerlyi</i>		Monitored	Found in Lake Crescent, including near the NPS house/boat dock and often associated with water lobelia locations (Cowles 2014). Also found all around the perimeter of the lake (Fradkin 2014).
Western pearlshell (freshwater mussel) <i>Margaritifera falcata</i>		Monitored	Found in the Lyre River and Lake Crescent, including near the NPS house/boat dock and often associated with water lobelia locations (Cowles 2014).

### Pacific Fisher

The park recently reintroduced the fisher, which is a federal candidate species. Fishers reside in forested areas near the lake and on the adjoining slopes. Several fishers have established home ranges near Lake Crescent (NPS OLYM 2012:110).

### Northern Spotted Owl

The northern spotted owl (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. 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.

*Range:* The current range of the northern spotted owl extends from southern British Columbia into central California (Marin County) (USFWS 1990 in USFWS 2008). There are also two other subspecies of spotted owls – the southern spotted owl and the Mexican spotted owl.

*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. Among the most disturbing trends, however, in low elevation areas is the increasing use by barred owls, rather than spotted owls. It has become apparent through research that competition from barred owls (*Strix varia*) poses a significant threat to northern spotted owls. Past and current habitat loss are also threatens the spotted owl, even though loss of habitat due to timber harvest has been greatly reduced on federal lands over 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 almost entirely on northern flying squirrels and 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 range 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).

### 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 designed 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. 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-foot elevation on the west side of the park, or above 4,000-foot 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 owl habitat within the Park (95 percent) is located within designated wilderness areas (USFWS 2008).

In 2015, monitoring of 52 spotted owl territories to determine their occupancy and reproductive status found that three sites in the park were occupied by spotted owl pairs and three sites were occupied by single spotted owls (Gremel 2015). This showed a reduction of more than 60 percent from the 35 sites with pairs observed in 1996. Most of the occupied sites occur in the northern and eastern portions of the park (Gremel 2007).

Northern spotted owl survey data collected in the park has been used to monitor spotted owl demographic trends on the Olympic Peninsula since 1985. The most recent demographic analysis (completed in 2011 by Dugger et al. 2016) indicates an average population decline of 3.9 percent per year. This has resulted in an apparent loss of 59 percent of the territorial spotted owl pairs on the Olympic Peninsula over the past decade (Dugger et al. 2016). This range-wide declining trend is linked to declines in the apparent survival rates for adult spotted owls (i.e., the probability that an adult spotted owl will survive from one year to the next has declined) and fecundity. According to Dugger et al. (2016), the reasons for these population declines include: (1) increasing numbers of barred owls, (2) loss of spotted owl habitat, and (3) poor weather conditions. This research also suggests that on the Olympic Peninsula the primary reason for the decline is the invasion of barred owls.

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).

#### Status of Northern Spotted Owls in the Project Action Area

Although structurally suitable habitat for northern spotted owls is found in immediate proximity of the project area, ongoing park surveys have indicated that much of this habitat is no longer used for nesting by northern spotted owls and is instead occupied by barred owls (Gremel pers. comm. 2015). “Prior to the range expansion of barred owls into the Olympic Peninsula, spotted owls occurred close to Highway 101 around Lake Crescent, and were sometimes detected from the road on night surveys” (Gremel pers. comm. 2015). There were formerly four northern spotted owl territories in this vicinity that were part of the park’s long-term monitoring program. No northern spotted owls have been observed in areas within 500 meters of the highway near Lake Crescent since 2010 (Gremel pers. comm. 2015). This decline has been documented both near Lake Crescent and throughout the park.

#### **Marbled Murrelet**

The marbled murrelet was listed as a threatened species in Washington, Oregon, and northern California in 1992. 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. This represents an overall population decline of 19 to 34 percent since 2000 (NPS MORA and USFWS 2010). Since 2008, populations have continued to decline. The USFWS Recovery Plan for the marbled murrelets emphasizes maintaining and protecting occupied habitat and minimizing the loss of unoccupied suitable habitat (USFWS 1997a in USFWS 2008).

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. 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. Other conservation zones are located in Oregon and California, and include the Oregon Coast Range, Siskiyou Coast Range, Mendocino, and Santa Cruz Mountains.

*Description:* Marbled murrelets are small, pigeon-size, long-lived diving seabirds that spend most of their life in nearshore marine waters foraging on small fish and invertebrates and which 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).

*Threats:* 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 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 in NPS MORA and USFWS 2010). 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).

*Suitable Habitat:* Murrelets generally select nests within 37 mi (60 kilometers (km)) of marine waters (Miller and Ralph 1995 in USFWS 2008). In Washington, occupied habitat has been documented 52 mi (84 km) from the coast and murrelets have been detected up to 70 mi (113 km) from the coast in the southern Cascade Mountains (Evans Mack et al. 2003 in USFWS 2008). Nests occur primarily in large, old-growth trees, with large branches or deformities that provide a suitable nest platform. Murrelets do not 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 tree 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 2 feet, 7.2 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).

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 contiguity (USFWS 1996 in NPS MORA and USFWS 2010). Critical habitat is designated near Olympic National Park. 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.

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 (Miller pers. comm. 2015). 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 now 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.

#### Status of Marbled Murrelets in Olympic National Park

Suitable nesting habitat consisting of old-growth multilayered conifer stands with moderate to high canopy closure. This habitat type occurs along major drainages in the park's lower elevations, overlapping most of the suitable habitat for northern spotted owls. There is also some habitat in the coastal strip and along the Queets River corridor which is isolated by surrounding areas of managed forest lands. Marbled murrelets also occasionally nest in younger stands if remnant large trees or deformities provide large enough limbs (NPS 2008: 189).

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. As a result, there is approximately 453,000 acres of suitable marbled murrelet habitat in the park. Most of this is located in wilderness.

The park is the largest contiguous block of suitable nesting habitat remaining within the range of marbled murrelets in the lower 48 states. Inland surveys have been conducted according to Pacific Seabird Group Inland Survey protocol in all developed areas and in a sampling of backcountry valleys. As a result, the presence of marbled murrelets was documented at every site surveyed. In addition, more than 80 percent of sites surveyed in the park were occupied. According to the Hurricane Ridge Road biological assessment, suitable habitat in the park is used more intensively than that surrounding the park (Hall 2000).

Although some marbled murrelets habitat within the park has been lost due to past development of roads, campgrounds and other facilities, within the park threats to marbled murrelets are now associated with natural disturbances, such as wildfire and windthrow. Additional threats include corvid predation associated with human activities near developed areas. As described above related to northern spotted owl habitat, loss of suitable habitat from a major windstorm in 2007 has occurred.

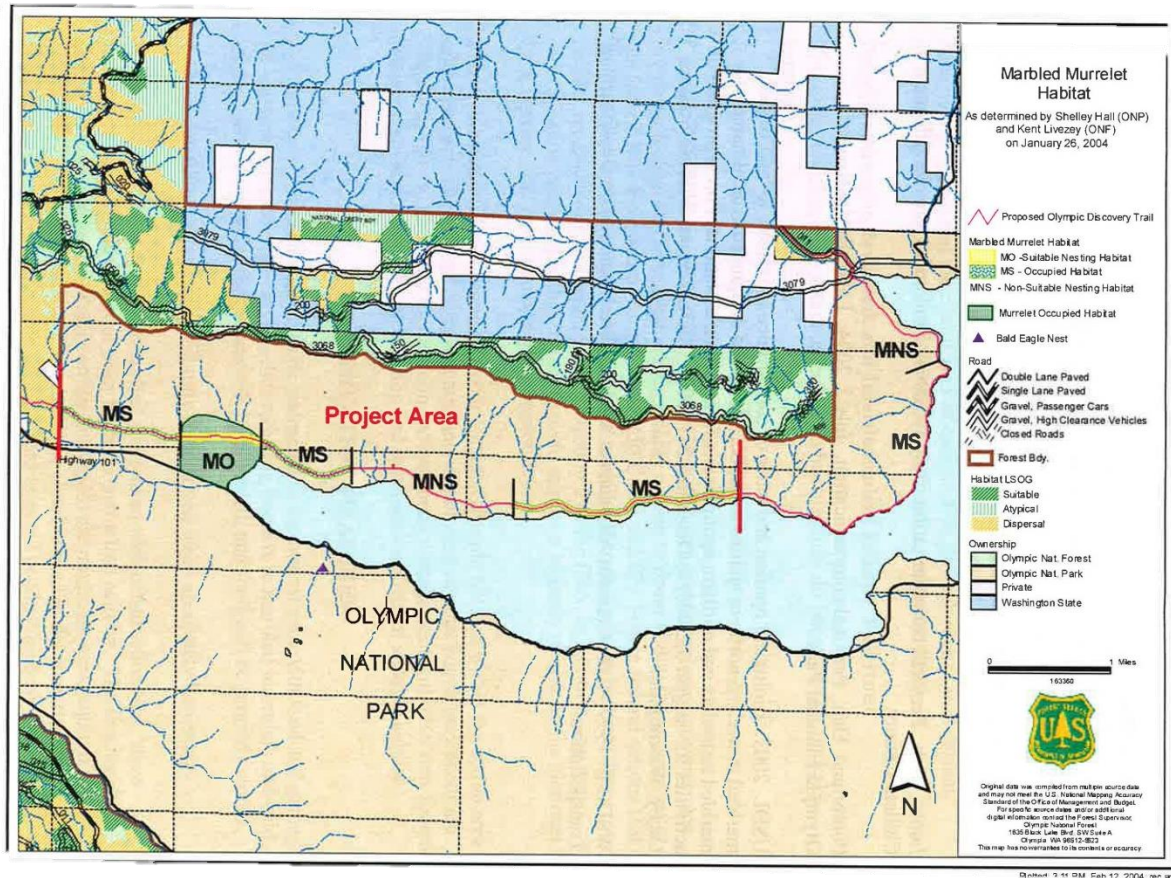
#### Status of Marbled Murrelets in the Action Area

Surveys of marbled murrelets in the project area have found that murrelets occur in suitable habitat adjacent to Lake Crescent, including within one mile of Log Cabin Resort. In addition, there has been at least one reliable occurrence of murrelets observed floating on the lake surface. Since most activity away from the nest occurs on saltwater, this was noted as unusual (Gremel pers. comm. 2015). Suitable habitat for murrelets is found near the project area (Figure 21).

Between 1995 and 2000, inland surveys were conducted in the park according to Pacific Seabird Group protocols in all developed areas and in some backcountry valleys (Hall 2000 in USFWS 2008). Every site surveyed documented the presence of murrelets. Occupancy behavior was detected at 83 percent of the sites surveyed within the park (Hall 2000 in USFWS 2008). These detections peaked in July and tapered beginning in August. Similarly, radar was used to count murrelets in each of 10 river valleys on the Olympic Peninsula. All of the drainages resulted in detections of murrelets, with the highest numbers strongly correlated with the total amount of nesting habitat in the watershed (Raphael et al. 2002 in USFWS 2008). The drainages with the highest counts in the park were the Queets, Upper Quinault and Elwha. As a result, USFWS (2008) concluded that all suitable murrelets habitat within the park is occupied by murrelets.

As noted in USFWS 2008, the large blocks of murrelet nesting habitat within the park play a critical role in the conservation and recovery of murrelets in both Conservation Zones 1 and 2 (U.S. Fish and Wildlife Service 1997a in USFWS 2008). The park currently provides large, undisturbed blocks of murrelets nesting habitat and supports reproductive pairs of murrelets. Because the most of the park is designated wilderness, high-quality murrelet nesting habitat within the Park is largely undisturbed, and is protected by the wilderness designation and NPS mandates which emphasize the protection of threatened and endangered species habitats. Nesting habitat in many areas within the park is located in close proximity to productive marine foraging areas in the nearshore Pacific and Strait of Juan de Fuca waters. These areas provide essential nesting habitat and marine foraging areas for murrelets.





**Figure 21: Marbled Murrelet Habitat 2004**

A survey of the Lake Crescent corridor along Highway 101 in February 2015, determined that much of that area should be considered suitable habitat. The preliminary survey and analysis followed the guidelines published by the USFWS for western Washington, including: platforms greater than 4" across in coniferous trees, above 33' in height, with suitable vertical cover by limbs or foliage, and located within an area of contiguous forest. . . Although there was evidence of fire in probably the last 100 years, many large, older coniferous trees were present within nearly all the younger forest stands. Most trees in this older age class had structures that could potentially support murrelet nests, and these older trees were well distributed along the highway corridor (Gremel pers. comm. 2015).

### Bald Eagle

Bald eagles are resident throughout much of the park. More than 50 nest territories on the park coast are routinely monitored. The number of territories has increased significantly since 1980, as have the numbers of fledglings produced by those nesting pairs. In the interior of the park, eagles are mainly observed foraging or as a winter migrant, although several nests are known along inland lakes and rivers (NPS 2008: 190).

Wintering habitat in the park is typically along the Pacific coast and some inland rivers. Olympic National Park is within two of the Washington bald eagle recovery zones: Washington Coast and interior Olympic. Bald eagles are listed as threatened but have been proposed for delisting due to population recovery. For the purposes of analysis, bald eagle nesting season in Washington begins January 1 and concludes August 15. Wintering season is from October 31 through March 31.

There is one bald eagle nest near Lake Crescent in the vicinity of Eagle Creek. Since removal from the list of threatened and endangered species, park monitoring of bald eagle nests has generally been discontinued. Although the nest is no longer monitored, it has been observed to be active in recent years. During surveys of the road corridor for the proposed Highway 101 project, bald eagles were seen several times over the western part of Lake Crescent. Although bald eagles are no longer listed, their habitat remains important to protect under the Bald and Golden Eagle Act and as a formerly listed species. In spring, 2015 a park wildlife ecologist observed four adults and two sub-adults, including a return to the nest (Gremel, pers. comm. 2015).

#### **Fish (Park Endemic Species: Beardslee Rainbow Trout and Crescenti Cutthroat Trout)**

Lake Crescent supports a unique assemblage of fish populations, including two endemic subspecies of trout that evolved in response to the distinctive geologic history of the region. The lake was historically connected to the Elwha River basin through an outlet draining to the east, through the Indian Creek valley. Anadromous fish occupied the area after the retreat of the Cordilleran ice sheet but a massive landslide within the last 7,000 years isolated the lake from the Elwha basin (Tabor 1987). As the water level rose, a new outlet formed down the Lyre River drainage.

As a result of the above-described geologic processes, Beardslee rainbow trout and Crescenti cutthroat trout are endemic to the Lake Crescent system and spawn in discrete, limited locations within the watershed. Both trout were originally considered separate species; however, genetic research has shown them to be rainbow and cutthroat trout.

According to the GMP, these populations are considered keystone species in the Lake Crescent ecosystem and must be protected to a level that not only ensures their existence in perpetuity, but also ensures that they thrive at levels required by the NPS's primary mandate (NPS 2008). The GMP also called, therefore, for an addition to the park which would protect the Lyre River and Lake Crescent outlet area. These areas are critical to Beardslee and Crescenti trout spawning areas and rearing habitat. This is the only place in the world where the Beardslee trout spawn. The park addition, if acquired, would protect the Lyre River and the lake outlet, which provide critical spawning habitats for cutthroat trout and provide a migratory corridor for cutthroat moving to and from the lake. Cutthroat also spawn in shallow areas of Lake Crescent, the Lyre River and likely in other Lake Crescent tributary streams.

In the early 1990s, both Beardslee trout and Crescenti trout appeared to be at risk of extirpation. Annual spawning ground surveys accounted for less than 100 individuals of each species (Meyer and Fradkin 2002). Beardslee trout in particular were at risk, as they are known to spawn solely in a one-acre section of gravel at the outlet of Lake Crescent. Crescenti trout, also in very low abundance, have developed a number of unique life history traits - including multiple spawning locations that include tributaries to the lake, the lakeshore, and downstream in the Lyre River lake outlet. These several locations buffer the potential for a catastrophic event to decimate the population (NPS OLYM 2012:112).

Kokanee salmon are believed to be the most abundant fish species in Lake Crescent and have been identified as the primary food source for the adult Beardslee and Crescenti trout (Scheffer 1935; Garlick 1949; Pierce 1984; Meyer and Fradkin 2002). Kokanee eggs are also a significant food source for the juvenile trout (Pierce 1984). Stomach content analyses of larger trout in the lake have found that nearly all prey items were kokanee (Garlick 1949). Little information exists on the status of pygmy whitefish, prickly sculpin, although whitefish spawning has been video documented at depths in excess of 100 feet (NPS OLYM 2012: 112).

Beardslee rainbow trout can reach a size of over 10 pounds. Genetic analysis indicates that they are genetically distinct from all other rainbow trout populations to the extent that they may qualify as a unique sub-species. These fish spawn only in the outlet of the lake. Spawn timing is from late-December through early-May. The annual abundance of spawning adults is approximately 500 fish.

Crescenti cutthroat trout can reach a size of 5 to 10 pounds. The Crescenti appear to be a mixture of several different populations which spawn at different times and different locations throughout the watershed. There are at least four distinct spawning populations of cutthroat, and perhaps more. The largest two populations spawn in Barnes Creek from February to June and in the Lyre River from September to February. The shoreline population is somewhat smaller than these first two, spawning from April to June. Finally, there is spawning which occurs in Log Cabin/Piedmont Creek from February to June, and perhaps a limited amount of spawning in some of the other tributaries. Spawning, which mostly occurs at night, peaks between April and June and their eggs are within the gravel until August, when they hatch (Crain pers. comm. 2015). One population of cutthroat swims downstream from the lake into the Lyre River to spawn. Not only does this population have a distinct migrational behavior, but they also spawn at a very different time of the year than other similar trout - from October through March. There may also be limited cutthroat spawning occurring in LaPoel Creek, Eagle Creek, and Piedmont (Log Cabin) Creek, but surveys are limited.

## Archeological Resources

The Olympic Peninsula has had the potential for human occupation since the last glacial retreat about 12,500 years ago. Archeological evidence indicates that people used all of the area encompassed by Olympic National Park from the coastal margin to the subalpine and alpine areas. Prehistoric and historic American Indian populations of the Olympic Peninsula belong to the Northwest Coast culture area distinguished by features such as highly developed woodworking technology, twined basketry, woolen and vegetable-fiber textiles, large dugout canoes, and permanent villages or towns built of plank houses. The prehistoric economy included hunting, fishing, traveling throughout the area to trade materials, gathering resources, and practicing traditional spiritual activities (NPS 2008: 200).

Archeological resources are the remains of past human activity and records documenting the scientific analysis of these remains (NPS Director's Order 28). Archeological resources are often buried but may extend above ground. In this document the term "prehistoric" refers to archeological resources associated with Native Americans, particularly before contact with Euro-Americans. Prehistoric archeological resources also means cultural resources that predate the beginning of written records and includes isolated artifacts, petroglyphs, pictographs, and shell middens. There are also prehistoric submerged archeological resources (NPS 2008: 204-5).

The term "historic archeological resources" refers to those that postdate Euro-American contact with Native Americans. Historic archeological resources may be terrestrial or submerged and include cemeteries, trails, building remnants, and a variety of other features. Archeological survey work has been conducted in Olympic National Park since the 1940s, and systematic archeological surveys in the park began in the 1950s with a survey along the coast. The coastal strip is one of the best known archeological areas on the Olympic Peninsula. Beginning in the 1970s and continuing up to the present, archeological surveys have expanded to include areas other than the coast, such as river valleys and subalpine parklands. These projects have revealed a variety of archeological resources, including historic homesteads, mining sites, prehistoric lithic sites, and culturally modified trees.

Olympic National Park's Archeological Research Design (NPS 1988) and Ethnographic Overview and Assessment (NPS 1997) provide a general context and guidance for identifying and evaluating the park's archeological resources. In addition, Olympic National Park's cultural resource division has surveyed about 2,800 acres in conjunction with specific construction projects and in compliance with the NPS Systemwide Archeological Inventory Program (NPS 2008: 204-5).

More than 650 prehistoric archeological sites documenting 10,000 years of human occupation are protected within Olympic National Park's boundaries. Archeological resources are found in every major physiographic province in the park and can be divided into broadly defined classes, including lithic scatters, shell middens, petroglyphs, homesteads, and mining, logging, and other industrial sites. Lithic sites represent the most abundant class of prehistoric archeological resource found in the park. Lithic

sites in the park's mountain and subalpine areas are located within trail corridors and campsites. Recent research has identified lithic sites in river valleys and lowland prairies; however, dynamic geologic processes and dense vegetation inhibit site identification in these areas and have not yet yielded extensive archeological resources. None of the park's lithic sites have been evaluated for listing in the National Register of Historic Places (NPS 2008: 204-5).

Shell midden sites are the most visible of the site types in the park and are exposed along actively eroding beach terraces along the coastal strip. Current knowledge about this area comes mainly from the intensive investigations at the Ozette site carried out by Washington State University between 1966 and 1982. The Ozette Indian Village Archeological Site is listed in the National Register of Historic Places. Petroglyph sites are also known in the park. Wedding Rock Petroglyphs is listed in the National Register of Historic Places (NPS 2008: 204-5).

Approximately 300 historical archeological sites have been identified in the park from historic maps and documents, but most have not yet been formally documented or evaluated for their eligibility for listing in the National Register of Historic Places (NPS 2008: 204-5).

A detailed archeological survey was undertaken under contract to the park in 2012. This survey consisted of a pedestrian survey looking for surface artifacts, approximately 130 shovel test probes and the analysis of six one-meter<sup>2</sup> test pits as well as an extensive data and archival records search (Rooke and Cooper 2013).

Nine archaeological sites were found to have been recorded near Log Cabin Resort (Rooke and Cooper 2013). These historic resources include railroad grades, sunken vessels, historic debris scatters, and ferry pilings.

Within the Log Cabin Resort area one precontact archeological resource site and one historic archeological site are found. Neither of these, however, is within the proposed project area. Based on shovel test probe archeological investigation of the proposed project area, much of the ground surface within the Log Cabin Resort was found to have been disturbed by past development and maintenance activities (Rooke and Cooper 2013). Nonetheless, the site has yielded an array of both prehistoric and historic artifacts. Nonetheless, the sites have been determined ineligible for the National Register. They are unlikely to yield information significant to the Olympic Peninsula or to Log Cabin Resort because of the lack of diagnostic artifacts recovered, coupled with the extensive ground disturbance observed (Rooke and Cooper 2013). The Spruce Railroad was determined eligible for the National Register in 2006.

## Lake Crescent Recreational Development

Recreational development on the Olympic Peninsula began in the early 20th century. Natural hot springs of the Sol Duc and Elwha rivers prompted resort development at those locations in the early 1900s. An automobile road to Sol Duc Hot Springs was completed in 1910, and ferry service began the same year on Lake Crescent between Piedmont and Fairholme. This ferry allowed visitors to cross the lake from Log Cabin Resort, visit the Sol Duc hot springs and return in time for supper at the Log Cabin Hotel (Rooke and Cooper 2013).

Following World War I, tourists to the Olympic Peninsula began visiting the newly created Mount Olympus National Monument in their cars. Singers Tavern (Lake Crescent Lodge) was the site of meetings conducted to discuss the creation of Olympic National Park in the 1930s. On June 29, 1938, President Franklin Delano Roosevelt signed legislation creating Olympic National Park. The boundaries of Olympic National Park were extended to include Lake Crescent in 1940 (NPS 2008: 203).

The south shore Lake Crescent road was completed in 1922, ending the Piedmont to Fairholme ferry service on Lake Crescent (NPS 2008: 202). In 1931 the Olympic Loop Highway (U.S. Highway 101) was completed connecting the Lake Crescent segment with the rest of the road.



The development of the Sol Duc Highway and the Loop Highway led to more demand for recreational facilities and resort development at Lake Crescent and along the coastal strip. Resorts around Lake Crescent developed during the early 20th century include Ovington's, later known as Beardslee Bay Camp, on the north shore of the lake; Marymere, the earliest resort hotel on the south shore of the lake at Barnes Point; Hotel Crescent at Piedmont (at the site where the campground is now at Log Cabin Resort); and Fairholme at the western end of the lake. Singers Tavern (now Lake Crescent Lodge) was built at Barnes Point in 1915.

By the mid-1930s there were 12 resorts around Lake Crescent (NPS 2008: 201). Between the early 1860s and the 1960s, there were approximately 30 resorts around Lake Crescent (Alexander 2012). From the 1890s through the 1920s, there was also a town called Port Crescent six miles north of Lake Crescent that included a school, a hospital, sawmills and homesteads (Alexander 2012). Among the resorts were: Ovington's Resort, Marymere Hotel, Singers Lake Crescent Tavern, Hotel Piedmont/Log Cabin Hotel, Arcadia Resort, LaPoel Resort, Hotel Fairholme, Sunnybank Resort, Bonnie Brae Resort, Lenoir's Cabin Camp, and others (craigmagnuson.com accessed 9-17-15). Several of these burned down or were closed and remaining buildings were moved to those that remained open, such as Log Cabin Resort. As a result, it contains a variety of cabins and structures that came from different resorts, including Ovington's and Bonnie Brae (NPS 2008, and Rooke and Cooper 2013).

The wood frame structures of the Lake Crescent resorts were subject to fires, and resorts rose and fell with the ashes around the margins of Lake Crescent. The resort known as Rosemary was built near the meadow where Marymere formerly stood. The original Log Cabin Hotel (reminiscent of Fort Nisqually) burned down in August 1932 (Rooke and Cooper 2013) and was replaced first by an interim Log Cabin Auto Camp and then by the current Log Cabin Lodge as the property changed hands.

Although, the Log Cabin Lodge was designed by an important NPS modernist architect, Cecil J. Doty, and built on the east side of Lake Crescent by Carl Hansen, a local builder, in 1955, it has been highly modified since its design and construction. As noted in the analysis of eligibility sent to the State Historic Preservation Office (SHPO), "the Log Cabin Lodge has almost every example of inappropriate alterations" mentioned in the NPS Modern Design criteria for inclusion as an important example of NPS Modern Design (Creachbaum 2015). "These include but are not limited to 1) the addition of a new facade, entrance wing, or other major exterior alteration, 2) complete alteration of sequence through building, 3) addition of a pitched roof structure, 4) and extensive interior remodeling that alters definition of interior spaces, function of spaces, and sequences through spaces" (Creachbaum 2015).



**Figure 22: Log Cabin Lodge 1957**



**Figure 23: Present-day Log Cabin Lodge**

The analysis notes that

the building's original design used an asymmetrical plan with a large low pitched gable front main block as public space which was connected to a carport and motel units under one flat roof on its west side. The original design of the main block used large expanses of glass on front and rear facades as well as an open interior plan which provided views of Lake Crescent through the building from its main entrance. The lake facing rear facade of the building used five large log posts to frame a facade of which the east half was enclosed in glass and the west half was left open as a large transitional space between the building and the beaches of Lake Crescent.

Today the building retains little evidence of this mid-century modern design. The expanse of glass on the main facade has been in-filled with solid siding, the carport has been claimed as building space for an expanded gift shop, the roof structure of the motel units has been converted to a gable roof, the transitional space of the lake facing facade has been closed to house an expanded restaurant, and the interior space has been substantially divided (Creachbaum 2015).

As a result, the SHPO has concurred that Log Cabin Lodge is not eligible for listing in the National Register of Historic Places.

Similarly, individually, the rustic cabins themselves have also lost integrity not only because of physical modifications to them over the years, but also because many of them were moved from their original locations in other resorts (including some by barge in the 1950s from Ovington and Bonnie Brae). The A-frame chalets were constructed in the 1960s, about the same time as improvements were made to the boat launch area and RV hook-ups were installed. Collectively, these other buildings at Log Cabin Resort were determined ineligible for the National Register in 2011.

The Spruce Railroad Trail, accessible near the resort was among the railroads constructed in the Pacific Northwest to transport spruce logs to mill sites for use in the production of airplanes for World War I. The Lake Crescent Olympic Spruce Railroad No. 1 skirted the precipitous shoreline of Lake Crescent with 10 miles of deeply cut grade and two tunnels. This 36-mile long railroad, an engineering feat, was constructed in less than four months, which was four times faster than usual for a comparable job. Eight thousand men were involved in its construction. Unfortunately, however, the railroad was completed on November 30, 1918, nineteen days after the war was over. Eventually, the line was surplused and served as a branch line for hauling timber from the "Soleduc." It did not actually contribute to the military purposes for which it was built until the 1940s when it hauled timber for military use during World War II. The line was abandoned and rails removed in 1954 (NPS 2008:202).

## Visitor Experience

### Visitor Access and Transportation

Much of the access through the park is via U.S. Highway 101, known also as State Route 101, which originates in Olympia, runs north along the east side of the peninsula, turns west and passes through the cities of Sequim and Port Angeles. The highway continues west south of Lake Crescent, through Forks and turns towards the coast at the Hoh River. It travels south for approximately 11 miles through the park in the Kalaloch area (10 miles along the coast), and then turns inland to Aberdeen. From there, State Routes 12 and 8 run eastwards to connect to Olympia and Aberdeen. U.S. Highway 101 provides connections into the park from state roadways and a number of city, county, tribal, and U.S. Forest Service roads.

Approximately one mile of Highway 101 at the east end of Lake Crescent is on a state-owned right-of-way, managed by the Washington Department of Transportation (WSDOT). The approximately 12 miles of roadway in the park is also maintained through a cooperative agreement between the park and WSDOT. Law enforcement rangers patrol the highway segments within the park at Lake Crescent (NPS 2008: 228).



West of Port Angeles, the Lake Crescent area is one of only two park areas directly served by Highway 101. Highway 101 provides access to the facilities at Barnes Point, including the Storm King Information Station, Lake Crescent Lodge, NatureBridge at Olympic, and the Moments in Time, Marymere Falls, and Storm King trails. It also provides access to a number of overlooks, the La Poel picnic area, and the Fairholme Store. Monthly public use data, from 2009, indicates that Lake Crescent is the most visited area of the park (1,895,748) (NPS OLYM 2011:8). Overall, approximately one-third of park visitors surveyed report going to Lake Crescent.

At the west end of Lake Crescent, U.S. Highway 101 provides access to Camp David Junior Road and the north shore of Lake Crescent. Facilities accessed from this road include Fairholme Campground, North Shore day use area, Pyramid Peak Trail, and the western trailhead for the Spruce Railroad Trail. Camp David Junior Road is five miles long, paved the first two miles, and gravel for the remaining three miles.

East Beach Road is a paved, secondary road at the east end of Lake Crescent that provides access from U.S. Highway 101 to the East Beach picnic area and Log Cabin Resort. East Beach Road turns into Piedmont Road after the resort, then extends north for four miles to the town of Joyce on State Route 112. Near the start of the Piedmont Road, the Lyre River Road extends to the west one mile, providing access to the east side of the Spruce Railroad Trail. The Lyre River Road is paved to the Lyre River Bridge, but is comprised of gravel beyond that point.

**Public Transportation:** Clallam Transit provides bus service to Forks, La Push, and Port Angeles and Sequim, and travels through Olympic National Park in the Lake Crescent area, with scheduled stops at Fairholme, Barnes Point and East Beach Road.

**Accessibility:** Numerous facilities in the Lake Crescent area are accessible. Among these are the Lake Crescent Lodge main building, including the common area, store, restaurant, and lounge and the Log Cabin Resort restaurant. Two guest rooms in the Marymere building at Lake Crescent Lodge were remodeled to provide for accessibility in 2012. There are also two tent and two RV sites as well as the group tent site in the Log Cabin Resort Campground that are accessible.

Accessible trails in the vicinity include the first 0.5 mile of the Marymere Falls Trail, as far as the Barnes Creek overlook. This trail has a gravel and dirt surface and is accessible; however, the route to the falls is not accessible. Both ends of the Spruce Railroad Trail are accessible (meet ADA/ABA guidelines), and there is an accessible vault toilet at the east end. The Moments in Time nature trail (a loop) is nearly one mile long and has a compacted crushed rock surface. It is accessible, and can be accessed from NatureBridge, from a parking lot north of Lake Crescent Lodge, or via a short trail from the parking lot at the Storm King Information Station. There are accessible toilets at the Storm King Information Station, in Loops A and C of the Fairholme campground, at the East Beach picnic area (vault toilet), and in the Log Cabin Resort campground (NPS 2008: 233-234).

## Visitor Use Opportunities

**Scenic Driving:** As noted in the GMP, the dramatic setting of U.S. Highway 101 along Lake Crescent offers ever-changing views of the lake, nestled among steep forested mountains. Variable weather conditions can add to the dramatic setting. The road is shared with commuter and highway traffic, trucks, and bicyclists. Recreational drivers, who may desire to focus on the scenery or wildlife, may feel less comfortable with the commuter and commercial drivers who use the same road corridor. Traffic noise can be heard at many visitor facilities such as the Lake Crescent Lodge, Storm King Information Station, La Poel picnic area, and in the Fairholme area (NPS 2008: 220). It is also evident from across the lake.

**Hiking:** There are numerous hiking trails in the vicinity of Lake Crescent; however most are accessed from Barnes Point (near the seasonally open Storm King Ranger Station). Some trails explore the surrounding mountains, while others traverse lowland forests and creeks. The short Marymere Falls hike is the most popular. Other trails include the Mt. Storm King Trail, Barnes Creek Trail, Aurora Creek and

Aurora Ridge trails and Pyramid Peak Trail. The self-guided Moments in Time trail (0.8 miles) is also popular. Fairholme Campground offers access to the Fairholme Campground Loop Trail. The Spruce Railroad Trail offers year-round hiking, mountain bicycling and horseback riding. The trailhead for this 3.5 mile unpaved multiuse trail is located off East Beach Road near the outlet of Lake Crescent into the Lyre River. A recent Environmental Assessment calls for an additional two miles to be open for multiuse.

**Fishing:** The lake is open to catch-and-release fishing from June 1 to October 31. Angler interviews conducted in 2010 and 2011 indicate that the lake is a popular fishing destination for people from across Washington State and around the United States. Anglers from 16 Washington counties, 12 States, and Canada were interviewed over the two years of the study (Kerr et al. 2013). Historically, Lake Crescent was a popular fishing destination, with many of the resorts specifically catering to anglers. The Washington State record rainbow trout was taken from Lake Crescent

**Interpretation:** Although seasonal programming varies, park interpretive staff often provides campfire programs at Log Cabin Resort and Lake Crescent Lodge and guided walks to Marymere Falls.

**Amenities:** The Fairholme Store offers sandwiches, snack food, a gift shop, non-motorized boat rentals, marine fuel, and camping and fishing supplies. There is also a store at Log Cabin Resort offering similar amenities as well as non-motorized boat and bike rentals.

**Picnicking:** Picnic tables are available at Fairholme, Bovee's Meadow, La Poel, and the North Shore picnic areas.

**Camping:** There is camping near Lake Crescent at Log Cabin Resort (concessioner-run), Fairholme Campground (NPS), and Klahowya Campground (USFS). Log Cabin Resort offers 38 total sites, including 31 full hook-up RV sites, one group tent campsite with five tent pads, four tent sites with electricity and water, and two bike-in tent sites. Two of the RV sites are accessible. One tent pad in the group site is accessible. One tent site is accessible. Fairholme Campground has 88 campsites, including RV and accessible sites (two). Klahowya campground, approximately 20 miles north of Forks off U.S. Highway 101 on the south shore of the Sol Duc River, has 55 campsites, including RV and accessible sites.

**Lodging:** Although there were formerly approximately 30 resorts along the shore of Lake Crescent, there are now only two (Log Cabin Resort and Lake Crescent Lodge). The park concessioner offers lodging at both. Lake Crescent Lodge is located at Barnes Point, off U.S. Highway 101 and offers 55 rooms. Log Cabin Resort is located on East Beach Road, north of U.S. Highway 101. Both are generally open from late spring until early fall. For the last two years, however Lake Crescent Lodge has been open until New Year's Day. The Roosevelt cabins at Lake Crescent Lodge are also available on weekends (only) during the winter.

Log Cabin Resort currently offers lodging in four lodge guest rooms (motel units) and 12 A-frame chalets, and seven rustic and four camper cabins. The lakeside chalets are located on the waterfront with mountain views. The main room has a double bed and a double-sized futon. There is a private bathroom with a shower and an upstairs loft with a double bed. The chalets accommodate a maximum of six people.

The lodge rooms (motel units) are within the lodge, which is also located on the waterfront with mountain views. Each accommodates a maximum of four people. Camper Cabins have two double-beds and accommodate a maximum of four people. There is a communal comfort station/shower facility nearby.

According to the concessioner website, the Rustic Cabins were built in the 1920s (<http://www.olympicnationalparks.com/stay/lodging/log-cabin-resort.aspx>). Each of the cabins has a lake and mountain view, as well as an outdoor picnic table. Rustic cabins accommodate a maximum of six people

Lake-based Recreation: Many people enjoy water-based recreation, including motorized craft, during the summer and fall. Boat launches are located at Log Cabin Resort, Barnes Point, and Fairholme. Kayaks and canoes are available for rental from Lake Crescent Lodge and at the Fairholme Store. Kayaks, canoes and paddle boats are available for rental at Log Cabin Resort. Visitors enjoy boating, kayaking, sailing, or simply relaxing on the beaches and shores of Lake Crescent.

Bicycling: As noted above the Spruce Railroad Trail is available for bicycling. Log Cabin Resort rented bicycles for the first time in summer 2014. There are also several miles of nearby USFS trails that are available for mountain biking and other recreational opportunities.

Environmental Education: NatureBridge at Olympic (the former Olympic Park Institute) located at the historic Rosemary Inn area is a national private non-profit environmental education institute that provides a wide variety of on- and off-site hands-on environmental science programs for children and teens. Olympic National Park is one of seven national park locations in the U.S. Over 700 schools and 30,000 students and teachers participate in the programs each year (<https://www.naturebridge.org/about-us> accessed 8/4/2015). The Olympic facility also offers a location for conferences, weddings, and family/group learning experiences. They offer flexible meeting space and dining services for groups from 12-150.

Camp David Jr. is a Clallam County residential outdoor camp that offers cabins, a swimming beach, and a large dining hall for groups. Depending on county budget restrictions, it is open 6-10 months per year.

Nearby Recreational Opportunities: The USFS also offers several nearby trails and day use areas, including:

- The Pioneer Path Interpretive Trail: located within the Klahowya campground is an easy 0.3-mile handicap accessible interpretive loop trail that borders the Sol Duc River.
- The Kloshe Nanitch Trail accesses Kloshe Nanitch Lookout viewpoint and links the west side of the Sol Duc Valley via Snider Ridge to Mt. Muller Loop Trail. Opportunities include day hikes, mountain bike riding, observing diverse wildflowers and wildlife, and viewing dramatic scenery such as Lake Crescent, Sol Duc Valley, and Mt. Olympus.
- The Mt. Muller trail is a multiuse 12.8 loop just north of Highway 101 and 24 miles east of Forks. The loop shares its southeast corner with the ODT, which can be used to access Lake Crescent. It offers spectacular views of Mt. Olympus, Lake Crescent, the Straits of Juan de Fuca, and the Sol Duc Valley below. The Littleton Horse Camp is near the Mt. Muller Trailhead.

## Chapter IV: Environmental Consequences

This chapter describes the impacts, including cumulative impacts, of each alternative on park resources. It is organized by resource impact topics in the same sequence as they were discussed in Chapter III, with the impacts of each alternative combined under resource headings. Methods used for the analysis are presented below.

### Introduction to Impact Analysis

NEPA requires that government agencies disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the proposed action be implemented. In this document, “effects” and “impacts” are used interchangeably. The analysis of the environmental impacts of project alternatives on affected park resources is the basis for comparing the effects of the alternatives.

Regulations implementing NEPA put forth by the Council on Environmental Quality (CEQ) require consideration of context, intensity and duration of impacts, direct and indirect impacts, cumulative impacts, and measures to mitigate impacts. Impacts related to endangered species follow Section 7 of the ESA. Impact analysis for historic properties is based on NHPA 36 CFR Part 800 criteria of effect.

The context for understanding the analysis within this chapter is provided in the Affected Environment chapter and in the “Impact Topics” section in Chapter 1. To compare the differences in projected impacts among the alternatives, an *Impact Comparison Chart* is included.

### Methodology

The environmental consequences for each impact topic were defined based on the following information regarding context, type of impact, duration of impact, area of impact and the cumulative context. Unless otherwise stated in the resource section in *Environmental Consequences*, analysis is based on a qualitative assessment of impacts.

Impacts are described in terms of context, type and duration.

#### a. Context of Impact

The context is the setting within which impacts are analyzed – such as the project area or region, or for cultural resources – the area of potential effects (APE).

#### b. Type of Impact

The type of impact is a measure of whether the impact will improve or harm the resource and whether that harm occurs immediately or at some later point in time.

- **Beneficial:** Reduces or improves impact being discussed.
- **Adverse:** Increases or results in impact being discussed.
- **Direct:** Caused by and occurring at the same time and place as the action, including such impacts as animal and plant mortality, damage to cultural resources, etc.
- **Indirect:** Caused by the action, but occurring later in time at another place or to another resource, including changes in species composition, vegetation structure, range of wildlife, offsite erosion or changes in general economic conditions tied to park activities.

#### c. Duration of Impact

Duration is a measure of the time period over which the effects of an impact persist. The duration of impacts evaluated in this EA may be one of the following:

- **Short-term:** Often quickly reversible and associated with a specific event, and lasting one to five years.
- **Long-term:** Reversible over a much longer period, or may occur continuously based on normal activity, or for more than five years.

#### d. Area of Impact

The area of impacts may be detectable in nearby or surrounding areas as defined below:

- **Localized:** Detectable only in the vicinity of the activity.
- **Widespread:** Detectable on a landscape or regional scale.

#### e. Impact Mitigation

Impacts may be reduced in the following ways. Projects can:

- **Avoid** conducting management activities in an area of the affected resource
- **Minimize** the type, duration or intensity of the impact to an affected resource

Impacts may also be reduced by additional actions such as by:

- **Repairing** localized damage to the affected resource immediately after an adverse impact.
- **Rehabilitating** an affected resource with a combination of additional management activities.
- **Compensating** a major long-term adverse direct impact through additional strategies designed to improve an affected resource to the degree practicable.

#### f. Impact Analysis

Impacts on various resource topics are compared among alternatives by describing qualitative or quantitative differences. Special Status Species and Cultural Resources impact determinations are formally determined under the Endangered Species Act (Section 7) and the National Historic Preservation Act (Section 106), respectively. In accordance with *Management Policies* (NPS 2006), the analysis in this Environmental Assessment fulfills the responsibilities of the NPS under Section 106 of the National Historic Preservation Act.

#### Special Status Species

Conclusions drawn for impacts to special status species adhere to the following definitions:

- **No Effect:** The project (or action) is located outside suitable habitat and there would be no disturbance or other direct or indirect impacts on the species. The action will not affect the listed species or its designated critical habitat (USFWS 1998).
- **May Affect, Not Likely to Adversely Affect:** The project (or action) occurs in suitable habitat or results in indirect impacts on the species, but the effect on the species is likely to be entirely beneficial, discountable, or insignificant. The action may pose effects on listed species or designated critical habitat but given circumstances or mitigation conditions, the effects may be discounted, insignificant, or completely beneficial. Insignificant effects would not result in take. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not 1) be able to meaningfully measure, detect, or evaluate insignificant effects or 2) expect discountable effects to occur (USFWS 1998).
- **May Affect, Likely to Adversely Affect:** The project (or action) would have an adverse effect on a listed species as a result of direct, indirect, interrelated, or interdependent actions. An adverse effect on a listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions and the effect is not: discountable, insignificant, or beneficial (USFWS 1998).

#### Cultural Resources

Conclusions drawn for impacts to cultural resources adhere to the following definitions:

- **No effect:** There are no historic properties in the Area of Potential Effect (APE); or, there are historic properties in the APE, but the undertaking will have no impact on them.
- **No adverse effect:** There will be an effect on the historic property by the undertaking, but the effect does not meet the criteria in 36 CFR Part 800.5(a)(1) and will not alter characteristics that make it eligible for listing on the National Register. The undertaking is modified or conditions are imposed to avoid or minimize adverse effects. This category of effects is encumbered with effects

that may be considered beneficial under NEPA, such as restoration, stabilization, rehabilitation, and preservation projects. Under the terms of the 2008 PA, data recovery can mitigate affect to archaeological properties that are eligible for listing on the NR under criterion D. However, some archaeological sites are eligible as traditional cultural places under criterion A, and such mitigation may not be sufficient or appropriate.

- **Adverse effect:** The undertaking will alter, directly or indirectly, the characteristics of the property making it eligible for listing on the National Register. An adverse effect may be resolved in accordance with the Stipulation VIII of the 2008 Programmatic Agreement, or by developing a memorandum or program agreement in consultation with the SHPO, ACHP, American Indian tribes, other consulting parties, and the public to avoid, minimize, or mitigate the adverse effects (36 CFR Part 800.6(a)).
- **Significant Impact:** An impact to a National Register historic property would be considered significant when an adverse effect cannot be resolved by agreement among SHPO, ACHP, American Indian tribes, other consulting and interested parties, and the public. The impact will diminish the integrity of location, design, setting, materials, workmanship, feeling or association characteristics that make the historic property eligible for inclusion in the National Register Historic Places. The resolution must be documented in a memorandum or programmatic agreement or the FONSI.

## Cumulative Impacts

Cumulative impacts are the effects on the environment that would result from the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions.

The Council on Environmental Quality (CEQ) describes a cumulative impact as follows (Regulation 40 CFR 1508.7):

*A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Cumulative actions are evaluated in conjunction with the impacts of an alternative (including existing conditions) to determine if they have any additive effects on a particular resource. Because most of the cumulative projects are in the early planning stages, the evaluation of cumulative impacts was based on a general description of the project.

## Projects Included in the Cumulative Effects Analysis for the Lake Crescent Log Cabin Resort Cabin Replacement Plan

The following projects were identified for the purpose of conducting the cumulative effects analysis.

### Past Projects

- Lake Crescent Alternatives Analysis

The Lake Crescent Alternatives Analysis (1997) was prepared by the Department of Transportation to assess the safe alternatives for nonmotorized travel along the length of Lake Crescent. The analysis area included approximately 11 miles of U.S. Highway 101 to the south of Lake Crescent, and up to 15 miles of trails and roads on the north side of the lake. The findings of this plan were considered in the formulation of alternatives in the General Management Plan.

- Lake Crescent Management Plan

See description of this plan in Chapter 1: Purpose and Need

- Olympic National Park General Management Plan (NPS 2008)

See description of this plan in Chapter 1: Purpose and Need



- Spruce Railroad Trail Environmental Assessment (NPS 2012)

See description of this plan in Chapter 1: Purpose and Need

#### Current Planning Projects

- U.S. Highway 101 at Lake Crescent Rehabilitation Environmental Assessment (targeted completion date Winter 2016)

This environmental assessment examines the environmental impacts associated with the proposal to rehabilitate 12.3 miles of U.S. Highway 101 along Lake Crescent within Olympic National Park.

#### Proposed Planning Projects

- Lake Crescent Shoreline Management Plan

The Lake Crescent Management Plan calls for development of a Lake Crescent shoreline protection/management plan to focus on water quality and shoreline issues, including issues associated with wastewater treatment and development.

- Resurfacing and Rehabilitation of Park Roadways

The Federal Highway Administration (FHWA) has a series of road resurfacing projects on schedule for completion at the park, including Camp David Junior Road, Sol Duc Road, Hurricane Ridge Road, MORA Road, Quinault North Shore Road, Ozette area, and the Hoh River Road. In addition several road rehabilitation projects (in addition to the above-mentioned Highway 101 project) are slated within the next five years. These include the Elwha Road, a small portion of the Staircase Road, and Heart of the Hills Road.

## **Environmental Impacts**

### **1. Impacts to Topography, Geology and Soils**

Because impacts that affect soils may also affect geology and topography, these impact topics are combined in the analysis. In addition, it is important to note that most actions that would affect soils would also affect vegetation (see separate vegetation section).

#### **Alternative A**

There would be no additional impacts on topography, geology or soils. No excavation is proposed.

Existing impacts on soils, such as a small amount of soil erosion and compaction, would continue from ongoing use of informal pathways between site features, from trampling of vegetation near the banks of Log Cabin/Piedmont Creek and within the forested area around the resort, and from use of the Lake Crescent shoreline. There would also likely continue to be a loss of soils along Log Cabin/Piedmont Creek, where bank erosion is occurring.

Because the project area has been a developed area since 1895, when the first Log Cabin Hotel was constructed, over time, various portions of the landscape have been affected. Much of the resort is comprised of lawn, gravel roads and parking areas, and buildings, as well as a campground. Nonetheless, there are portions of the 14 acre developed area within the 109-acre area that appear natural.

The area where the existing rustic cabins are has been highly disturbed and is at the top of a small grassy knoll, rising above Lake Crescent, where the existing access road (approximately 250 feet long and 10 feet wide or 0.06 acres) traverses an area between the lawn and the cabins. Behind the cabins is an earthen cut-bank and orchard and the hillside rises beyond these up toward East Beach Road. In addition to the 38-site campground, the resort currently includes approximately 0.6 miles of roadway and 19 buildings.

#### **Alternative B**

Under Alternative B, soils would be disturbed to implement the following project components:

- Removal of nine existing deteriorated rustic cabins (varying between 200 and 400 square feet each), and manager's residence (600 square feet), including dry wells for each cabin (six-feet in diameter by six feet deep or 168 cubic feet of excavation);
- Construction of nine new public cabins (approximately 400 square feet each) and a new manager's residence (approximately 400 square feet);
- Construction of associated cabin features, including parking (1,800 square feet) and porches (400 square feet);
- Construction of a new cabin access road (200 feet by 18 feet, or 3,600 square feet);
- Construction of approximately 1,200 linear feet of accessible pathways linking site features;
- Construction of an employee parking area (four vehicles, 800 square feet); and
- Stabilization of Log Cabin/Piedmont Creek bank in two locations (50 linear feet).

Restaurant Accessible Restrooms: There would be no impacts on soils from modifications to Log Cabin Lodge to reconstruct indoor accessible restrooms for the restaurant.

Gift Shop Accessible Restrooms: There would be modifications to Log Cabin Lodge to construct accessible restrooms accessed through the gift shop. The resort office and existing Motel Unit #1 would become men's and women's restrooms. This would require extending the north wall of the lodge approximately five feet (100 square feet) to provide enough room to meet accessibility guidelines. Extending the wall would affect soils in an area of approximately 100 square feet, resulting in permanently compacting and covering this previously disturbed area in front of the lodge. The area is now covered by landscape plantings and a condenser. Actions affecting soils would include the excavation needed to construct a stable base (foundation) for the extension. The waste water line would also connect to the line in the road directly north of the addition.

Replacement Cabins: The proposed construction for eight of the cabins would be atop the grassy knoll in an area that does not contain significant topographic or geologic features. Regardless, existing topography and subsurface geology would be disturbed by construction of the cabins and other site modifications. The ninth cabin would be constructed in place of the existing manager's residence and would compensate for the loss of Motel Unit #1 as concessioner lodging rental space. The manager's residence would be constructed across the road in the former location of the manager's residence. That building was removed in 2012. Construction of these buildings would have varying, but similar effects on soils. Because they would be pre-fabricated (and trucked in), rather than stick-built, structures, it is likely that there would be less of the surrounding area disturbed for their construction, resulting in a comparatively smaller size project area.

Throughout Log Cabin Resort, the proposed project areas show clear evidence of recent and continuing human disturbance, including past construction of roads, utilities and buildings. Because there is an earthen cut-bank located behind the area proposed for the new access road behind eight of the cabins, excavating into the cut-bank laying back (reducing the slope and scale of) this cut-bank would be required to provide a level surface on which to construct (relocate) the access road and parking for the new cabins. The slope would be laid back at a 3:1 angle (33 percent slope).

Soils would also be disturbed and compacted in the proposed footprint of each of the cabins, which would be approximately 600 square feet each (5,400 square feet total). Approximately 100 cubic feet would be excavated in the footprint of each cabin to construct foundations for the buildings and another approximately 20 cubic feet would be excavated to construct utility connections. Soil impacts would also include additional site disturbance of approximately 2,400 square feet for construction of porches and parking.

Demolishing cabin 5C, which is near a small wetland, could benefit soils by reversing loss of soil permeability and compaction in seasonally saturated soils near the cabin. There would also be opportunities to restore native plants in this area (the current proposal calls for relocating the new cabin

further away from the wetland). If restoration occurred, long-term indirect beneficial effects on soils would result from improving soil fertility by increasing plant growth and decay. There could also be slight beneficial effects from constructing a smaller cabin in place of cabin 1C, the current manager's residence. Landscaping areas nearby as part of the proposed employee parking area could also have long-term beneficial effects (see below).

Access Road: The new access road (which would be behind, rather than in front of the replacement cabins) would be approximately 200 feet long and 18 feet wide, 50-feet shorter and 8-feet wider than the existing road. To construct it, the area would be excavated and graded, with road fill (compacted crushed rock) placed in the roadway. This would be regraded for drainage and compacted. Approximately 4,000 cubic feet would be excavated to relocate the access road from in front of the cabins to behind the cabins. The new cabins would occupy a portion of the former access road. Other portions would become part of the landscape in front of the cabins.

Accessible Pathways: Constructing approximately 1,200 linear feet of accessible pathways (five feet wide) would require grading and fill placement over approximately 6,000 square feet (0.14 acre) to attain the desired level surface. These pathways would be constructed to connect to the lodge, cabins, amphitheater, campground restroom/shower facility, the chalets, boat docks, and day use parking. For the most part, their construction would affect existing disturbed areas, which are currently comprised of crushed rock, concrete, native soil and vegetation, and nonnative grass. Because these areas are already disturbed and because of the designed circuitous nature of the pathways that would be needed to meet accessible grades, there would be minimal effects on soils and topography and no effect on geology. Where the pathways passed close to campsites or other key features, screens would be constructed to minimize the intrusion of pathway use on adjacent areas. These screens (tall fences) would require additional soil excavation (post holes).

Employee and Camper Cabin Parking: The employee parking area would disturb soils in an area of approximately 800 square feet, in an area which was previously covered by a building and which is currently comprised of sparsely vegetated forest understory and bare ground. Because of compaction resulting from this previous disturbance, overall effects would be minimal. Similarly camper cabin parking would comprise an additional 800 square feet. For both areas, site grading would be used to create swales around the parking area to reduce runoff speed, creating slight changes in topography.

Utilities: Approximately 200 cubic feet of excavation and 200 square feet of soil disturbance would be needed to make electrical, water, wastewater and other utility line connections for the cabins and manager's residence. This excavation and disturbance would cause long-term changes in the soil profile and short-term changes in soil disturbance, with revegetation minimizing the visibility of utility lines throughout the site.

Stabilization of Log Cabin/Piedmont Creek Bank: Stabilization of the creek bank would consist of placement of approximately 10 logs (with attached rootwads) on the edges of the creek in two locations. The logs would be tied into the bank and would affect approximately 50 linear feet. Post holes dug to hold a split rail fence would also compact and disturb soils. The logs would begin to trap debris and eventually would likely catch the falling bank edge, while the fence would prevent interim public access to the overhanging bank, reducing bank erosion. As a result, eroding soils would be stabilized and natural functions of the creek would be maintained, resulting in long-term beneficial effects.

### Summary

Overall, construction impacts would result in excavating, removing and replacing native soils with fill material, changing the soil profile in small ways in areas of construction. Existing native soils would also be compacted and covered with crushed rock and/or asphalt. Compacting soils would result in no or slower infiltration of water, less nutrient exchange (from removing plant cover) and faster runoff when it rains. (See also sections on water resources and vegetation.) There would also be a slight chance of soil contamination from the use of heavy equipment; however effects would be minimized by the use of

vegetable-based hydraulic fluid and by having spill containment materials available on site during work. Combined, there would be approximately 0.31 acres of soil disturbed from the construction of nine cabins, a manager's residence, access road, employee parking area, utilities, and accessible pathways in Alternative B.

### **Alternative C**

Actions and impacts in Alternative C would be the same as in Alternative B for construction of eight of the cabins, access road, utilities, and accessible pathways. In Alternative C, more area would be affected because there would also be construction of a new, detached restroom building and a new 0.4-mile site loop trail with a 600-foot spur to East Beach Road.

Under Alternative C, soils would be disturbed for the following project components which would have the same impacts as described in Alternative B:

- Removal of eight existing deteriorated rustic cabins and existing manager's residence
- Construction of a new cabin access road
- Construction of approximately 1,200 linear feet of accessible pathways (same as Alternative B)
- Stabilization of Log Cabin/Piedmont Creek bank

Impacts from construction of the cabins would vary from Alternative B because there would be one less cabin constructed in Alternative C. This would result in 650 fewer square feet of soils disturbed for the cabin and associated parking and porch.

Added project components in Alternative C include:

- Construction of a new restroom building (550 square feet), including providing an accessible route to it (1,700 square feet) and replacing the 1,000-gallon propane tank with a 500-gallon tank and relocating it behind the lodge (60 square feet)
- Construction of a slightly larger employee parking area (1,000 square feet)
- Construction of a site loop trail (2,100 feet by five feet)

Impacts on geology, topography and soils from these new or modified components are described below.

**Detached Restroom Building:** The size of the day use restroom (550 square feet) is comparable to the size of the replacement rustic cabins (200-400 square feet). As a result, impacts from constructing the detached restroom on soils would be similar to the replacement of the ninth cabin in Alternative B. As with the cabins, it is likely that the restroom would be a prefabricated building and would therefore have fewer site impacts than constructing a stick-built structure. Construction of the building would also require replacing and relocating a 1000-gallon propane tank behind the Lodge to provide room for an accessible pathway. This would require the construction of a concrete pad for the new tank, disturbing another 30 square feet of soil, currently covered by nonnative lawn.

**Employee Parking Area:** Compared to Alternative B, an additional 200 square feet of soils could be graded, surfaced and compacted as part of the employee parking area. As in Alternative B, it would be constructed near Rustic Cabin 1C, the existing manager's residence (which would also be demolished in this alternative).

**Site Loop Trail:** Construction of a loop trail, approximately 0.4 miles long and five feet wide (10,000 square feet or 0.23 acres), with a spur to East Beach Road (to provide easier bicycle access to the Spruce Railroad Trail) would affect area soils. As in most trail construction, the top layer of soil and humus would be removed to mineral soil and fill would be brought in to bring the trail to grade and to make it easier to maintain during wet periods. Unlike much of the area comprising Log Cabin Resort, the area where much of the loop trail is planned is well-vegetated with both native and nonnative plants, therefore constructing a trail would result in the loss of vegetation and the ability of the soil to grow vegetation in a small area.

**Paving:** Paving of unpaved gravel roads and parking areas would result in an additional 20,000 square feet (0.46 acres) of impermeable surface area in the Resort. This would be in addition to repaving of 1.03 acres of existing areas. This would have slight adverse effects on soil moisture from reduced rain water infiltration.

Overall construction impacts would be similar, but more extensive than, to those described in Alternative B. Combined, there would be approximately 0.64 acres of soil disturbed from the construction of eight cabins, a manager's residence, access road, employee parking area, utilities, accessible pathways, a detached comfort station and site loop trail in Alternative C, plus paving of existing and gravel areas (1.49 acres).

### **Impact Avoidance, Minimization and Mitigation Measures**

Measures that would be included in the proposed project (as appropriate to the alternative actions) to minimize impacts to geology, topography and soils include:

- Narrowly defining project construction areas to minimize disturbance outside building footprints.
- Using vegetable oil in place of hydraulic fluid in heavy equipment.
- Using existing roads, trails and established pathways to access construction areas.
- Providing spill-response materials on site during construction.
- Constructing pre-fabricated buildings rather than stick-built structures.

### **Cumulative Impacts**

Although there have been considerable impacts to parts of this concessioner-designated area (14 of 109 acres), these comprise a small portion of the area protected within Olympic National Park, including other areas adjacent to Lake Crescent. Much of the Lake Crescent shoreline is comprised of protected forested areas. Within this area, however, is also another long segment occupied by a developed road corridor (U.S. Highway 101), where several minor developed areas both within (Barnes Point and Fairholme) and outside the park (private lands) also occur. In these areas, and elsewhere in the park, development of visitor facilities, such as visitor centers, campgrounds, picnic areas, roads, and trails, has affected geology, topography and soils. According to park GIS data, developed areas comprise a small percentage of Olympic National Park. In these areas, a variety of impacts on soil properties have occurred, including loss of vegetation and fertility, where surface treatments have been applied, loss of the soil profile from excavation for building foundations and road base, erosion of soils from placement of facilities, such as roadways in river floodplains, and occasional effects on soil contamination from former areas where underground storage tanks were placed, and/or where herbicides are used to control nonnative invasive species.

When the impacts from actions in Alternatives A-C are added to the impacts of the past, present and reasonably foreseeable future actions on geology, topography and soils, there would be a small number of incremental impacts added to those impacts that have affected or that are planned and would affect these resources. For example, excavation of areas in Log Cabin Resort would add incrementally to proposed excavation in the U.S. Highway 101 corridor that would be used to improve the lifespan of that highway. Currently no other buildings are proposed to be constructed by the park in the Lake Crescent area, however, rehabilitation of existing buildings would continue to occur as needed in the park. Incremental impacts on geology, topography and soils at Log Cabin Resort would be from replacement of buildings, rather than from construction of new buildings under Alternative B. Under Alternative C, additional cumulative impacts would occur from new construction of a site loop trail (0.23 acres). There would be no cumulative effects on these resources from actions in Alternative A.

### **Conclusion**

There would be slightly less soil disturbance (0.23 acres) in Alternative B, compared to Alternative C, primarily because there would be no site loop trail constructed. Compared to Alternative B, the outdoor restroom in Alternative C would be slightly larger than (550 square feet) the extra cabin constructed in

Alternative B (200-400 square feet) and would require a short additional section of accessible trail construction. Overall impacts to topography, geology and soils would comprise a small degree in both alternatives.

## 2. Impacts to Water Resources

### Alternative A

There would be no additional impacts to water resources under Alternative A. Existing impacts on water quantity, including from the provision of water for public use of existing facilities would continue. There would also continue to be an increased potential for sedimentation and/or contamination of water from the use of unpaved roads, unimproved trails, wastewater treatment, shoreline, swimming/wading and boating access to Lake Crescent, and shoreline access/wading in Log Cabin/Piedmont Creek. The small area of bank erosion along Log Cabin/Piedmont Creek would also continue to deposit sediment to the creek as erosion continues.

### Alternatives B and C

In addition to ongoing existing impacts from Alternative A, there would be a potential for a range of short-term impacts from runoff during construction. Although construction equipment would be inspected (see impact avoidance, minimization and mitigation measures), there is a small potential for contamination from leaks or spills. Long-term impacts from faster runoff would continue from replacement of existing impervious areas (buildings, roadways and walkways) and the addition of new impervious areas (accessible walkways in Alternative B and accessible walkways, paved roadways and parking areas and the trail in Alternative C).

There would be a possibility of sedimentation from heavy precipitation runoff if it occurred during excavation and other construction activities from exposed soil. Eventually, exposed soil would be covered by buildings, crushed rock, other surface treatments, and/or revegetation. Although there would be a potential for long-term runoff, it would be minimized by these surface treatments and by the use of swales on the edges of roadways and parking areas to slow down water and to trap sediment and other contaminants before they reached the lake. In Alternative C, where existing unpaved roadways and parking areas would be paved, there would be an increase in the speed of runoff, before it reached the swales, however, the potential for sedimentation would be reduced by the existing and new swales which would trap water and sediment.

In Alternative B, there would be no construction within the park-proposed 100-foot lake buffer zone, while in Alternative C construction of the detached restroom would take place within the proposed buffer zone. The buffer zone was proposed to align park actions with regulatory policies of Clallam County for Lake Crescent. Although undesignated, the buffer zone concept was intended to be a reminder of the sensitivity of the shoreline. Although construction would occur within the area in Alternative C, it has been heavily altered over time and the area proposed for the restroom currently consists of nonnative lawn.

Where construction activities have the potential to affect surface water resources, protection measures, such as silt fencing, would be used by the park and contractors to minimize effects on Lake Crescent and Log Cabin/Piedmont Creek. For example, there would be dry wells located below the downspouts of each cabin. The dry wells would reduce runoff and related erosion in the area adjacent to and south of the rustic cabins. In addition the dry wells would serve to remove pollutants from the newly paved roadway and pathways before the runoff reaches the lake.

The use of surface water protection measures would also be implemented where actions have the potential to affect the wetland behind Cabin 5C. In both action alternatives, this small wetland would be protected from disturbance during removal of the cabin and construction of a new cabin and roadway nearby, resulting in no effect on the wetland. As described in the soils section, demolishing this cabin



could benefit the area by reversing loss of soil permeability and compaction in seasonally saturated soils near the cabin. There would also be opportunities to restore native plants in this area (the current proposal calls for relocating the cabin further away from the wetland). If restoration occurred, there could be long-term indirect beneficial effects on area water resources.

There would likely be a slight increase in the amount of water used at the resort in both alternatives from the provision of a separate restroom facility either in the lodge (Alternative B) or outdoors (Alternative C). Elsewhere at the resort, although the locations of some of the cabins would change, there would be no overall increase in lodging accommodations in the area. The new public restrooms, however, would replace a combination of the existing portable toilet outside the lodge, while at the same time decreasing non-restaurant use of the existing lodge restrooms.

**Stabilization of Log Cabin/Piedmont Creek Bank:** There would be effects on two sections (30 and 60 linear feet or 0.10 acres) of Log Cabin/Piedmont Creek, a riparian area (palustrine wetland), where bank stabilization measures would be used to prevent an overhanging bank from continuing to collapse into the creek. Although in-water work would not occur and proposed actions would be timed to occur during the dry season, stabilization of the creek bank would consist of placement of approximately 10 logs (with attached rootwads) on the edges of the creek in two locations. The logs would be driven into and anchored to the bank and would affect approximately 60 linear feet of the creek bed. The logs would begin to trap debris and eventually would likely catch the falling bank edge, while a proposed split rail fence would prevent interim public access to the overhanging bank, reducing bank erosion. As a result, eroding soils would be stabilized and natural functions of the creek would be maintained, resulting in long-term beneficial effects. The creek would be further protected from visitor use and additional adverse impacts from erosion by construction of a short split-rail fence in the lawn back from the top of the bank. Although there would be short-term adverse effects from placement of the logs, such as the potential release of soil into the creek, overall effects would be long-term and beneficial and mitigation measures would be used to reduce adverse effects. Beneficial effects from recent (2012) stabilization of another 50 linear foot section downstream are already evident (Figure 7).

### **Additional Impacts from Alternative C**

**Paving:** Paving of unpaved gravel roads and parking areas would result in an additional 20,000 square feet (0.43 acres) of impermeable surface area, which would adversely affect soil moisture from reduced rain water infiltration into the aquifer and could increase runoff into the lake, however mitigation measures, including an existing swale and new rain garden would be included in the proposed project to prevent this. The swale is adjacent to the downhill edge of the day use parking area and the rain garden proposed as a mitigation measure would effectively limit the extent of this impact. The grassy swale would capture the runoff and it would slowly flow east to the rain garden. The grassy swale and the rain garden would serve to remove pollutants in the runoff from the parking lot before it reaches the lake. The ground surface in the area of the rain garden would need to be excavated to an average depth of two feet (150 cubic yards). Topsoil would then be spread over the area to a depth of eight inches. The area would then be planted with sedges and other wetland plants native to the area. Runoff associated with additional parking in the vicinity of the chalets would be minimized by the chalets and the existing lawn area.

### **Impact Avoidance, Minimization and Mitigation Measures**

Measures that would be included in the proposed project (as appropriate to the alternative actions) to minimize impacts to water resources include:

- Dry wells would be provided to capture runoff from the downspouts on the proposed rustic cabins and the runoff from the paved areas adjacent to the rustic cabins.
- A rain garden would be located just beyond the east end to the day use parking lot to drain water south to a grassy swale.
- A small palustrine emergent wetland, dominated by slough sedge (*Carex obnupta*) behind existing rustic cabin 5C would be avoided and protected during construction activity.

- Overall site erosion would be reduced by providing formal (constructed), direct paths to facilities, minimizing the formation of social trails.
- Establish staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, hazardous material storage, etc.) at least 150 feet away from streams in a location and manner that would preclude erosion into or contamination of streams or wetlands.
- Delineating staging areas to prevent incremental expansion.
- Covering stockpiled fine-grained soil and rock during heavy precipitation.
- Using temporary sediment control devices such as silt or filter fabric fences and sediment traps.
- Identifying the area to be cleared in advance and clearing only those areas necessary for construction.
- Minimizing the amount of exposed soil and duration of soil exposure to rainfall.
- Reseeding or revegetating disturbed areas as soon as practical.
- Retaining silt fencing in sensitive disturbed areas until stabilization (by reseeding or revegetation).
- Installing protective construction fencing around, adjacent to, or near wetland and/or riparian areas that are to be protected or other erosion control measures to protect water resources in the project area.
- Using vegetable based hydraulic fluid in heavy equipment.
- Limiting the duration of in-stream work as much as possible.
- Timing in-stream work to occur at lower flow periods.
- Requiring the contractor to have a Storm Water Pollution Prevention Plan (SWPPP) to control surface runoff, reduce erosion, and prevent sedimentation from entering water bodies during construction.
- Developing and implementing a comprehensive spill prevention/response plan that complies with federal and state regulations and addresses all aspects of spill prevention, notification, emergency spill response strategies for spills occurring on land and water, reporting requirements, monitoring requirements, personnel responsibilities, response equipment type and location, and drills and training requirements.
- Conducting daily inspections of equipment used in the proposed project for fuel, oil, hydraulic fluid and other potential leaks.

### Cumulative Impacts

A range of beneficial and adverse effects on water resources have occurred in the park to provide facilities and water for public and administrative use. In the Lake Crescent area, these include facilities located at key points on the lake, including at Barnes Point, La Poel, Fairholme, North Shore and at Log Cabin Resort. The most extensive facilities are at Barnes Point and include areas for administrative, maintenance and visitor use. While some provide public water sources, others offer more limited infrastructure, but contribute impacts in other ways, such as by runoff on unpaved roads. A variety of other park and visitor management actions, such as nonnative invasive plant management, bank armoring and vehicle use also contribute to effects on water resources. Some rivers in the park and surrounding areas have considerable bank armoring. Much of this armoring uses large woody debris. There is also a small degree of bank armoring on Log Cabin/Piedmont Creek. That armoring was constructed during recent (2012) rehabilitation of the campground to reduce erosion that was then occurring in the creek bed. Elsewhere in the park, particularly along the shores of Lake Crescent near U.S. Highway 101, considerable riprap placement has occurred to minimize the erosive effects of wave action on the bench above the lake that supports the highway. Bank armoring, including the use of large woody debris is also present on other park rivers (Sol Duc, Elwha, Hoh, and Quinault).

Future proposed rehabilitation of other roadways in the park may also result in modifications to water resources, including the potential for additional bank armoring. Rehabilitation of Highway 101 and others is also likely to affect intermittent and perennial creeks from the replacement of culverts, and there would continue to be runoff contaminated with vehicle residue on park roadways.

When the actions in the alternatives are added to past, present and reasonably foreseeable future actions, there would continue to be a range of beneficial and adverse effects on park water resources. Adverse effects on water resources would also continue to be avoided, minimized or mitigated through the use of best management practices, and other measures to reduce impacts, including by restoring an equal area when wetlands are affected. In Alternative A, there would be no additional cumulative effects on water resources. Cumulative effects under Alternative B would primarily be contributed by a very small increased building footprint and from continued loss of material on unpaved roads to erosion. Comparatively, in Alternative C, there would be a similar slight increase in the building footprint, but roadways would be paved, rather than comprised of crushed rock. As a result of mitigation measures, there would be a potential for less sediment delivery, however overall runoff speed would increase.

### **Conclusion**

There would be minimal additional effects on water quantity from the provision of indoor (within the lodge) or outdoor restrooms. Effects on water quality would generally be short-term in both alternatives, however, paving some additional roadway sections and parking areas in Alternative C would likely result in faster runoff, which would be reduced by earthen swales near Lake Crescent and where it would affect other water resources.

## **3. Impacts to Vegetation**

### **Alternative A**

There would be no new impacts to vegetation, however existing impacts would continue. Among these impacts would be trampled vegetation as guests and day use visitors wander through the area on various informal pathways including social trails. In areas where buildings have been removed or other disturbance has occurred, there would continue to be a potential for nonnative plants to invade. There would also likely continue to be a small loss of vegetation along Log Cabin/Piedmont Creek, where bank erosion is occurring.

### **Alternative B**

Proposed actions would have a variety of effects on vegetation, exclusively in areas that have previously been altered. These effects would primarily include the removal of vegetation. Surface treatments, such as constructing accessible pathways and attendant construction impacts would make it difficult for vegetation to establish or reestablish because soil compaction would result in other impacts, such as reduced soil permeability to water and nutrients. Disturbance would also increase the potential for nonnative plants to invade. Shorter-term impacts, such as compaction and trampling during construction activities would also occur. Some of the compaction would be alleviated by scarifying areas intended for restoration, prior to seeding or planting.

Replacement Cabins and Parking Areas: Although construction of the cabins would occur in a previously disturbed area, primarily comprised of an existing roadway, parking areas and nonnative lawn, numerous trees of varying sizes would be removed and a small number of native shrubs would also be affected by the removal and replacement of the cabins and rustic cabin parking areas. The removal and construction of replacement cabins would take place within an overall area of approximately 4,760 square feet, including the cabins, associated parking and porches (0.11 acres). Trees that would be removed include Douglas-fir in the following approximate diameter-at-breast-height (dbh) sizes: 12-inch (2), 10-inch (2), 8-inch, 14-inch, and 18-inch. The latter larger trees could also be retained, depending on effects from removal of the cabins they are closest to (5C and 6C). Other trees that would be retained and specifically avoided by construction include two that are approximately 36-inch and one 48-inch Douglas-fir. One nonnative lilac (*Syringa* sp.) near cabin 4C, numerous snowberry, sword ferns, wood fern, bracken fern and trailing blackberry adjacent to and behind the cabins would also be removed and/or transplanted out of the construction area. As mentioned elsewhere, a small wetland behind Cabin 5C and a small orchard behind the cabins would not be affected by their construction. A small area of vegetation cover (mostly nonnative

grasses and forbs), however would be affected by the proposal to place benches in the orchard. Vegetation could be lost through repeated trampling to access the benches or from physical clearing of pathways to them.

Parking areas for several of the new rustic cabins would be located between the cabins, the same as the existing situation, albeit in a different configuration. Accessible parking and parking for the last two cabins would be clustered to avoid impacts to the more intact cut-bank behind the last two cabins and the wetland.

Access Road: Vegetation removed in preparation for relocation of the roadway would include loss of the native and nonnative plants, including a 30-inch Douglas-fir stump, 10-inch western red cedar, numerous small Douglas-fir, a variety of shrubs (such as wild rose, Oregon grape, and ocean spray) and native (wild ginger) and nonnative forbs and grasses over the 200 x 18 foot area (3,600 square feet or 0.08 acres). This includes excavating into the earthen cut-bank to create a stable 33% slope and the attendant loss of existing native and nonnative vegetation cover.

Manager's Residence/9<sup>th</sup> Cabin: Although there is some vegetation in the vicinity of the former manager's residence location and where the ninth cabin would be constructed, for the most part it is sparse and nonnative and includes grasses and forbs such as dandelion, and daisy fleabane. Approximately 800 square feet plus parking and porches would be converted to hardscape (buildings and parking).

Employee and Camper Cabin Parking: Another two areas comprised of approximately 800 square feet each would be converted to parking. Vegetation in these areas is similar to the groundcover elsewhere in the area and is comprised of species similar to those in the vicinity of the manager's residence.

Accessible Pathways: Similarly vegetation that would be affected by the construction of the accessible pathways (1,200 linear feet by 5-feet wide or 0.14 acre) is primarily comprised of nonnative lawn and forbs, including the same species located in the vicinity of the former manager's residence. Some of the area where pathways would be improved is also currently concrete sidewalk (in front of the chalets) or existing informal pathway (near the campfire amphitheater).

Log Cabin/Piedmont Creek Bank Stabilization: Bank stabilization would primarily affect sword fern (*Polystichum* spp.) growing on the bank in an area of approximately 90 square feet in two locations.

There would be minimal effects on landscaping vegetation (rhododendron, horizontal juniper, and dogwood (*Cornus* sp.) adjacent to the lodge from adding approximately 100 square feet to the lodge to provide for accessible indoor restrooms in the existing gift shop location. Similarly, construction of utility trenches of approximately 200 cubic feet (one-foot wide by 200 feet long by two-feet deep) would result in temporary loss of vegetation, which would likely be restored with replacement of the top layer of vegetation and soils upon backfilling the trenches. Where recommended by the park plant ecologist, areas comprised of nonnative plant cover would not be replaced and would instead be reseeded or planted with vegetation from disturbance elsewhere on site.

### **Alternative C**

In addition to vegetation removed in the cabin replacement area, vegetation impacts would occur in the construction areas needed for the trail and for the day use comfort station. Because an extra cabin would not be needed, impacts identified above associated with a cabin in place of Cabin 1C would not occur.

Comfort Station: Instead of the 9<sup>th</sup> cabin (200-400 square feet) that would be constructed in Alternative B, there would be a restroom of comparable size (550 square feet) constructed. Because it would replace existing nonnative lawn in front of the lodge, it would have minimal effects on vegetation. Constructing the restroom, however, would also require the replacement and relocation of the propane tank and construction a pathway to it, resulting in slightly more soil disturbance (30 square feet) for placement of a concrete pad and 1,500 square feet (300 feet long by five feet wide) for the pathway.

**Site Loop Trail:** A variety of native plants, such as western red cedar and Douglas-fir trees and salal, Oregon grape, serviceberry, Pacific ninebark, Indian plum, and snowberry shrubs, ferns (bracken fern, sword ferns), forbs (wild strawberry [*Fragaria* sp.], wild ginger [*Asarum caudatum*]), mosses, and sedges would be affected by construction of the site loop trail, approximately 2,100 feet long by 5 feet wide (10,000 square feet or 0.23 acres). There are also nonnative plants, such as Canada thistle (*Cirsium arvense*) and clover (*Trifolium* sp.) present on this well-vegetated hillside. The area of the trail would no longer have the ability to host plants, since it would be excavated to mineral soil and covered with a mixture of soil and crushed rock, allowing for use by a range of users, such as those with wheelchairs and strollers.

Proposed repaving and new paving of existing paved and crushed rock roadways and new accessible pathways and the trail would also affect vegetation, primarily from the need to recreate the surface, which would affect vegetation adjacent to the roadways and pathways, including the future ability of vegetation to grow in these areas that would likely contain a high percentage of gravel leftover from paving, making them more suitable for nonnative plants that grow in nutrient poor areas.

### **Impact Avoidance, Minimization and Mitigation Measures**

Measures that would be included in the proposed project (as appropriate to the alternative actions) to minimize impacts to vegetation include:

- Equipment used in the project would be cleaned of all dirt and weeds before entering the project area to prevent the spread of noxious weeds.
- Areas where buildings have been removed, added or other site disturbance created would be monitored for nonnative invasive plants. If found, these would be treated to minimize the potential that they would spread to other areas.
- Construction limits and areas to be cleared would be minimized.
- Rehabilitation of all disturbed areas would be conducted to ensure that similar or better than pre-work conditions would be attained. Among the techniques that could be used include: spreading of stockpiled materials, seeding, and/or planting with locally native seed mixes or plants. Planting shall be completed no later than fall planting season of the year following construction.
- Design a planting plan for revegetating and re-landscaping the resort area.
- Suitable native plant material would be salvaged and replanted.

**Cumulative Impacts:** Although Olympic National Park is comprised of a wide range of intact native habitats, including of low and high elevation meadows and forests, the Log Cabin Resort area has been highly disturbed over the years since its initial development in the 1860s. Over the recent history of Log Cabin Resort, human impacts at the site have been extensive. A recent history of resorts around Lake Crescent shows that the site has been the location of two lodges, a homestead and an auto-camp. These impacts included removal of most trees and a great deal of native understory vegetation to provide room for building construction and other uses at the site. Old photographs of the area show extensive trees that are no longer present. There has also been deliberate planting of nonnative species and inadvertent invasion of the site by nonnative plants during and following disturbance. Compared to existing widespread major adverse effects on vegetation, implementation of Alternatives A-C would contribute small-scale additional cumulative adverse impacts, combined with some beneficial impacts. Although replacement of the cabins and additional development of the site would affect vegetation at the site, most impacts to vegetation would be impacts in previously disturbed areas and to mostly nonnative plants. No additional development at Log Cabin Resort is planned; however, there could be proposals for additional resort components in the future. Because it is anticipated that these projects would be combined with periodic or systematic vegetation rehabilitation or restoration, overall adverse effects would be small and would generally contribute both long-term adverse and beneficial effects.

**Conclusion:** There would continue to be both small adverse and beneficial effects in Alternative A that would also occur in Alternatives B and C. Although there would also be incremental loss of native

vegetation in Alternatives B and C, mitigation measures would contribute beneficial effects from restoration of native species (such as by using a native reseeding mix) and adverse effects would primarily affect nonnative species and previously disturbed areas.

## 4. Impacts to Wildlife

### Alternative A

There would be no new impacts to wildlife from the implementation of Alternative A. Existing low-level impacts, such as periodic noise and disturbance from operation of mowers and weed-eaters during maintenance and nonnative invasive plant removal, as well as from routine human disturbance at the site associated with visitor use would continue. These long-standing effects could continue to contribute to localized adverse effects on the presence of wildlife within the area comprised by Log Cabin Resort. It is likely that most large and medium-sized mammals would continue to avoid the resort area during the peak visitor use season. Some animals, such as birds and deer would, however, continue to be present and other wildlife species could also be detected in the mornings, evenings and at night and/or by the presence of tracks or other wildlife sign. Overall, the project area is somewhat noisy, especially during the visitor use season. Year-round noise from Highway 101 across the lake can also be heard. Even the off-season is disturbed by the passage of large trucks and buses and occasional aircraft fly overhead. Nonetheless, deer, and numerous birds, including Canada geese, juncos, winter wrens, gray jays, and others, are routinely present at the site and there is evidence of sapsuckers in the orchard.

### Alternative B

The presence of humans, human-related activities, and structures have removed or displaced much of the native wildlife habitat, particularly understory species, in most of the project area, which has altered the number and variety of wildlife occurring in the area during the primary visitor use season. In addition to ongoing impacts from Alternative A, there would be short-term noise and disturbance within wildlife habitat during building replacement and other construction activities, including for the accessible pathways and lodge addition. The increase in noise during construction would disturb wildlife in the project area and vicinity. This construction-related noise would be temporary, and existing sound conditions would resume following construction activities. Because the proposed construction work would take place during the resort's off-season period, this off-season period would not provide the typical respite from human activity that normally occurs. As a result this noise and activity would occur during a period that typically is quieter for area wildlife and would therefore have comparatively more effects than work conducted during the peak visitor use season.

Initial site work for the replacement cabins is expected to take approximately four months, placement of the buildings one month, and finish work on them three months. During this time, there would be above ambient noise and activity associated with the proposed work. Since most of the physical construction of the pre-fabricated cabins would take place off-site, before the cabins are trucked in, most noise would be from heavy equipment doing site preparation (excavating the roadway, constructing parking, digging foundations and constructing pads for the cabins) and finish work (adding porches, etc.). As a result, the intermittent occurrence of large and medium-sized mammals would be reduced during the day by this noise and activity. Other wildlife, such as birds, small mammals and insects would continue to occur but would likely be disturbed by project work and may be less evident. In the evening, at night, and on weekends when work would generally cease, wildlife use would be expected to return to normal in the project areas.

Staging of machinery and construction materials would also result in some impacts to wildlife habitat, causing some vegetation to be removed, trampled, or run over. There would also be loss of, or other adverse effects on, some species, such as small mammals, amphibians and insects affected by soil disturbance and removal activities. Some wildlife habitat for these species would be changed or eliminated during construction. There would also be both temporary and permanent impacts to wildlife habitat from construction activities. Temporary impacts would occur from construction of utility lines



because the ground above these would soon be revegetated following disturbance, Long-term impacts from loss of habitat would occur from redeveloping the roadway and accessible pathways throughout the site and from removal of Douglas-fir trees ranging from two to ten inches in diameter and a variety of shrubs between the cabins (see Vegetation section). These permanent modifications at the site would result in minimal additional loss of habitat because of the existing high level of disturbance in these sites, which have long since lost most of their component native vegetation/wildlife habitat. Impacts on the area would continue until the areas were restored or construction finished. Habitat modification due to vegetation removal would preclude short- and long-term return to the former level of use by some species of wildlife. Perching birds, in particular, use trees and shrubs for roosting, nesting, and food or to forage for food. Therefore, habitat loss would have long-term localized effects from incremental loss of trees and associated habitat that may have been used for perching, nesting, or procurement of food for a variety of species.

Despite spill mitigation measures, potential impacts from inadvertent spills of fuel, oil, hydraulic fluid, antifreeze or other chemicals could also occur. If they occurred, they would be cleaned up as soon as possible and the sites restored to clean conditions. Eventual road surfacing with asphalt-concrete pavement would minimize sediment runoff from the road, but would also increase impervious areas, causing faster runoff. This surfacing would also increase the delivery of contaminants such as petroleum products originating from the asphalt, potentially resulting adverse effects on water quality that would affect wildlife. To a large degree, however, these effects would be minimized by the use of swales to slow and clean runoff before it entered sensitive wildlife habitat areas.

Alternative B could also result in a slight increase in visitation to the site from the improvement of day use facilities. This could result in additional long-term low level disturbance of wildlife. Although there may be an increase in noise levels during construction, these impacts would be temporary and would not be expected to result in other direct effects on wildlife habitat. In addition, although some alteration or loss of habitat would also occur, the proposed project is would occur in a highly disturbed area, where most loss of wildlife habitat occurred many years ago and where the area has not recovered. Disturbed areas would be revegetated and rehabilitated following construction, which would result in fewer long-term adverse effects on wildlife and wildlife habitat.

### **Additional Impacts from Alternative C**

Impacts in Alternative C would be the same as in Alternative B, except that instead of constructing an additional cabin, a new public day-use restroom facility would be constructed. Although it would be slightly larger, it would be constructed in an area where there is little or no native wildlife habitat, within the lawn area adjacent to the lodge. In comparison the cabin in Alternative B would be constructed in a still relatively densely forested area in the former footprint of one of the camper cabins. As a result, impacts in Alternative C, though slightly larger (100 square feet) in physical space would have fewer impacts on native wildlife habitat.

Other differences in wildlife habitat modifications in Alternative C would be related to the construction of the site loop trail, which would be constructed in a well-vegetated area on a hillside sloping down toward Lake Crescent, which is located above the day-use parking area. The construction of a 0.23 acre trail would affect a variety of native and nonnative vegetation, including small trees, shrubs, forbs and bryophytes (ferns and mosses), thereby altering wildlife habitat. Because the trail would, however, be a long linear feature (approximately 2,100 feet by five feet), most wildlife habitat in the area would remain.

There would be slightly more area used for the employee parking area (1,000 square feet vs. 800 square feet in Alternative B) and the need to construct a trail to the day-use restroom, a pad for the replacement 500-gallon propane tank, and additional site work related to the construction of the restroom. Together these project components would disturb additional areas of lawn at the resort. Much of this existing lawn is used for sunbathing in the summer but is also part of a park-proposed buffer zone around Lake Crescent. There would also be additional impacts from paving of existing gravel parking areas and roadways from the potential for faster runoff, reduced infiltration and slight additional loss of road edge

vegetation. Development in it would adversely affect the intent of the buffer zone and would result in of lawn that provides minimal wildlife habitat.

### **Impact Avoidance, Minimization and Mitigation Measures**

Measures that would be included in the proposed project (as appropriate to the alternative actions) to minimize impacts to wildlife include:

- Scheduling construction activities with seasonal consideration of wildlife lifecycles to minimize impacts during sensitive periods (e.g., bird nesting and breeding seasons). The timing of bank stabilization measures would be limited to avoid spawning and other sensitive periods for fish and aquatic wildlife.
- Minimizing the degree of habitat removal (vegetation clearing) by delineating construction limits.
- Limiting the effects of light and noise on wildlife habitat through controls on construction equipment and timing of construction activities, such as limiting construction to daylight hours.
- Maintaining escape routes for animals that might fall into excavated pits and trenches.
- Using spill-prevention measures to prevent inadvertent spills of fuel, oil, hydraulic fluid, antifreeze, and other toxic chemicals that could affect wildlife.
- Prohibiting construction personnel at work sites from providing a source of human food to wildlife, avoiding food conditioning of wildlife and increased human/wildlife conflicts. (Title 36, Code of Federal Regulations, Chapter 1, Section 2.10(d) prohibits anyone from leaving food unattended or stored improperly where it could attract or otherwise be available to wildlife. Title 36, CFR, Chapter 1, Section 2.14(a) prohibits the disposal of refuse in other than refuse receptacles. Title 36, CFR, Chapter 1, Section 2.2(a)(2) prohibits the feeding and molesting of wildlife.)
- Vegetation removal, especially trees and shrubs, would not occur during the nesting and denning season (April-September).

**Cumulative Impacts:** Similar to other protected areas in the northwest and elsewhere in the U.S., the combined effects of development in the recreation area and in the surrounding area over time coupled with the purposeful eradication of predators through the mid-1900s have contributed to low-level or extirpated wildlife populations of some key species in the recreation area. Olympic National Park contains most of its historic species, although in diminished numbers. Wildlife in the park are primarily affected by noise, human presence and habitat fragmentation or loss associated with logging near the park, the presence and construction of buildings and roads, nonnative landscaping and other development that is adjacent to or affects key wildlife habitat components. Past and reasonably foreseeable development projects planned for the park, such as additional construction of visitor and administrative facilities, would result in incremental additional adverse effects on wildlife. In addition, ongoing tree harvesting and development in surrounding areas would continue to affect park wildlife. The existence and continued maintenance of the resort and nearby developed area under Alternatives B and C would continue to contribute to long-term cumulative adverse effects on wildlife, increasing some species while decreasing the presence of others.

In the project area, which is surrounded by developed private lands, wildlife impacts would continue to be greater. Because, however, the park consists of a high percentage of designated wilderness where overall impacts on wildlife are minimal, Log Cabin Resort is only a small part of a much larger protected area. When past, present and future actions, such as implementation of the park's GMP, rehabilitation of U.S. Highway 101 along Lake Crescent and nearby harvesting activities are added to Alternative A, there would continue to be long-term adverse effects on wildlife from noise and disturbance from mortality associated with road corridors, and from habitat loss on the Olympic Peninsula. The contribution of impacts from existing conditions at Log Cabin Resort under Alternative A, however, would remain small, with most impacts occurring seasonally during the peak visitor use season from May – October. For most years this would be the same in Alternatives B and C. For a small percentage of this time (1-2 winters), there would be additional impacts from noise and disturbance on wildlife that would be present during a time which would normally be a respite from summer seasonal impacts.

**Conclusion:** Overall impacts to wildlife would be short- and long-term. While construction would increase noise and disturbance at the site during the day, there would continue to be a respite from these activities at night when wildlife are most active. As mentioned above, there would be short-term impacts during the off-season for 1-2 years, while at other times (over the long-term) the respite would continue to be available. Alternatives A and B would not result in any additional wildlife habitat loss. Alternative C would affect 0.1 acres of wildlife habitat. In both action alternatives, these effects would occur primarily in areas already highly disturbed by human activity (in-season). Because of the site loop trail, Alternative C would have more effects on areas vegetated by mostly native plants.

## 5. Impacts to Special Status Species

### Alternative A

There would be no new impacts on special status species from the implementation of Alternative A. Because there would be no new management actions affecting lake or stream water resources, there would be no effect on Beardslee rainbow or Crescenti cutthroat trout. There would also continue to be no effect on fishers because no habitat or animals would be affected by the alternative.

Existing impacts including potential effects on water lobelia near the lakeshore from recreational boaters accessing the lake or swimming near the boat docks or adjacent shoreline would continue. Based on studies by the park, however, boating has not had substantial effects on water lobelia elsewhere on Lake Crescent where it occurs in the same areas where water lobelia is present. Observed effects primarily are related to other human uses that disturb sediments, such as swimming (Chenoweth pers. comm. 2015). Based on past use, swimming near the docks has been limited; however, day use of the resort area has been encouraged in recent years and there is a set of steps leading to the water that is used by swimmers to enter the water.

There could also continue to be a potential for adverse effects on marbled murrelets from the attraction of, and potential predation by, corvids, such as ravens and crows, on marbled murrelet eggs and chicks. Increased presence of corvids, compared to other less well-used areas, is expected based on the dense summertime human use at Log Cabin Resort and elsewhere in the Lake Crescent area. No specific instances of such predation, however, are known. While conditions at the resort are unsuitable for nesting, murrelets are known to nest within one mile of the resort. These existing impacts associated with human presence may affect, but would be unlikely to adversely affect marbled murrelets. There would be no effect on northern spotted owls, which are not currently known from the area in the vicinity of the resort. In addition, no trees are proposed for removal in Alternative A. Log Cabin Resort is a relatively small disturbed area within a very large area of lands otherwise protected within Olympic National Park, where abundant habitat for both species is present.

### Alternatives B and C

Existing impacts on water lobelia, Beardslee rainbow and Crescenti cutthroat trout would be similar to Alternative A. Additional short-term impacts from sediment entering water bodies could also occur, but would be mitigated by project management actions to prevent this. Other special status species, particularly birds, could be affected by noise and disturbance from construction activities, including from placement of the prefabricated cabins and from later actions to construct an asphalt overlay for the roadways and parking areas. Effects from noise and disturbance would be the same as described in the wildlife section above and would primarily result in changes in behavior, including avoidance of impact areas, in the immediate vicinity of the noise and disturbance. Most noise and disturbance impacts would be temporary, lasting only as long as construction occurred (approximately eight months, with most occurring during the first five months). Because nesting habitat would not be affected, key habitat components, such as dense undisturbed old-growth forests, would remain in the area, with large habitat areas available near Log Cabin Resort in areas that would remain unaffected by the proposed project.

**Marbled Murrelets:** Although there would be loss of approximately 12 small and medium-sized conifers, no habitat-sized (nesting) trees would be removed in either Alternative B or C. The trees that are proposed for removal do not provide old-growth characteristics typical of marbled murrelet nesting habitat (e.g. no large or splayed moss-covered branches). Two large trees (approximately 36-inches and 48-inches dbh) that do provide habitat characteristics would be retained and protected during construction. Construction-related impacts to the trees and their drip-lines would be avoided.

Because marbled murrelets are known to nest within one mile of the resort, above ambient noise during the nesting season would also be avoided. Most construction and construction preparatory work would be completed in the winter, prior to the typical spring-opening of the resort in April, avoiding the marbled murrelet nesting season from April 1 through September 23. Actions in Alternatives B and C to construct the cabins and to improve other aspects of the resort may affect, but would be unlikely to adversely affect marbled murrelets.

**Northern Spotted Owls:** Because northern spotted owl territories are not known from within or near the project area, there would be no effect on this species. Habitat effects Crescenti would also be minimal; the same as for marbled murrelets. There would be no loss of nesting habitat trees and little loss of trees that may be used for perching or roosting. Although some understory shrub species would also be removed, potentially affecting prey habitat for northern spotted owls, there is little understory in most of the resort area and the loss of a small number of shrubs would not have measureable effects on northern spotted owl prey species, such as voles. The area has not been intact habitat for decades. Actions in Alternatives B and C may affect, but would be unlikely to adversely affect northern spotted owls.

#### **Additional Impacts from Alternative C**

In addition to short-term impacts on fish in Alternative B, there would also be a potential for long term adverse impacts, associated with the increase in impermeable surfaces. These impacts would largely be mitigated by appropriate detention ponds, swales, etc. mentioned earlier. Compared to Alternative B, there would be more impacts associated with the presence of these areas in Alternative C because of the paving of the now gravel public parking area near the lake.

#### **Impact Avoidance, Minimization and Mitigation Measures**

Measures that would be included in the proposed project (as appropriate to the alternative actions) to minimize impacts to special status species include:

- There would be no felling of large trees (16 inches dbh or greater) in suitable nesting habitat for marbled murrelets or northern spotted owls.
- Felling of trees in unsuitable habitat and smaller trees would not be permitted from April 1 through September 23 to protect nesting murrelets, eggs, and young in stands that are identified as suitable murrelet nesting habitat.
- All project activities in nesting habitat would only occur 2 hours after official sunrise, and would cease 2 hours prior to official sunset during the murrelet nesting season (April 1 to September 23). This restriction would avoid potential disruption to murrelets during their daily peak activity periods for feeding and incubation exchanges.
- All food items would be stored inside vehicles, trailers, or trash dumpsters except during actual use to prevent unnatural attractants to crows, jays, and other wildlife which have been identified as predators of murrelet eggs and young.
- Work in or near flowing water would be restricted to the dry season (late September through October).

**Cumulative Impacts:** There has been extensive loss of old-growth habitat used by northern spotted owls and marbled murrelets on the Olympic Peninsula from actions on federal, state, and private lands. Existing remaining protected areas, such as Olympic National Park, therefore are critical components of the habitat used by these species. Some areas within Olympic National Park have not been intact habitat for some time as a result of past development and human use. This is the case at Log Cabin Resort, which

was affected by development, including logging to construct past lodges as early as the mid-1860s. By the early 1900s, the area had lost much of its former tree cover on the lakeside and was a well-used summertime resort. Past, present, and reasonably foreseeable actions under Alternative A would continue to contribute to low-level adverse effects on special status species. Currently there is a small number of old-growth trees and widespread second growth trees present at the resort which contribute to remaining habitat. This habitat, however, is fragmented by loss of understory species, roads, buildings and structures. Routine human noise and disturbance at the resort occurs during the peak visitor use season and there is consistent low-level background noise from ongoing use of East Beach Road and Piedmont Road, as well as from use of internal roads in the resort area. Beyond the resort and the park, there would continue to be loss of suitable habitat on the Olympic Peninsula, from continued logging and development activities and from human uses, including for recreation, commuting and housing that have had and would continue to have effects on special status species, such as marbled murrelets.

**Conclusion:** There would be no additional effects on listed species, including fishers under Alternative A. Actions in Alternatives B and C may affect, but would be unlikely to adversely affect marbled murrelets and northern spotted owls. There would be no additional effects on water lobelia, Beardslee rainbow, Crescenti cutthroat trout or fisher populations.

## 6. Impacts to Archeological Resources

### Alternative A

There would be no effect on known archeological resources eligible for inclusion in the National Register of Historic Places under Alternative A.

### Alternatives B and C

There would be no effect on known archeological resources eligible for inclusion in the National Register of Historic Places under Alternatives B or C. There is a slight potential to affect currently unidentified historic graves in the vicinity of the project area. Because proposed cabins and site work, however, would be conducted in areas previously used for buildings, it is unlikely that this would occur. There have been reports of a small number of graves that were also purported to be removed to another location in the past. The areas of most concern are the replacement of the former manager's residence under Alternatives A and B and the construction of a replacement cabin in the site of the existing manager's residence.

### Impact Avoidance, Minimization and Mitigation Measures

Measures that would be included in the proposed project (as appropriate to the alternative actions) to minimize impacts to archeological resources include:

- Because of the potential for adverse effects to undetermined or unknown archeological resources to occur, archeological survey, monitoring (and/or testing as determined necessary) would be conducted associated with the following proposed actions (notify archeologist in advance of proposed work) in the vicinity of both the former and new manager's residence and/or any other areas identified as recommended for monitoring by the park archeologist.
- Should unknown archaeological resources be uncovered during construction, work would be halted in the discovery area, the park archeologist contacted, the site secured, and the park would consult according to 36 CFR part 800.11 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. In compliance with NAGPRA, the National Park Service would also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary, and sacred objects should these be discovered during the course of the project.
- If necessary or possible, relocation of work to a non-sensitive area would occur to enable site testing and documentation. Long-term actions could include reinitiating the project in the same area (upon effective data collection) or relocating the action (if possible). There would be an emphasis on taking actions that would avoid further disturbance to the site(s).

**Cumulative Impacts:** Occasionally, there have been localized long-term adverse effects on archeological resources from the discovery of these during park activities and development projects. Much of the development of Olympic National Park also occurred before the advent of archeological resources protection laws and it is likely that, as a result, inadvertent impacts occurred then that affected archeological resources. There have also been long-term beneficial effects on archeological resources from the establishment of the park and the effort to inventory and analyze archeological resources within the park, particularly when development projects have been undertaken. For many years, it has been a key step in the process of project management analysis to analyze whether archeological resources are present before undertaking actions. This has resulted in both the preservation of those sites that have been found and avoidance of areas with sensitive resources. Numerous sites have also been found that are considered eligible for the National Register of Historic Places and some of these have been listed. When the impacts from past, present and reasonably foreseeable future actions are considered, there would continue to be a small degree of long-term adverse effects on archeological resources, combined with a larger degree of beneficial effects on archeological resources under Alternative A from the continued investigations that would occur prior to ground disturbance in the park and on other federal lands in the vicinity of the park. Similarly Alternatives 2 and 3 would contribute a small degree of adverse effects and a substantial degree of beneficial effects from ongoing surveys of park lands for archeological resources and because most projects that occur in the park are redevelopment projects rather than wholly new actions, similar to the proposed replacement of deteriorated cabins at Log Cabin Resort and to past actions that have occurred at the resort, including redevelopment of the existing campground. Nonetheless, since many of the redevelopment projects are occurring in previously disturbed areas, much of that disturbance occurred before systematic surveys for archeological resources, so there continues to be a potential to find new sites within old developments, such as at Log Cabin Resort. As a result, the park continues to monitor ground disturbance, even in these previously affected areas.

**Conclusion:** There would be no ground disturbance in areas where archeological resources that are potentially eligible for the National Register have been found. Other potential impacts to archaeological resources would be avoided by avoiding sites that have been found through surveys and by monitoring ground disturbance associated with areas that have additional potential for uncovering archeological resources.

## 7. Impacts to Visitor Experience

### Alternative A

#### Visitor Access and Transportation

There would be no changes in visitor access and transportation under implementation of Alternative A. No physical improvements would be made to roadways or trails within the Log Cabin Resort area.

#### Visitor Use Opportunities

There would be no additional effects on visitor use opportunities under implementation of Alternative A. The wide array of existing opportunities, such as camping, lodging, non-motorized boating, and bicycling, would continue. Visitors would continue to find lodging opportunities in existing Rustic Cabins and other accommodations at the resort. Although the cabins are deteriorated, ongoing repairs and slight modifications to them would continue to be made to keep them habitable. Where possible, accessibility improvements would also continue to be made over time.

### Alternatives B

#### Visitor Access and Transportation

There would be short-term adverse and long-term beneficial effects from small changes in visitor access and transportation under implementation of Alternative B. Adverse effects would primarily be related to noise and activity from construction and inconvenience related to future paving of area roadways and from the improvements to make area pathways between site features accessible. These activities may disturb both overnight and day use resort visitors. All visitors, including those with accessibility needs,



would eventually benefit from the improved pathways because they would provide designated, safe, and efficient routes between site features. During construction of the new roadway behind the cabins and paving operations, however, visitors and guests could be inconvenienced if delays, which affected the visitor use season occurred, and/or if the noise and activity from the construction disrupted their visit or interfered with their expectations. Because most construction would be done outside the visitor use season, with some finish work occurring as the spring visitor use season began, these effects would be minimal and would not be expected to inconvenience the majority of resort guests.

#### Visitor Use Opportunities

There would be a range of long-term beneficial effects on visitor use opportunities under Alternative B. Among these beneficial effects would be new and/or improved facilities and new opportunities. New facilities, under Alternative B, would include nine new cabins, new lodge and restaurant restroom facilities, a new manager's office, and new accessible cabins and pathways. Improved facilities would include roadways and pathways. Because the manager's office would be relocated to Motel Unit #1, the overall number of new lodging accommodations for visitors would increase in this alternative. The roadway and parking in front of the cabins would be relocated behind the cabins. Pathways would also be realigned to allow visitors to walk throughout the site to each focus area (campground, campground restroom/shower facility, amphitheater, lodge, dock, etc.). New visitor use opportunities would include two accessible cabins and pathways. Realigned pathways would reduce the number of social trails that cut through campsites to reach the restroom/shower facility, also improving the campground visitor experience. These new or improved visitor use opportunities would result in a range of long-term beneficial effects, depending on the visitor and their ability, interest and expectations.

Relocating the manager's residence would likely result in beneficial effects on improving overall management of the resort by increasing the satisfaction of the manager, thereby indirectly increasing visitor satisfaction. Depending on the interest of the employee and concessioner, the residence could be occupied year-round.

There would also be improved public safety from realigning the roadway behind the cabins, thereby reducing the mix of people and cars that often occurs in front of the cabins as kids play on the lawn and families picnic at the tables in front of the cabins alongside the current roadway. The realignment of the roadway and parking areas would also improve aesthetics from the new cabins, including the view from the porches of the new cabins toward Lake Crescent.

### **Alternative C**

#### Visitor Access and Transportation

Adverse and beneficial impacts on visitor access and transportation would be the same as in Alternative B. In addition, there would be long-term beneficial effects from establishing a new trail through the site that would begin near the orchard and/or parking area and would pass through one of the more natural areas at the resort. The trail would also provide access to the East Beach Road, where the Spruce Railroad Trail could be accessed a short distance (slightly more than a half mile away). Because construction of the trail is unlikely to result in delays or impacts on other areas of the resort, there would be minimal adverse effects from its construction, mostly related to clearing vegetation and creating the trail surface. Most of this work could be done by hand or using small motorized equipment. As with other construction activities, however, the noise and activity in the vicinity may disturb resort guests. In addition, future paving of the resort trails and roadways could result in additional disruption of the resort guest visitor experience. This activity would likely occur during the warmest part of the visitor use season and could cause intermittent delays in visitor access to some areas. Although most roadways are paved, the campground roads and parking areas remain unpaved and the new accessible pathways and trail would also initially be unpaved.

#### Visitor Use Opportunities

There would also be a range of long-term beneficial effects on visitor use opportunities under Alternative C. These are similar to Alternative B, with new facilities, improved facilities and new visitor use

opportunities. Instead of the nine new cabins under Alternative B, there would be eight new cabins. Restaurant restroom improvements would also be the same as in Alternative B, however there would be new day use restroom facilities instead of the restroom accessed through the lodge gift shop. This day use restroom would improve opportunities for visitors to access the facility when the lodge, but not the restroom, was closed. As in Alternative B, there would also be new accessible cabins and pathways, providing new opportunities for improved navigation within the resort for all visitors, including those with accessibility needs. In addition to this range of improvements with actions similar to Alternative B, there would also be a new accessible trail through the forested area above the day use parking lot. This trail would link to a spur that would provide access to East Beach Road for those visitors who wish to access that road and the Spruce Railroad Trail at the west end of East Beach Road. The site loop trail would augment other visitor use opportunities at the resort, providing a close place for a short walk.

### **Impact Avoidance, Minimization and Mitigation Measures**

Measures that would be included in the proposed project (as appropriate to the alternative actions) to minimize impacts to visitor experience include:

- Proposed activities would be conducted during the off-season to the extent possible.
- Actions conducted during peak visitor use would be well-signed and advertised on the park and resort website and would avoid quiet hours to the extent possible.
- Avoiding evening, weekend and holiday work by requiring approval in advance. Longer construction delays or total road closures would also be approved in advance.
- Using a public information program to warn of construction related road closures, delays, and road hazards.
- Managing vehicle traffic and contractor hauling of materials, supplies, and equipment within the area to minimize disruptions to visitors. (Depending on road construction activities, proposed prefabricated cabins could be transported via East Beach or Joyce Piedmont road.)
- Developing a safety plan prior to the initiation of construction to ensure the safety of visitors, workers, and park staff.

**Cumulative Impacts:** Log Cabin Resort has provided visitor use opportunities since the late 1800s, including early transportation by ferry from Port Crescent and Fairholme. While there have been changes over time, it has been one of many to one of several resorts on Lake Crescent offering a variety of short-term vacation accommodations for visitors. Continuing to rehabilitate the structures at Log Cabin Resort would contribute to cumulative beneficial effects from continuing to improve the area as a visitor destination. With the recent expansion of visitor services to accommodate more day use visitors (such as by improving the day use parking area and docks), the resort will likely continue to evolve and attract more visitors over time, resulting in long-term beneficial and adverse effects on visitor experience, depending on facilities and crowding, which could also result in some cumulative adverse effects on visitor experience.

Because it is possible that the proposed repaving of East Beach Road and the Log Cabin/Piedmont Creek culvert would take place simultaneously with the rehabilitation actions at the resort, there could be some cumulative effects on visitor access and transportation under all alternatives. If this occurred, the park would work to notify visitors of these delays in advance and to minimize their effect where possible.

There would be no additional cumulative effects under Alternative A, however, over time if left without rehabilitation, resort facilities, such as the Rustic Cabins, would continue to deteriorate and the facilities could become unsafe and need to be removed. Replacement of the Rustic Cabins under Alternatives B and C would have long-term cumulative beneficial effects on visitor experience from continuing to allow access to and use of these for the foreseeable future.

**Conclusion:** There would be no effect on visitor access and transportation under Alternative A from actions in this Environmental Assessment, however repaving on East Beach Road could affect the ability to reach Log Cabin Resort from that direction under all alternatives. Continued deterioration of the

cabins could also eventually result in the need to remove them or close them for long periods for extensive rehabilitation. Under Alternatives B and C, there would be a wide range of short-term adverse effects on visitor access and transportation that would largely occur outside of the primary visitor use season. Nonetheless, finish work for the cabins could affect visitors during one visitor use season, especially just following spring opening. Longer-term adverse effects could occur from actions in Alternative C, including from additional construction of a site accessible trail and from late season paving operations. Overall, under both alternatives, visitors to Log Cabin Resort would find improved facilities that would be likely to last well into the future and which would provide new opportunities for some visitors, especially those with mobility impairment.

Table 4: Impact Comparison Chart

Resource	Alternative A Impacts	Alternative B Impacts	Alternative C Impacts
<b>Topography/Geology / Soils</b>	No new impacts. Existing impacts would continue from ongoing uses and bank erosion.	Impacts from excavation, compaction, grading, and replacement of soils with fill, as well as covering soils with crushed rock and/or asphalt. Impacts would be from construction, including for cabins, utilities, pathways, a new cabin access road and parking. New disturbance would affect 0.31 acres in previously impacted areas  Reduced bank erosion from stabilization with large woody debris.	Impacts would be similar to Alternative B. In addition, new disturbance for site loop trail would affect another 0.33 acres (0.64 acres total) of previously disturbed areas and new paving would affect 0.46 acres of existing gravel parking areas and roadways, while repaving would affect an additional 1.03 acres.
<b>Water Resources</b>	No new impacts. Existing impacts, including from the use of water for the resort, and ongoing potential for effects from existing water and wastewater treatment and eroding creek bank would continue.	Potential for short-term impacts, such as sedimentation from runoff during construction and from stabilization of creek bank. Slight long-term adverse effects from additional use of water for increased restroom capacity. Long-term beneficial effects from removing cabin closest to small wetland and replacing it further away, from stabilizing bank of Log Cabin/Piedmont Creek, and from constructing rain garden adjacent to day use parking area.	Similar to Alternative B plus additional long-term impacts from additional impervious surface area (paving approximately 0.46 acres of existing gravel roadways and parking areas, plus construction of new restroom in area of nonnative lawn adjacent to lake). Additional short- and long-term impacts from construction of site loop trail and small detached restroom facility.
<b>Vegetation</b>	No new impacts. Existing impacts include areas of nonnative invasive plants and trampling of native vegetation and potential loss of vegetation from eroding creek bank.	Loss of mostly nonnative vegetation, plus some native trees, shrubs and forbs in vicinity of existing cabins and for accessible pathways. Beneficial effects from replacement landscaping and rehabilitation of disturbed areas.	Similar to Alternative B plus additional loss of native and nonnative vegetation within and near site loop trail, nonnative lawn from new restroom, and on the edges of roadsides and parking areas from paving.
<b>Wildlife</b>	No new impacts. Existing low level impacts from noise and disturbance of wildlife habitat in the vicinity of the resort.	Additional short-term adverse effects from noise and disturbance during construction. Long-term adverse effects from a small amount of habitat loss, including trees, forbs and shrubs in the vicinity of the cabins and new access road.	Same as Alternative B plus additional habitat loss from construction of the trail and additional potential for adverse effects associated with additional paved areas.
<b>Special Status Species</b>	No new impacts. No effect on Beardslee or Crescenti trout. Potential for impacts	Similar to Alternative A. Additional noise and disturbance from	Same as Alternative B.

	to water lobelia prevented by distance from water-based recreational activities. Ongoing potential for attraction of corvids to human activity in the area. May affect, not likely to adversely affect marbled murrelets and northern spotted owls.	construction activities. No loss of habitat-sized (nesting) trees. Most construction work completed in the winter, avoiding the marbled murrelet nesting season. Finish work may be completed later. May affect, not likely to adversely affect marbled murrelets and northern spotted owls.	
<b>Archeological Resources</b>	No effect on known archeological resources.	Same as Alternative A	Same as Alternative A
<b>Visitor Experience: Visitor Access and Transportation</b>	No changes in visitor access and transportation. No improvements to roadways or parking areas.	Short-term adverse impacts during construction and long-term beneficial effects following it. Improvements in site accommodations, accessibility, restrooms, pathways and aesthetics.	Same as Alternative B, plus more pathway improvements from new loop trail, and from paved roads and parking areas.
<b>Visitor Experience: Visitor Use Opportunities</b>	No new impacts. Existing array of activities would continue, however cabins would continue to deteriorate.	Long-term beneficial effects on visitor use opportunities, including new facilities, improved roads and pathways and accessibility. New visitor use opportunities from newly accessible cabins and pathways. Improved public safety from realignment of the cabin access road.	Same as Alternative B, plus additional beneficial effects from new opportunities to walk site access trail and from smoother roadways and parking areas, as well as from separate restroom facility.

## Chapter V: Consultation and Coordination

### A. Internal Scoping

The NPS used internal scoping to define the purpose and need for the project and the proposed project goals and objectives. An interdisciplinary team comprised of staff from the park and regional office was identified. This process continued with identifying potential actions to address the need, and determining what park resources could potentially be affected by the proposal. Internal scoping began with the idea for improvements to the resort prior to the new concession contract approval in October 2013 and continued through development of this Environmental Assessment in numerous meetings, including on April 14 and 16, 2014, July 16, 2015, and July 29, 2015, and also included numerous site visits, including in November 2013, May 2014, and March and October 2015.

A variety of concerns were identified regarding what should be in the plan and what impacts should be included. The interdisciplinary team defined the purpose and need, identified ongoing and potential management actions, determined the likely issues and impact topics and provided related information about proposed improvements. The site visits were also conducted to evaluate proposed actions and to discuss impacts associated with these.

### B. Public Involvement

The general public, federal, state and local agencies, and organizations were provided an opportunity to identify concerns and issues regarding the proposal to replace cabins at the resort as well as the potential effects of this proposed federal action. Native American tribes were also provided an opportunity to comment.

A 30-day external (public) scoping period was initiated with the distribution of a scoping letter to inform the public of the proposal to construct new cabins and to generate input on the preparation of this Environmental Assessment. This public scoping occurred from May 9 to June 9, 2014. The public scoping letter was distributed via the park's mailing list as well as to local newspapers and other news outlets, including being emailed to approximately 75 individuals on the park's mailing list. An article about the modifications was published in *The Peninsula Daily News*. In addition, the scoping letter was mailed to various federal and state agencies, affiliated Native American tribes, local governments, and local news organizations. Scoping information was also posted on the park's website. Although no public scoping meetings were held, the park received two written responses from individuals on the NPS Planning, Environment and Public Comment (PEPC) website ([www.parkplanning.nps.gov/olym](http://www.parkplanning.nps.gov/olym)).

The public scoping press release asked commenters to comment on the description of the project to help define the issues and concerns to be addressed in the Environmental Assessment. Respondents provided useful information regarding how the work should be conducted while protecting park resources, including that:

- existing buildings should be upgraded and maintained, and
- new male and female day use accessible restrooms with hand washing are needed as large groups of people come on a warm summer day for day use.

Comments outside the scope of the proposal included comments related to the docks/boat mooring, to the "old time" quality of the lake, the possibility of dining room upgrades, and the possibility of purchasing gas.

### C. Agency Consultation

#### U.S. Fish and Wildlife Service

In accordance with the Endangered Species Act, the National Park Service contacted the U.S. Fish and Wildlife Service to determine which federally listed special status species should be included in the



analysis. Based on subsequent analysis of the project and its potential effects, the park has determined that there would be no effect on the most species identified by the USFWS as present in the project area, including northern spotted owls (see impact analysis section). The project, however, may affect, but is unlikely to adversely affect marbled murrelets. During public review of this document, prior to preparing a NEPA decision document, concurrence with this determination of effect from the USFWS will be sought.

#### **Washington State Department of Archaeology and Historic Preservation**

In accordance with Section 106 of the National Historic Preservation Act, the National Park Service provided the State Historic Preservation Officer (SHPO) of the Washington State Department of Archaeology and Historic Preservation an opportunity to comment on the effects of this project.

Three separate consultations occurred, one for concurrence with a Determination of Effect that the proposed cabins to be removed are not eligible for the National Register of Historic Places (2011), another for concurrence with a Determination of Eligibility for Log Cabin Lodge as not eligible for the National Register (2015) and the last regarding the ineligibility of two archeological sites found at Log Cabin Resort for the National Register (2013).

#### **Native American Indian Consultation**

Native American Indian tribes, including the Elwha, Jamestown and Port Gamble Tribes, which have treaty rights in Lake Crescent were included in public scoping notices and letters. No comments from the tribes were received during the internal or public scoping processes. Regular meetings are also held with the tribes to discuss issues of concern. During those meetings, no issues regarding the proposed improvements to Log Cabin Resort were identified as a concern for any of the tribes.

## **D. List of Preparers, Persons and Agencies Consulted**

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Greg Griffith, Deputy State Historic Preservation Officer  
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## Appendix 1: Laws, Executive Orders, Policies, and Plans Related to this Environmental Assessment

### Laws

#### **NPS Organic Act (1916) (16 USC 1 et seq.)**

The NPS plans for one purpose—to ensure that the decisions it makes will carry out, as effectively and efficiently as possible, its legal mandate:

“... to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

The NPS Organic Act – along with other applicable laws, policies, and plans, directs management within Olympic National Park.

#### **1970 National Park Service General Authorities Act (as amended in 1978 – Redwood amendment)**

This act prohibits the NPS from allowing any activities that would cause derogation of the values and purposes for which the parks have been established (except as directly and specifically provided by Congress in the enabling legislation for the parks). Therefore, all units are to be managed as national parks, based on their enabling legislation and without regard for their individual titles. Parks also adhere to other applicable federal laws and regulations, such as the Endangered Species Act, the National Historic Preservation Act, the Wilderness Act, and the Wild and Scenic Rivers Act. To articulate its responsibilities under these laws and regulations, the NPS has established *Management Policies* (NPS 2006) for all units under its stewardship.

#### **National Parks Omnibus Management Act (1998) (Public Law 105-391)**

The National Parks Omnibus Management Act requires the Secretary of the Interior to continually improve the ability of the NPS to provide state-of-the-art management, protection, interpretation of, and research on NPS resources. Additionally, this act requires the Secretary to ensure the full and proper use of the results of scientific study for park management decisions.

#### **National Environmental Policy Act of 1969, as amended (NEPA) (42 USC 4321 et seq.)**

NEPA is the basic national charter for protection of the environment. The stated purpose of this act is “to declare a national policy which will encourage productive and enjoyable harmony between [humans] and [their] environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of [humans]; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality (CEQ).”

NEPA applies to all federal agencies and all federal actions. The act requires a systematic analysis of major federal actions that includes a consideration of all reasonable alternatives as well as an analysis of short-term and long-term, direct, indirect, and cumulative impacts. Within NEPA the environment includes natural, historical, cultural, and human dimensions. The NPS emphasis is on minimizing adverse impacts and preventing “impairment” of park resources as described and interpreted in the NPS Organic Act. The result of analyses conducted under NEPA are presented to the public, federal agencies, and public officials in document format (e.g. Environmental Assessments and Environmental Impact Statements) for consideration prior to making official decisions or taking actions that have the potential to affect the human environment.

#### **Endangered Species Act of 1973 (ESA), as amended (16 USC 1531 et. seq.)**

The purposes of the ESA include providing a means whereby the ecosystems upon which endangered and threatened species depend may be conserved. According to the ESA all federal agencies shall seek to

conserve endangered and threatened species and shall ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered, threatened, or proposed species or adversely modify designated or proposed critical habitat. The effects of any agency action that may affect endangered, threatened, or proposed species or their critical habitat must be evaluated in consultation or conference with either the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS), as appropriate.

### **National Historic Preservation Act and Other Laws Related to the Protection of Cultural Resources**

The National Historic Preservation Act of 1966 (1992, as amended) (NHPA), and other applicable laws and regulations including the NPS Organic Act (1916), the Antiquities Act of 1906, NEPA, the National Parks and Recreation Act of 1978, the Archeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the Curation of Federally Owned and Administered Archeological Collections (1991), along with applicable agency policies provide direction for the protection, preservation, and management of cultural resources on public lands. Further, these laws and policies establish what must be considered in general management planning and how cultural resources must be managed in future undertakings resulting from the approved plan, regardless of the final alternative chosen.

Section 106 of the NHPA directs federal agencies to take into account the effect of any undertaking (a federally funded or assisted project) on historic properties. A historic property is any district, building, structure, site, or object that is eligible for listing in the National Register of Historic Places (NRHP). Properties that have national, state, or local significance in American history, architecture, archeology, engineering, or culture may be eligible for listing in the NRHP. Section 106 also provides the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) an opportunity to comment on the anticipated effects of an undertaking.

### **Clean Water Act (CWA) of 1972, as amended (33 USC 1251 et seq.)**

The Clean Water Act, passed in 1972 as amendments to the Federal Water Pollution Control Act, and significantly amended in 1977 and 1987, was designed to restore and maintain the integrity of the nation's water. It furthers the objectives of restoring and maintaining the chemical, physical and biological integrity of the nation's waters and of eliminating the discharge of pollutants into navigable waters by 1985. It establishes effluent limitation for new and existing industrial discharge into U.S. waters; authorizes states to substitute their own water quality management plans developed under Section 208 of the act for federal controls; provides an enforcement procedure for water pollution abatement; and requires conformance to permit required under Section 404 for actions that may result in discharge of dredged or fill material into a tributary to, wetland, or associated water source for a navigable river. Section 401 addresses the management of water quality.

### **Architectural Barriers Act (ABA) and Architectural Barriers Act Accessibility Standards (ABAAS)**

The Architectural Barriers Act Accessibility Standards (ABAAS) replaced the Uniform Federal Accessibility Standard (UFAS). Accessibility to all newly constructed and altered NPS buildings and facilities is required by the Architectural Barriers Act of 1968, and the Rehabilitation Act of 1973, as amended. Beginning in 1984 the required design and construction standards for compliance with these mandates were in the UFAS and the Americans with Disabilities Act (ADA) accessibility guidelines. The United States Access Board has worked to combine these documents, resulting in the Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines (ADAABAAG), published in 2004. The new standards went into effect on May 8, 2006.

## **Executive Orders**

Among the Executive Orders (EO) considered for their potential relationship to the proposal were: Floodplain Management (11988), Protection of Wetlands (11990), Control of Invasive Species (13112), Consultation and Coordination with Indian Tribal Governments (13175), Facilitation of Cooperative Conservation (13352), Responsibilities of Federal Agencies to Protect Migratory Birds (13186), etc.

### **Protection of Wetlands Executive Order 11990 (1977, 42 FR 26961) (as amended by Executive Order 12608, 1987, 52 FR 34617, 42 USC 4321)**

The NPS manages wetlands in accordance with this executive order, the CWA, the Rivers and Harbors Appropriation Act of 1899 and the procedures in Director's Order (DO) 77-1 (Wetland Protection). According to DO 77-1, the Service will 1) provide leadership and take action to prevent the destruction, loss or degradation of wetlands; 2) preserve and enhance the natural and beneficial values of wetlands; and 3) avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands. The NPS will implement a "no net loss of wetlands" policy. In addition, the NPS will strive to achieve a long-term goal of net gain of wetlands across the national park system through restoration of previously degraded or destroyed wetlands.

Under this EO, the federal agencies are ". . .to avoid to the extent possible the short- and long-term adverse impacts associated with the destruction or modifications of wetlands and to avoid direct or indirect support of new construction in wetlands whenever there is a practicable alternative." NPS implementation guidance for this EO is found in DO 77-1: Wetland Protection (October 22, 1998). Under DO 77-1, the NPS adopted a "no net loss of wetlands" goal and the Cowardin *et al.* (1979) wetland classification system as the NPS standard for defining, classifying, and inventorying wetlands.

Under this EO, federal agencies are to:

- 1) provide leadership and take action to minimize the destruction, loss, or degradation of wetlands,
- 2) preserve and enhance the natural and beneficial values of wetlands, and
- 3) avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable alternatives to minimize harm to wetlands in carrying out agency responsibilities.

For proposed new development or other activities, plans, or programs either located in or which otherwise have the potential to affect wetlands, the NPS will:

- avoid adverse wetland impacts to the extent practicable;
- minimize impacts that cannot be avoided; and
- compensate for remaining unavoidable adverse wetland impacts by restoring wetlands that have been previously destroyed or degraded.

## **NPS Policies**

Current plans and policy that pertain to this proposal include the Olympic National Park *General Management Plan* (NPS 2008), and *Management Policies: The Guide to Managing the National Park System* (NPS 2006). Following is more information on how this proposal meets the goals and objectives of these plans and policies:

### **National Park Service Management Policies (NPS 2006)**

The proposal is consistent with the goals and objectives of *Management Policies* (NPS 2006) related to NPS concessions management.

#### Chapter 10: Commercial Visitor Services

"Through the use of concession contracts or commercial use authorizations, the National Park Service will provide commercial visitor services that are necessary and appropriate for public use and enjoyment. Concession operations will be consistent to the highest practicable degree with the preservation and conservation of resources and values of the park unit. Concession operations will demonstrate sound environmental management and stewardship."

#### 10.2.6.1 Design

“Concession facilities will be of a size and at a location that the Service determines to be necessary and appropriate for their intended purposes. All concession facilities must comply with applicable federal, state, and local construction codes, and meet accessibility requirements as set forth in applicable accessibility guidelines. Proposed concession facilities must conform to NPS standards for sustainable design, universal design, and architectural design. Concession development or improvement proposals must undergo review for compliance with the National Environmental Policy Act of 1969 and section 106 of the National Historic Preservation Act (16 USC 470f), and proposals must be carried out in a manner consistent with applicable provisions of the *Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation* and other applicable legal requirements.

In addition to general park design requirements, the Park Service will apply value analysis during the design process to analyze the functions of facilities, processes, systems, equipment, services, and supplies. Value analysis must be used to help achieve essential functions at the lowest life-cycle cost, consistent with required performance, reliability, environmental quality, and safety criteria and standards.”

## NPS Director’s Orders

Directors Orders (DO) serve as a vehicle to clarify or supplement NPS Management Policies to meet the needs of park managers. Among the Directors Orders with relevance to this project include:

- DO-2 Resource Management Planning
- DO-12 Environmental Impact Assessment
- DO-28 Cultural Resources
- DO-42 Accessibility
- DO-77 Natural Resource Protection

## Park Management Plans

### Olympic National Park General Management Plan (GMP) and Final Environmental Impact Statement (2008)

The GMP provides park managers with long-term direction for achieving the resource protection and visitor experience goals of ONP and establishes broad direction for managing Lake Crescent, including the Log Cabin Resort. The proposed project is consistent with the GMP. Among the provisions in the plan that are applicable to this project include:

- Trails, campgrounds and related facilities will be kept at approximately their current levels, but may be modified for resource protection, restoration, management of hazardous tree conditions, or enhancing visitor experience, or to address increased visitation (NPS Presentation Plan 2008: 37)
- Retain park facilities, including visitor centers, campgrounds and concessioner-operated facilities; some facilities and campgrounds may be modified or relocated to protect resources, minimize adverse effects on river processes and aquatic and riparian habitats to the extent possible, or for improved sustainability. Some facilities will be improved (NPS Presentation Plan 2008:41).
- Facilities would be retained at Barnes Point, Log Cabin and Fairholme. Some improvements or modifications may be undertaken to enhance shoreline protection (NPS 2008:99 M16: Lake Crescent Alternative D = Preferred Alternative).
- Concession-operated Facilities: Retain existing facilities at Lake Crescent at Barnes Point, Log Cabin and Fairholme. Improve or modify these facilities as necessary to enhance shoreline protection. Encourage a longer lodging season (NPS 2008a:6).
- The existing frontcountry trail system at Lake Crescent will be retained and could be improved. A universally accessible frontcountry trail will be developed and maintained (NPS 2008:99 M16: Lake Crescent Alternative D = Preferred Alternative).
- When complete, the Olympic Discovery Trail will lead from Port Townsend to Port Angeles and then west to the Pacific Coast.

### Lake Crescent Management Plan (LCMP) and Environmental Impact Statement (1998)

The LCMP identified resource protection and visitor experience goals for the Lake Crescent area of the park. This Environmental Assessment guides implementation of the portions of the Lake Crescent Management Plan related to Log Cabin Resort.

This plan contains the following description of the Log Cabin Resort:

The Log Cabin management area includes the Log Cabin Resort and the Lyre River area on the northeast side of Lake Crescent. The resort is comprised of a main lodge, cabins and A-frame chalets, parking areas, maintenance building, RV camping area, boat ramp, and docking facilities. . . The resort is open from mid-winter through late fall.

Log Cabin has no formally designated day-use area<sup>1</sup>, although the area in front of the lodge is typically used for this purpose, while the shoreline near the RV camping area and the area in front of the A-frames [chalets] is used primarily by overnight visitors [guests] to the resort.

The Lyre River is the lake's only outlet and provides critical fish spawning habitat. Presently, the entrance to the river is delineated with buoys to minimize habitat disturbance by watercraft. The Lyre River, especially the several hundred feet immediately from the lake, is the sole spawning habitat for the endemic Beardslee trout.<sup>2</sup> Recreational use by boaters, bathers, and anglers may potentially harm this population. Parts of the shoreline show signs of overuse, particularly near the mouth of Log Cabin/Piedmont Creek adjacent to the RV area; boats often pull up on the small beach next to the creek, resulting in erosion along the lakeshore and loss of shoreline vegetation. Additionally, several social trails cross this stream channel upstream and have denuded much of the riparian vegetation.

Resource impacts associated with the RV campground are evident and include soil erosion and loss of wildlife habitat within the riparian zone of Log Cabin/Piedmont Creek and along the lakeshore. Log Cabin Resort has developed with a variety of architectural styles that are inconsistent with a national park setting (NPS OLYM 1998: 16).

Among the provisions of the LCMP related to Log Cabin Resort include:

- **Remove the A-frame units and locate replacement units away from the shoreline.**<sup>3</sup> The resort would be redeveloped and provide a range of accommodations including a main lodge and cabins. The redeveloped resort may have up to the same number of units that presently exist, with all new structures sited away from the shoreline.
- **Replace some RV camping with cabins.** To alleviate resource impacts to Log Cabin/Piedmont Creek, campsites bordering the creek would be eliminated. The creek would be restored with native vegetation and access would be delineated with established paths and footbridges across the creek. The RV camping area would be redesigned to allow for the construction of cabins. New cabins would be sited away from the creek.
- **Retain boat ramp and reconstruct dock.** The boat ramp and dock would remain in their present locations, or be relocated based on the site design. Boat trailer parking would be provided. Siting of new facilities would take into consideration disturbance to shoreline habitat and near-shore boat traffic.

<sup>1</sup> Visitation began to increase in 2012 with a new concessioner. Under the previous concessioner, little day use occurred. The day use parking area was improved in 2013. Boat docks were improved in 2015.

<sup>2</sup> There are also endemic cutthroat trout – Crescenti.

<sup>3</sup> A variety of modifications were made to the campground in 2013. Since the LCMP was written, plans have changed regarding management of the A-frame cabins. These have since been remodeled and are being retained. Instead, the rustic cabins, which exhibit greater deterioration and cannot be remodeled, except at greater expense, are proposed for replacement (the subject of this EA)

Additional components of the proposed action in the LCMP included:

- Concession option to provide boat rental service. The boat rental service would continue operating under the terms of existing and future contracts with Olympic National Park.
- Concession option to provide bike rental service. The Washington State Department of Transportation analyzed a variety of alternatives for improving bicycle access through the Lake Crescent area (WSDOT 1997a). The preferred alternative called for improving the Spruce Railroad grade as a safer and more enjoyable route for bicycle traffic than U.S. 101. The proximity of Log Cabin Resort to this trail presents an opportunity for establishing a bike rental service, which would be operated by a private concessioner.
- Provide additional parking. The park anticipates increased use of Log Cabin after redevelopment, with a greater need for parking. The site design process would be used to select a site for additional parking to support lodging and day-use facilities.
- Provide public boat fueling. An above-ground fuel tank would be installed to provide a boat fueling station on the east end of the lake.
- Consider establishing an interpretation/orientation program focusing on Euroamerican settlement in the Lake Crescent area. Euroamerican history is an integral part of the park's interpretive program. The park would consider expanding interpretation of this subject in the Log Cabin area as funding allows (NPS OLYM 1998: 33-34).

**Spruce Railroad Trail Expansion and Improvement (SRRT) Environmental Assessment (2011) and Spruce Railroad Trail Improvement Environmental Assessment (2012), FONSI 2012**

The SRRT EA considered a range of alternatives related to the development and extension of the Spruce Railroad Trail along the historic Spruce Railroad Grade. The 2011 EA did not result in an approved design. The alternatives considered in the 2011 SRRT EA were revised based on public input and are described and evaluated in the 2012 Spruce Railroad Trail Improvement EA (2012 SRRT EA). The NPS selected alternative will improve the SRRT to provide a universally accessible trail with 8 feet of paved asphalt and a 3-foot gravel surface shoulder. The SRRT will meet and exceed the guidelines for providing an accessible trail as described in the Draft Final Accessibility Guidelines for Outdoor Developed Areas published on October 19, 2009 (Access Board, 2009).

Phase I of the rehabilitation is complete. Phase II is anticipated to occur in 2018. Work will continue, simultaneously with the proposed rehabilitation of U.S. Highway 101 along Lake Crescent.