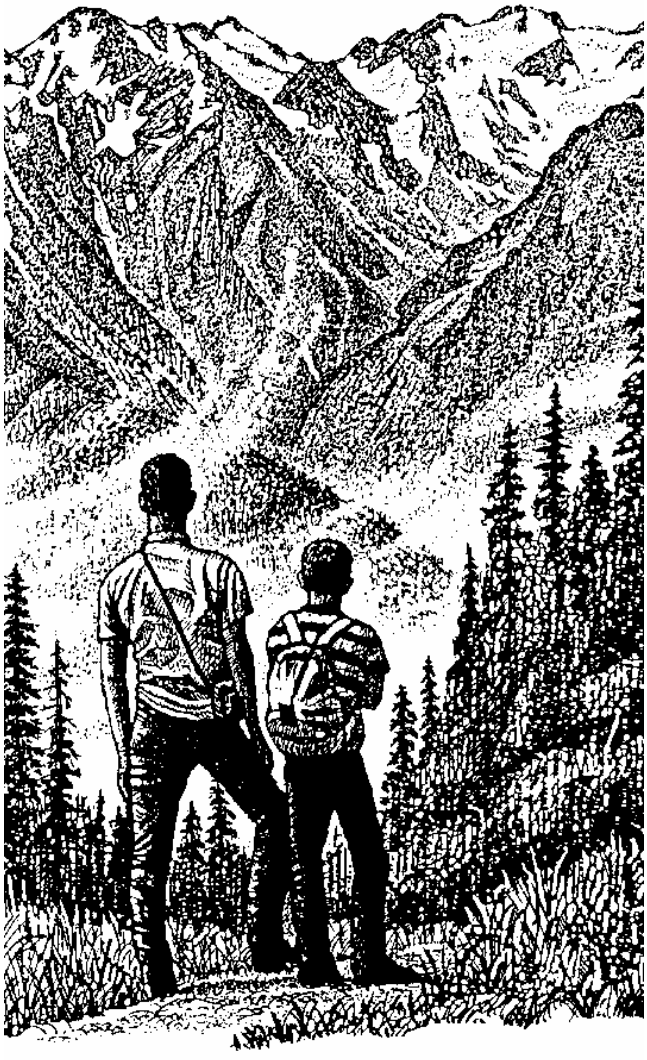
Chapter 3:

Affected Environment

Photo: John Teichert

INTRODUCTION

This chapter describes the existing environment of Olympic National Park and the surrounding region. It is focused on the park resources, uses, facilities, and socioeconomic characteristics that have the potential to be affected if the alternatives were implemented. Some features, such as floodplains and endangered species are discussed because they provide context or must be considered in an environmental impact statement.



NATURAL RESOURCES

Because 95% of the park is designated wilderness, many of the natural resources listed in this section add to the uniqueness of the park's wilderness experience and the quality of the wilderness resource.

AIR QUALITY

Olympic National Park is designated as a Class I area under the Clean Air Act, as amended in 1977. All surrounding areas are considered Class II areas. Class I areas are afforded the highest degree of protection under the Clean Air Act. This designation allows very little additional deterioration of air quality.

Protecting the overall park visibility and impacts on the views that are most important to park visitors is a management concern. The views from and of the Olympic Mountains can be spectacular. At times when the view is unimpeded by clouds, haze, or smoke, visitors can enjoy vistas of

- the Cascade mountain range to the north and east
- Mt. Baker to the northeast
- the Strait of Juan de Fuca, Vancouver Island, and the San Juan Islands to the north
- the Puget Sound Basin to the east
- the Pacific Ocean to the west
- the Olympic Mountain range

Park staff identified important scenic views from park viewpoints in 1980. The scenic viewpoints included, but are not limited to, Lookout Rock, Hurricane Ridge, Hurricane Hill and Deer Park; all are heavily visited areas. Additional important scenic views may be documented in the future.

Campfires, generators, heating systems, and the operation of motor vehicles and equipment all may cause local, temporary air quality degradation in the park. These sources are primarily in the development and day use zones (see Alternative A maps). These zones tend to be relatively small areas or linear corridors along major roads. Effects from these pollution sources on air quality in low use, special, and wilderness zones is somewhat mitigated by the air filtering effect of forests in the park.

Stationary and mobile emissions in the region are the major sources of air pollution near the park. These include

- motorized vehicles
- paper mills
- lumber mills, veneer dryers, and hog fuel burners
- marine vessel traffic
- sand/gravel/asphalt companies
- residential woodstoves and fireplaces
- urban development
- agriculture
- logging, slash burning, prescribed forest burning, and wildland fires

Past and current monitoring indicates that air quality in the park is relatively good. Olympic National Park monitoring efforts include the following:

Past Monitoring

- A continuous air quality monitoring site in the park was established as part of the NPS servicewide monitoring network in 1983 in front of the park's visitor center in Port Angeles. In 1985 the station was moved to its current location 0.1 mile south of the visitor center. Sulfur dioxide (SO_2), ozone (O_3) particulates, and meteorological parameters were measured at that site until the operation of the site

was terminated in 2004 due to lack of funding.
- A National Acid Precipitation Assessment Program site was established on West Twin Creek in the Hoh Valley in 1984. Funding for this site continued through the NPS Small Watersheds Program until 2003.
- A visibility camera documented daily conditions at Lake Crescent from 1985 to 1991.
- The Washington State Department of Ecology operated a nephelometer to monitor summer visibility at Hurricane Ridge from 1992 to 2002. This program was ended due to lack of state funding.
- Seasonal (summer only) passive ozone sampling occurred on the north, east, and southeast slopes of the park from 1995 to 2003. This effort was replaced with a portable ozone station in 2004.
- An EPA National Dioxin Air Monitoring Network (NDAMN) station operated at Ozette from 1999 to 2004.

Current Monitoring

- A National Atmospheric Deposition Program (NADP) monitoring site has been in place at the Hoh ranger station since 1980. The site provides a measure of the amount of sulfate, nitrate, and ammonium deposited by precipitation.
- An NPS-operated Interagency Monitoring of Protected Visual Environments (IMPROVE) site at Blyn (northwest of the park) uses fine particle samplers to quantify visibility. This site has been in operation since 2000.
- An automated web camera has documented visibility at Lake Crescent since 2003.
- A seasonal (summer only) portable ozone monitoring station at Hurricane Ridge has been in operation since 2004.

In addition to these monitoring efforts, a variety of short-term NPS and non-NPS studies continue to evaluate air quality. Most recent studies have focused on mercury deposition, cumulative impacts of nitrogen, and long range transport and deposition of persistent air borne pollutants.

The relatively "clean" status of Olympic National Park's air has made it an important baseline for comparing to regional and national air quality.

Area Climate

Note: The following text on climate has been adapted from Climate of Washington, National Climatic Data Center. http://www.wrcc.dri.edu/CLIMATEDATA.html

There are several climatic controls that have a definite influence on the climate of the Olympic Peninsula, namely; (a) terrain, (b) the Pacific Ocean, and (c) semi permanent high and low pressure regions located over the North Pacific Ocean. The effects of these various controls combine to produce entirely different conditions in short distances.

The rain forest area along the southwestern and western slopes of the Olympic Mountains receives the heaviest precipitation in the continental United States. Annual precipitation ranges from 70 to 100 inches over the Coastal Plains to 150 inches or more along the windward slopes of the mountains.

Winter season snowfall ranges from 10 to 30 inches in the lower elevations and between 250 to 500 inches in the higher mountains. In the lower elevations, snow melts rather quickly, and depths seldom exceed six to 15 inches. In midwinter, the snowline in the Olympic Mountains is between 3,000 and 4,000 feet above sea level. The higher ridges are covered with snow from November until June. The average maximum temperature in July is near 70° F along the coast and 75° F in the foothills, and minimum temperatures are near 50° F. In winter, the warmer areas are near the coast. In January, maximum

temperatures range from 43° to 48° and minimum temperatures from 32° to 38° F.

Very different conditions prevail on the east and northeast side of the park where warming and drying of air as it descends along the lee (northeastern) slopes of the Olympic mountains results in semi-arid conditions. The Olympic Mountains and the extension of the Coastal Range on Vancouver Island shield this area from winter storms moving inland from over the ocean. This belt in the "rain shadow" of the Olympic Mountains is the driest area in western Washington. The average annual precipitation ranges from about 18 inches near Sequim, Port Townsend, and Coupeville, to between 25 and 30 inches in the vicinity of Port Angeles. Measurable precipitation is recorded on three to five days each month in summer and on 17 to 22 days each month in winter.

Another factor that distinguishes this area from other localities in western Washington is the rate of rainfall. This area frequently receives drizzle or light rain while other localities are experiencing light to moderate rainfall. Snowfall is light in the lower elevations adjacent to the water, increasing with distance from the water and rise in terrain.

This area is considered to receive slightly more sunshine and have less cloudiness than other localities in western Washington; however, the difference is not in proportion to the decrease in precipitation. During the latter half of the summer and early fall, fog banks from over the ocean and Strait of Juan de Fuca result in considerable fog and morning cloudiness in the lower elevations.

The average July maximum temperature ranges from 65° F near the water to 70° or 75° F inland, and the minimum temperature is near 50° F. Maximum temperatures seldom exceed 90° F. In January, maximum temperatures are in the 40s and minimums in the lower 30s. Minimum temperatures between -5° and -8° F have been recorded; however, the minimum temperature seldom drops below 15° to 20° F. The coldest weather is usually associated with an outbreak of cold air from the interior of Canada. The average date of the last freezing temperature in the spring ranges from the latter half of March near the water to the last of April in areas 100 to 300 feet above sea level and a few miles inland. The first freezing temperature in the fall occurs around the first of November.

SOUNDSCAPES

NPS *Management Policies* (§4.9) require the National Park Service to preserve the natural soundscapes of the park. Natural soundscapes exist in the absence of human-caused sound. Olympic National Park is one of the best examples of a natural soundscape found anywhere in the national park system and includes natural sounds that are part of the biological or physical resources of the park. Examples of such natural sounds in Olympic include

- sounds produced by birds, frogs, and insects to define territories or attract mates
- sounds received by animals to detect and avoid predators or other danger
- sounds produced by physical processes such as wind in the trees, ocean waves, flowing streams, or claps of thunder

Sound researcher Gordon Hempton has conducted extensive sound studies in Olympic and other national park areas (Hempton, unpublished). His measurements of sound levels in the park are as follows (dB(A) = average decibels):

alpine environment, 25 dB(A)
rain forest, 30 dB(A)
coastal beach, 65 dB(A)
lakeshore, 45 dB(A)

These readings can vary by season because of water levels, number of birds, and insect activity. For comparison, a conversation between two people standing 3 feet apart averages 55-65 dB, and a typical outdoor urban setting is in the 70-85 dB(A) range (Hempton).

At Olympic, natural sounds generally predominate throughout the wilderness, and therefore through most of the park. There can be human-caused noise in the wilderness, such as sounds related to project activities and sounds from airplane overflights. Most human-caused sounds are usually confined to developed areas and along major roads. For example, engine-assisted brakes used by logging trucks on Highway 101 at Lake Crescent are a source of noise, although these brakes are illegal to use in this area. The level of noise in developed areas varies by location and time of year (relating to the number of visitors). In certain areas, such as on the beach or beside a major river, the natural sound level is great enough to overcome some human sounds

Some threats to natural soundscapes come from lands adjacent to the park boundaries, such as noise from logging or construction activities, National Park Service project related aircraft, and non-National Park Service aircraft such as military, commercial, and private sector aircraft.

GEOLOGIC PROCESSES

On the western edge of the North American continental plate, the park lies in a zone of mountain building and glaciation. Surface features that contribute to the scenic beauty of the Olympic Peninsula are the result of mountain building that formed the Olympic Mountains. Glaciation, earthquakes, subsidence, and erosion have further shaped the topography. Alpine glaciers scour the valleys on the peninsula, creating characteristic U-shaped valleys and leaving behind glacial deposits. The major peaks are ringed with cirques and contain active glaciers. The extremely high precipitation has caused rapid downcutting by streams, which results in many steep mountain slopes. The park's landscapes are continually being modified by landslides, river erosion, deposition, and uplift.

The Olympic Peninsula consists of a central core of the rugged Olympic Mountains surrounded by lowlands. On the east, the lowland strip is 1.5 to 10 miles (3 to 16 kilometers) wide and is part of the Puget Sound trough. The lowland strips on the north are very narrow, while the west side lowlands are wider, 10 to 20 miles (16 to 32 kilometers). The south-side lowlands are the largest, ranging up to 30 miles (48 kilometers) wide. Most ridges in the mountains are 4,000 to 5,000 feet (1,200 to 1,500 meters) in elevation, with some of the higher peaks attaining elevations of 7,000 to 7,965 feet (2,100 to 2,427 meters).

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.

The ongoing dynamic geologic processes (both natural and human-altered) have the potential to affect park facilities. For example, coastal and stream erosion in the Kalaloch area is threatening the lodge, two guest cabins, and the campground.

Scientists have determined that glaciers in the Olympic wilderness and throughout the region are shrinking at an unnatural rate. Glaciers in national park system units are being monitored to determine the rate of

change in area and thickness of ice and resulting effects on river flows, temperatures, and fish and other aquatic organisms.

HYDROLOGIC SYSTEMS

Water could be considered a unifying theme on the Olympic Peninsula. Rivers transport much sediment and organic material from mountains to the sea. More than 3,500 miles of the park's rivers and streams are habitat for at least 29 native populations of freshwater fish species, 54 unique populations of Pacific salmon and steelhead, one endemic fish species (Olympic mudminnow), and six nonnative fish species.

The park's rivers are relatively pristine, with the exception of the Skokomish River that has a hydroelectric dam outside the park, and the Elwha River, which has dams both inside and outside the park. The federal government owns the two Elwha River dams and is in the planning process of removing the dams and restoring the river. Other hydrologic systems in the park have been altered by channel modification, bank armoring, or other human impacts.

There are 13 major watersheds protected by the park (see table 5 and Watersheds map).

Floodplains

The rivers and streams in the park have associated floodplains. The upper reaches of these river courses are often steep and are in steep-sided valleys. As the rivers exit the higher mountains, their floodplains are often formed by the braided nature of the streambeds. Vegetation typical of Olympic Peninsula lowlands includes cottonwoods, alder, maple, and other riparian plants that take advantage of the abundance of water. High water events have led to streambed movement across the valley bottoms, often putting park roads and facilities at risk from flooding or washout. The streambeds of the west-side rivers are extremely active.

Homesteading efforts in the west-side river valleys encountered repeated flooding. Repeated efforts to route the water flow into more defined channels met with varied success during this homesteading period. A few of these modifications still exist in selected drainages on the west side of the park, creating impacts to the drainages and associated floodplains, and management challenges for park staff.

Today, many of the park's developed areas contain main roads, visitor contact stations, employee housing, campgrounds, and trails that are in the floodplains of major drainages. In protecting these areas, the park has often used large rock (rip rap) 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.

Lakes and Wetlands

Wetlands include 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. They can provide other benefits such as recreational opportunities, education, and research. Freshwater wetland ecosystems in the park include ponds, marshes, seasonally flooded meadows, and riparian areas.

Olympic National Park Watershed

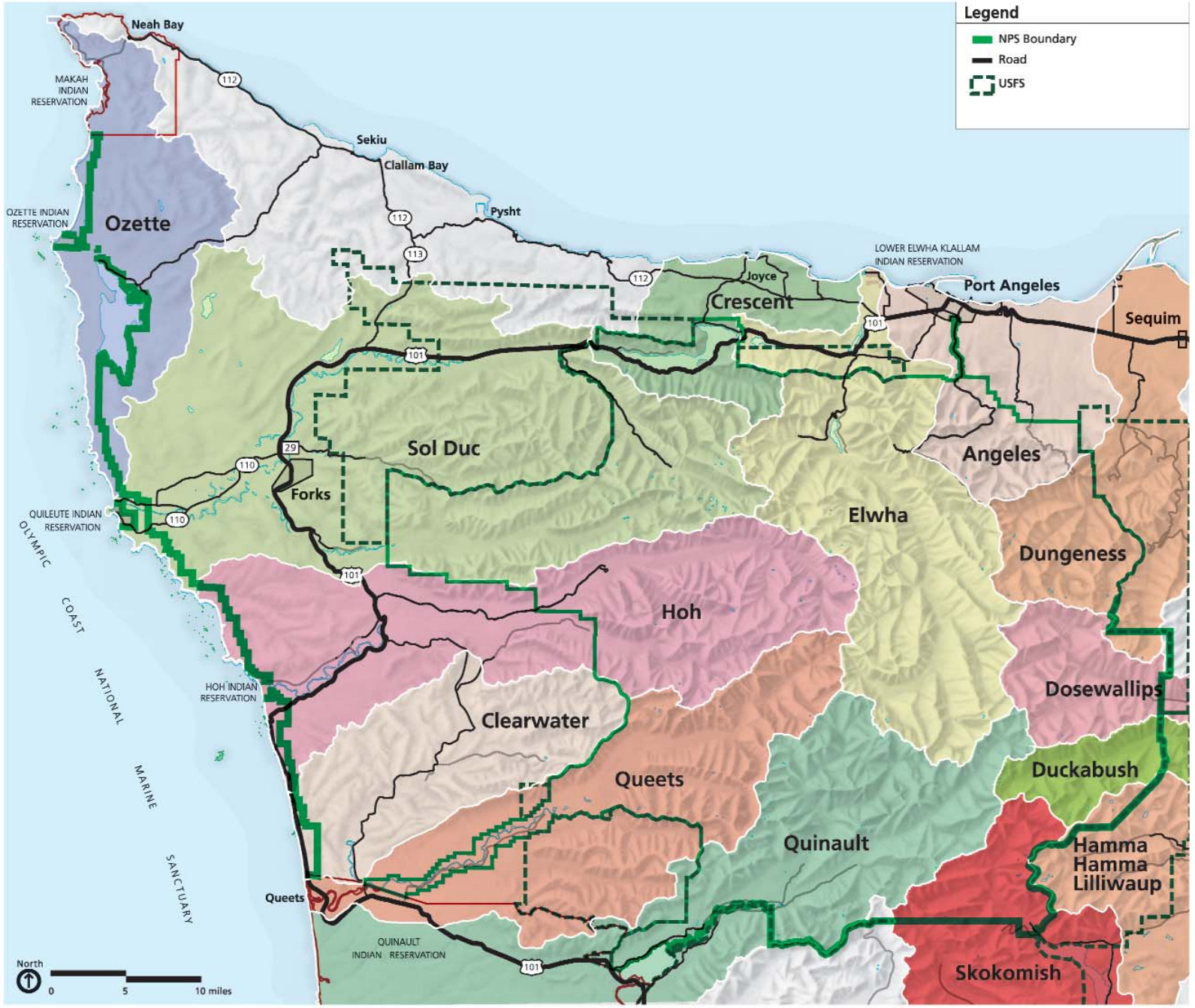


TABLE 5: PARK WATERSHEDS

WATERSHEDS THAT ORIGINATE IN OLYMPIC NATIONAL PARK				
WATERSHEDS	Length in Miles	Linear Creek Miles (total miles of tributaries and rivers)	Glacial (G) or Nonglacial (NG)	Percent of Watershed in the Park
Bogachiel	46.5	130	NG	Not available
Calawah	31.1	196	NG	Not available
Dosewallips	28.3	170	G	79%
Duckabush	24.1	119	NG	67%
Dungeness/ Greywolf	32	255	NG/G	36%
Elwha	44.8	488	G	85%
Hamma Hamma	17.8	110	NG	8%
Hoh S. Fork Hoh	56.1 14.0	312 Unknown	G NG	65% Not available
N. Fork Skokomish	41.9	340	NG	28%
Ozette	13.3	84	NG	Not available
Sol Duc	65.2	260	NG	28%
Queets	51.4	541	G	33%
Quinault	68.8	559	NG	64%
TOTAL		3,480		

Note: Depending on how the watersheds are mapped, some adjacent watersheds may be considered as a separate watershed, or a combined watershed; therefore, the number of watersheds may vary from 11 to 14.

Lakes and wetlands are catalogued as waterbodies 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 (5,657 hectares) in Olympic National Park. This number is derived from the National Wetlands Inventory, and is likely an underestimate because mapping did not include many of the forested wetland areas of the park.

INTERTIDAL AREAS

The relatively pristine coastal strip of the park is an unusual environment harboring a remarkably diverse assemblage of intertidal organisms. The intertidal area is the strip between high and low tides (Olympic National Park boundary extends seaward to the lowest low tide line). Many visitors plan part of their visit to see the tidepools. However, unregulated visitation can disrupt the delicate balance of life in this habitat. Fish, crustaceans, sea stars, anemones, and other forms of life rely on the tides, the substrate and other organisms for food and shelter.

Five major habitat types (following) have been described for the Olympic coast (Dethier 1988). The flora and fauna, and the marine processes affecting each habitat type are distinctive.

- **Exposed Rocky Headlands**: Rocky headlands unprotected from the Pacific Ocean's full wave energy. Dominant plant and animal species include the red algae

(Mazzaella cornucopiae), the barnacle *(Balanus glandula)*, the California mussel *(Mytilus calfornianus)*, and the ochre sea star *(Pisaster ochraceus)*.

- **More Protected Rocky Shores:** Broad benches or shores protected from wave action by sea stacks or rocks. Dominant species include the algae *(Fucus* and *Mastocarpus),* barnacles, periwinkles, the turban snail *(Tegula),* and the cloning anemone *(Anthopleura elegantissima)*.
- **Sand-Impacted Rock:** Rocky outcrops scoured by sand from adjacent high-energy sand beaches. Dominant species include the algae *(Mazzaella* and *Pelvetiopsis),* the mussel *(Mytilus),* barnacles including *(Pollicipes),* limpets, and the kelp *(Laminaria sinclairii)*.
- **Boulder and Cobble Areas:** Areas protected by near-shore sea stacks and islands so that boulders and cobbles are retained. Species are very diverse ranging from rocky-shore organisms to protected-shore and soft-sediment organisms.
- **Sandy Beaches:** Beaches ranging from coarse pebbles to fine sands. Species include polychaete and nemertean worms, isopods, and amphipods.

SOILS

The soils of the Olympic Peninsula reflect a varied environment and complex history, but are generally quite young. The complex geologic history of the Olympic Mountains has created a diversity of parent materials for soils. Bedrock on the peninsula includes various sedimentary rocks and marine basalts. Much of the lowlands and valley bottoms are covered with glacial sediments. Since the retreat of the glaciers, deep piles of rock and soil have accumulated in the valleys and on the slopes of the mountains. Rivers have reworked whatever sediments were left in the valley bottoms and have spread sheets of clay, silt, sand, gravel or other material along their courses. Volcanic ash from the Mount Saint Helens eruption in 1980, as well as Mazama ash deposits from more than 6,800 years ago, has been identified in Olympic soils. Additionally, soil is altered by annual precipitation, a 7,000-foot range in elevation, and topography that extends from flat to vertical.

Soil development in the Olympics is predominately driven by the amount of moisture in the soil. Sufficient water is present over most of the peninsula to cause both rapid weathering and leaching of nutrients; therefore, the soils tend to be relatively infertile.

The amount and kind of organic matter in the soil is very important to soil structure and fertility. Organic matter contains many organically bound nutrients such as nitrogen, phosphorous, and sulfur that are released slowly in the rooting zone where they are most available. Soil organic matter is also the food base for many animals, which are important in soil mixing and aeration. In the park, the tendency is for organic material to accumulate on the soil surface.

Soil Moisture Regimes

There are four soil moisture regimes present on the peninsula: aquic, perudic, udic and xeric.

Aquic. Aquic conditions occur where water collects, causing wet oxygen-deprived (anaerobic) conditions. The soil is not always saturated, but must be both saturated and anaerobic at some time in the year.

Perudic. These wet soils are supplied with oxygen by moving ground water. Water moves through these soils in all but months when the water is frozen.

Udic. This soil moisture regime includes all moist soils but can be dry for up to 90 days during the year or 45 consecutive days in the summer (in 6 out of 10 years). These soils are common on the west side of the park, and

rarely found in the rain shadow area on the east side of the park.

Xeric. Xeric soils are typically found in the rain shadow and are known to be dry for at least 45 consecutive days.

Soil Orders

Soil orders are classifications of soil types. In addition to common soil regimes, there are also at least six common soil orders found on the Olympic Peninsula. These include andisols, entisols, histosols, inceptisols, mollisols, and spodosols.

Andisols. This soil order is actually considered a "proposed" soil order. Commonly, this order consists of soils that are developed in volcanic ash; however, the definition of andisols is based on chemical properties, and therefore many nonvolcanic soils in humid climates may also meet the classification criteria. Many soils of the wetter environments in the Olympics will most likely be reclassified as andisols.

Entisols. Characterized as the youngest and least developed of the soil orders, entisols are often found in areas of recent deposits. Areas would include flood plains or areas where erosion has been quite severe.

Histosols. Organic soils such as bogs, moors, peats, or mucks are found in this soil order. Typically, this type of soil is saturated with water most of the year.

Inceptisols. These soils are considered to be very young, and are also the most prevalent on the peninsula. These soils are often characterized by weakly differentiated horizons, with materials in the soil that have been altered. The soils are usually moist, but some are dry for part of the warm season.

Mollisols. These soils are nearly black, easily crumbled, and have organic-rich surfaces. This type of soil is rare in Olympic National Park; however, the suborder Xerolls is identified. Xerolls are formed in climates with rainy winters and dry summers. These soils are dry for a long period during the summer. These soils are often described as prairie soils.

Spodosols. This type of soil is created by the decomposition of surface organic matter. Two suborders of spodosols have been found on the Olympic Peninsula: cryorthods and haplorthods. Cryorthods are typically found in cold regions while the haplorthods are found in cooler regions. These soils tend to have a very dark grayish-brown silt loam surface underlain by a dark yellowish-brown sand clay loam. These soils are typically found in cool, moist climates with coniferous forests. This soil would most likely be observed on the wetter west side and at cooler, higher elevations (e.g., the mountain hemlock zone; see table 6).

Soils within Olympic National Park have not been surveyed or mapped to date.

VEGETATION

Terrestrial Communities

Five major terrestrial communities are found in the Olympic National Park wilderness (Buckingham 1995).

- The Temperate Rain Forest Zone: Westside forests of Sitka spruce and western hemlock.
- The Lowland Zone: Lower elevation forests of Douglas-fir, western hemlock and western red cedar.
- The Montane Zone: Mid-elevation to upper slope forests of Pacific silver fir and western hemlock.
- The Subalpine Zone: The area between continuous forest and timberline. Tree clumps of mountain hemlock and subalpine fir mixed with meadows.
- The Alpine Zone: Areas above tree line,

mainly in the northeastern section of the park and on higher peaks.

Vegetation Zones

On the Olympic Peninsula, vegetation patterns reflect environmental gradients of moisture and temperature. Moisture increases from east to west and from lower to higher elevations. Temperature decreases from lower to higher elevations. The direction the slope faces will affect these variables as well. Because of the mosaic of vegetation types found at any elevation, the 17 tree types and 20 shrub/heather types found in the park will be lumped into six vegetation zones for this analysis based on potential climax dominants (Henderson et al., 1989; Agee, 1993). Table 6 depicts vegetation zones with their corresponding vegetation types and average elevations.

TABLE 6: VEGETATION ZONES, WITH CORRESPONDING DOMINANT TREE SPECIES AND TYPICAL ELEVATION

Vegetation Zone	Dominant Tree Species	Elevation
Sitka Spruce Zone	Sitka spruce	Typically below 600 feet on the west side of the park.
	western hemlock	
	western redcedar	
	red alder	
	bigleaf maple	
Western Hemlock Zone	western hemlock	Elevations extend from about 500 to 2,000 feet on the west side of the park and from sea level to 4,000 feet on the east side.
	Douglas-fir	
	western redcedar	
Douglas-fir Zone	Douglas-fir	Middle elevations in the upper Dungeness River drainage.
	lodgepole pine	
	madrone	
Silver Fir Zone	Pacific silver fir	Throughout the interior of the park, generally at middle elevations.
	western hemlock	
	Douglas-fir	
	Alaska yellow-cedar	
Mountain Hemlock Zone	Pacific silver fir	Generally above 3,500 feet (1,067 meters)
	western hemlock	
	mountain hemlock	
	Alaska yellow-cedar	
Subalpine Fir Zone	subalpine fir	Generally above 4,000 feet (1,219 meters)
	Douglas-fir	
	lodgepole pine	

Sitka Spruce 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 parviflorium)* and Alaska huckleberry *(Vaccinium alaskaense)*.

Western Hemlock 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, Oregongrape *(Mahonia nervosa)*, red huckleberry, Alaska huckleberry, salmonberry, and rhododendron *(Rhododendrom macrophyllum)*.

Douglas-Fir Zone This zone occupies the driest sites in the northeastern Olympics. Common shrubs include kinnikinnik *(Arctostaphylos uva-ursi)*, Oregongrape, serviceberry *(Amelanchier alnifolia)*, oceanspray *(Holodiscus discolor)*, baldhip rose *(Rosa gymnocarpa)*, creeping snowberry *(Symphoricarpus mollis)*, and salal.

Silver Fir Zone This zone is above the western hemlock zone and below the mountain hemlock zone. Common shrubs include Alaska huckleberry, red huckleberry, salmonberry, fool's huckleberry *(Menziesia ferruginea)*, salal, and Oregongrape. Relatively cool, moist conditions predominate in this zone.

Mountain Hemlock Zone Traditionally found at upper elevations and particularly on wetter sites, the mountain hemlock zone is known to grade into subalpine parkland in the upper portions of the zone. Winter snowpacks can exceed 10 feet (3 meters) in this zone. Common shrubs include Alaska huckleberry, oval-leaf huckleberry *(Vaccinium ovalifolium)*, bog huckleberry, white rhododendron *(Rhododendron albiflorum)*, mountain ash *(Sorbus sitchensis)*, fool's huckleberry, and red heather *(Phyllodoce empetriformis)*.

Subalpine Fir Zone. This zone occurs at upper elevations also, but only in the drier parts of the Olympics such as the upper part of the Dungeness. Snow accumulations are usually less than 10 feet (3 meters). Vegetation patterns are characterized by tree clumps interspersed with park like areas with low tree density and meadows. The harsh environment at upper elevations and the distance from seed sources can retard the reestablishment of trees following a disturbance in the mountain hemlock and subalpine fir zones.

Endemic Plants

There are eight known endemic plants that occur only within Olympic National Park.

- Cotton's milkvetch *(Astragalus cottonii)*
- Olympic bellflower *(Campanula piperi)*
- Flett's fleabane *(Erigeron flettii)*
- Olympic rock mat *(Petrophytum hendersonii)*
- Olympic Mountain ragwort *(Senecio neowebsteri)*
- featherleaf kittentails' *(Synthyris pinnatifida* var. *lanuginosa)*
- Olympic violet *(Viola flettii)*
- Woolbearing dandelion (*Taraxacum eriophorum)*

Special Status Species

The U.S. Fish and Wildlife Service (USFWS) lists no threatened or endangered plant species in the park, but does indicate that there are five species of special concern. There are more than 50 plants in the park

considered rare or sensitive, including 35 plants on threatened or sensitive species lists for the state of Washington. Appendix G contains a complete list of federal and state special status species.

USFWS Species of Special Concern

pink sand-verbena; (*Abronia umbellata* ssp. *breviflora)* — probably extirpated
Cotton's milkvetch *(Astragalus cottonii)*
triangleglobe moonwort *(Botrychium ascendens)*
tall bugbane *(Cimicifuga elata)*
whitebark pine (*Pinus albicaulis*)

Washington Natural Heritage Program-Listed Threatened Species

Cotton's milkvetch *(Astragalus cottonii)*
Pacific springbeauty *Claytonia lanceolata* var. *pacifica*
threeleaf goldthread *(Coptis trifolia)*
spotted coral-root *(Corallorhiza maculata* var. *ozettensis)*
Quinault fawn lily *(Erythronium quinaultense)*
Dortmann's cardinalflower *(Lobelia dortmanna)*
looseflower bluegrass *(Poa laxiflora)*
royal Jacob's-ladder *(Polemonium carneum)*
floating bur-reed *(Sparganium fluctuans)*
featherleaf kittentails' *(Synthyris pinnatifida* var. *lanuginosa)*

The list of rare or sensitive plant species is reviewed and revised as necessary to maintain an up-to-date database.

Nonnative Species

About 313 nonnative plant species are found in the park. Some of the most commonly found 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 park nonnative plants are perennials, which are the most persistent and difficult plants to control or eradicate. Attempts to limit species invasion by hand pulling, use of select herbicides, and other techniques on known areas has had some success in certain areas of the park. Most nonnative plants are found in disturbed frontcountry sites and near park roads, however, nonnative plants occur throughout the park.

FISH AND WILDLIFE

Overview

A very diverse wildlife population exists in Olympic National Park. There are an estimated 289 avian, 77 mammalian, 13 amphibian, 29 freshwater fish species, and 4 reptilian species that live in the park. The number of invertebrate species is unknown, but likely to be very large.

Wildlife occupy a variety of habitats, ranging from the intertidal marine to the alpine. A key wildlife resource in the park is the assemblage of species that depend on old-growth coniferous forest for all or some of their habitat requirements. Many of these species are either absent or exist in greatly reduced densities outside the park where old growth is fragmented and sparse (e.g., pileated woodpecker, northern spotted owl, long-eared myotis, and northern goshawk).

Endemic Animals

The following are species known to occur only within Olympic National Park.

Mammals
Olympic marmot *(Marmota Olympus)*
Olympic yellow-pine chipmunk *(Tamias amoenus caurinus)*
Olympic snow mole *(Scapanus townsendii olympicus)*

Olympic Mazama pocket gopher *(Thomomys mazama melanops)*
Olympic ermine *(Mustela erminea olympica)*

Amphibians
Olympic torrent salamander *(Rhyacotriton olympicus)*

Fish
Olympic mudminnow *(Novumbra hubbsi)*

Lepidoptera (butterflies and moths)
Hulbirt's skipper *(Hesperia comma hulbirti)*

Orthoptera (grasshoppers)
Olympic grasshopper *(Nisquallia olympica)*

Coleoptera (beetles)
Mann's gazelle beetle *(Nebria danmanni)*
Quileute gazelle beetle *(Nebri acuta quileute)*
Tiger beetle *(Cicindela bellissima frechini)*

Mollusks
Arionid slug *(Hemphillia dromedaries)*
Arionid jumping slug *(Hemphillia burringtoni)*

Wildlife

Fifty-four mammal species live in the park, including Roosevelt elk, one of the main reasons the park was established. Other common mammals are the black-tailed deer, black bear, marmot, and raccoon. More elusive mammals include the mountain lion, bobcat, coyote, beaver, river otter, mink, and striped and spotted skunks. There are eleven species of bats known to occur in the park, and several of these have special status.

Two hundred and sixty bird species use the park and adjoining coastal waters. Birds that are prevalent include American crow, common raven, varied thrush, American robin, winter wren, Steller's jay, gray jay, ruffed grouse, blue grouse, belted kingfisher, and a variety of warblers, woodpeckers, kinglets and sparrows.

Reptiles are represented by one lizard species, the northern alligator lizard, and three species of snakes, common garter, western garter, and northwestern garter. The rubber boa snake is a rare to uncommon park resident. Amphibians include tailed, red-legged, and cascade frogs; northwestern, western red-backed, Van Dykes, and Olympic torrent salamanders.

There are 3,000 to 5,000 Roosevelt elk inhabiting the park. The park herds exhibit two basic habitat use strategies. Some are migratory, spending summers in high elevation subalpine zones. Others, in particular the herds that reside in low elevation forest on the west side of the park, are nonmigratory. The preferred habitat for most herds, especially during the winter, includes river bottoms. The migratory herds that reside on the north, east, and south sides of the park, and some resident herds on the western boundary, often cross out of park boundaries where they are hunted. Because they have no hunting pressure or fear of humans inside the park, the animals are easy prey outside the boundary.

In 2002 and 2003, a northwest forest carnivore survey was conducted in the park. A total of 52 camera stations in 26 blocks were used in the survey. More than 1,200 automatic photographs of 21 species were taken. The most frequent mammalian carnivore was the spotted skunk (630 pictures), followed by short-tailed weasels (83), bobcat (24), long-tailed weasels (15), black bear (9), cougar (3), and coyote (12). There have been no detections of either fisher or marten ("Olympic National Park Forest Carnivore Inventory" 2005).

In recent years an assessment of butterflies in the coastal prairies was accomplished. In that effort several rare taxa were found,

along with one that is potentially new to science. Several rare butterfly taxa are known to occur in remnant coastal prairies (Roose's and Ahlstrom's prairies) in the park. These include the Makah copper and the Ozette skipper; the primary nectar source for these butterflies is the Douglas gentian (*Gentiana douglasiana*), a state-listed sensitive plant. Management consideration should be given to preserving the butterflies and their nectar source.

Olympic National Park has the richest herpetofauna of the three national parks in Washington. The park contains at least 13 species of amphibians, one of which is endemic to the Olympic Peninsula. A unique stream-amphibian fauna also occurs in the park, with tailed frogs among the most primitive extant frogs in the world.

Fish

Olympic National Park is home to more than 70 uniquely adapted local populations of salmonids, and numerous freshwater fish species, including

- Beardslee rainbow trout *(Oncorhynchus mykiss irideus)*
- Crescenti cutthroat trout *(Oncorhynchus clarki clarki)*
- rainbow/steelhead trout *(Oncorhychus mykiss*)
- cutthroat trout *(Oncorhynchus clarki)*
- coho salmon *(Oncorhynchus kisutch)*
- chum salmon *(Oncorhynchus keta)*
- pink salmon *(Oncorhynchus gorbushca*)
- sockeye salmon *(Oncorhynchus nerka*)
- Chinook salmon *(Oncorhynchus tshawytscha)*
- bull trout (*Salvelinus confluentus)*
- Dolly Varden (*Salvelinus malma)*
- peamouth (*Mylocheilus caurinus)*
- mountain whitefish (*Prosopium williamsoni)*
- pygmy whitefish *(Prosopium coulteri)*
- Pacific lamprey *(Lampetra tridenta)*
- river lamprey *(Lampetra ayersi)*
- western brook lamprey *(Lampetra richardsoni*)
- six species of freshwater sculpins
- threespine stickleback *(Gasterosteus aculeatus)*
- northern pikeminnow *(Ptychocheilus oregonensis)*
- longnose dace *(Rhinichthys cataractae)*
- speckled dace *(Rhinichthys osculus)*
- redside shiner *(Richardsonius balteatus)*
- longnose sucker *(Catostomus catostomus*)
- largescale sucker (*Castostomus macrocheilus*)

In addition, an endemic Olympic mudminnow *(Novumbra hubbsi)* is found in the park.

The salmon is a critically important species within Olympic National Park. Seeking spawning grounds, salmon swim upstream from the ocean. In late summer, migrating coho salmon can be seen in many park rivers. Pacific salmonids provide food for more than 130 species of aquatic and terrestrial wildlife species. Recent studies have shown that 20%–40% of the phosphorus, nitrogen, and carbon in freshwater may be derived through carcasses of spawned salmon. Introduced hatchery stock, overfishing, and degraded habitat have resulted in the destruction of wild, native strains of fish and altered aquatic systems.

Marine Species

Olympic National Park and the Olympic Coast National Marine Sanctuary have identified the following species frequenting the coastal areas where the park and the sanctuary have overlapping jurisdiction. The intertidal reef area has been identified as a Pacific harbor seal (*Phoca vitulina)* haul-out area. Sea otters *(Enhydra lutris)* may occasionally be found in the nearshore waters. Many of the other species of marine mammals (resident or migratory) that can be

seen in the sanctuary may pass through the nearby park waters, including California gray whales *(Eschrichtius robustus)*, sea lions *(Eumpetopias jubatus* and *Zalophus californianus),* and minke whales *(Balaenoptera acutorostrata)*.

American black oystercatchers *(Haematopus bachmani*) nest on the mainland at Kalaloch as well as on the unnamed rocks offshore. Pelagic cormorants *(Phalacrocorax pelagicus)* nest on the cliffs north of this area. The closest seabird breeding colonies are on Destruction Island, almost 7 miles to the north, where tufted puffins *(Lunda cirrhata)*, rhinoceros auklets *(Cerorhinca monocerata)*, and glaucous-winged gulls *(Larus glaucescens)* nest. On Willoughby Rocks, just over 13 miles to the south, common murres *(Uria aalge)*, tufted puffins, and glaucous-winged gulls nest. Many other seabirds and shorebirds use the sandy beaches. Shorebirds are especially likely to use the park's sandy beaches as feeding grounds during spring and fall migrations.

The sandy habitat of the Kalaloch area supports razor clam *(Siliqua patula)* populations, purple olive snails *(Olivella biplicata)*, ribbon worms *(Cerebratulus* spp.*)*, and several species of polychaetes and amphipods. Razor clams and other bivalves are harvested for personal consumption. Olympic National Park has jurisdiction over shellfish harvest within the park's intertidal area, including Kalaloch Beach. Shellfish harvest is allowed only in accordance with seasons and limits set by Olympic National Park in cooperation with the Washington Department of Fish and Wildlife which has jurisdiction over the other non-reservation coastal areas of Washington.

Redtail surfperch *(Amphistichus rhodoterus),* shiner perch *(Cymatogaster aggregata),* striped sea perch *(Embiotoca lateralis),* cabezon *(Scorpaenichthys marmoratus),* Pacific sand lance *(Ammodytes hexapterus),* Pacific herring *(Clupea harengus),* kelp greenling *(Hexagrammos decagrammus),* Ling cod *(Ophiodon elongatus),* surf smelt *(Hypomesus pretiosus),* staghorn sculpin *(Leptocottus armatus),* tubesnout poacher *(Pallasina barbata),* starry flounder *(Platichthyus stellatus),* and saddleback gunnel *(Pholis ornata),* also use the park's nearshore sandy bottom habitat.

Nonnative Species

The following nonnative wildlife occurs in or adjacent to the park:

mountain goat (*Oreamnos americanus*)
red fox (*Vulpes fulva*)
bullfrog (*Rana catesbeiana*)
hog (*Sus scrofa*)
opposum (*Didelphis virginiana*)

Nonnative mountain goats were introduced to the Olympic Mountains in the 1920s, before establishment of Olympic National Park. During an aerial survey completed in July 2004, the population of mountain goats in the Olympic Mountains was estimated to be between 259 and 320 goats.

The following nonnative fish species have been introduced to Olympic waters:

yellow bullhead *(Ictalurus natalis)*
eastern brook trout *(Salvelinus fontinalis)*
largemouth bass *(Micropterus salmoides)*
yellow perch *(Perca flavescens)*
Atlantic salmon (*Salmosalar*)

Although rainbow trout are a native species, they were stocked in many lakes that were originally barren of fish.

Exotic species can disrupt ecosystems by occupying ecological niches that are not natural. They can also outcompete or displace native species and feed on amphibians.

SPECIAL STATUS FISH AND WILDLIFE

Special Status Wildlife

Several wildlife species listed by the U.S. Fish and Wildlife Service under the Endangered Species Act inhabit the park (appendix G). Listed as threatened are the marbled murrelet *(Brachyramphus marmoratus)*, northern spotted owl *(Strix occidentalis caurina),* and bald eagle *(Haliaeetus leucocephalus)*, described below. No critical habitat has been formally designated in the park for these species, but much of the park contains high-quality habitat that is considered vital for their recovery.

Additionally, the following federally listed endangered or threatened wildlife species may be found near the park: brown pelicans *(Pelecanus occidentalis)*, the short-tailed albatross *(Phoebastris albatrus)*, and the western snowy plover (*Charadrius alexandrinus).*

The following federally listed marine animals occur in or near the park's coastal area:

- green sea turtle *(Chelonia mydas)*
- leatherback sea turtle *(Dermochelys coriacea)*
- loggerhead sea turtle *(Caretta caretta)*
- olive Ridley sea turtle *(Lepidochelys olivacea)*
- humpback whale *(Megaptera novaeangliae)*
- blue whale *(Balaenoptera musculus)*
- fin whale *(Balaenoptera physalus)*
- sei whale *(Balaenoptera borealis)*
- sperm whale *(Physeter macrocephalus)*

Also found in the park is the Mazama pocket gopher *(Thomomys mazama)*, a species of concern for the state and a candidate species under the Endangered Species Act.

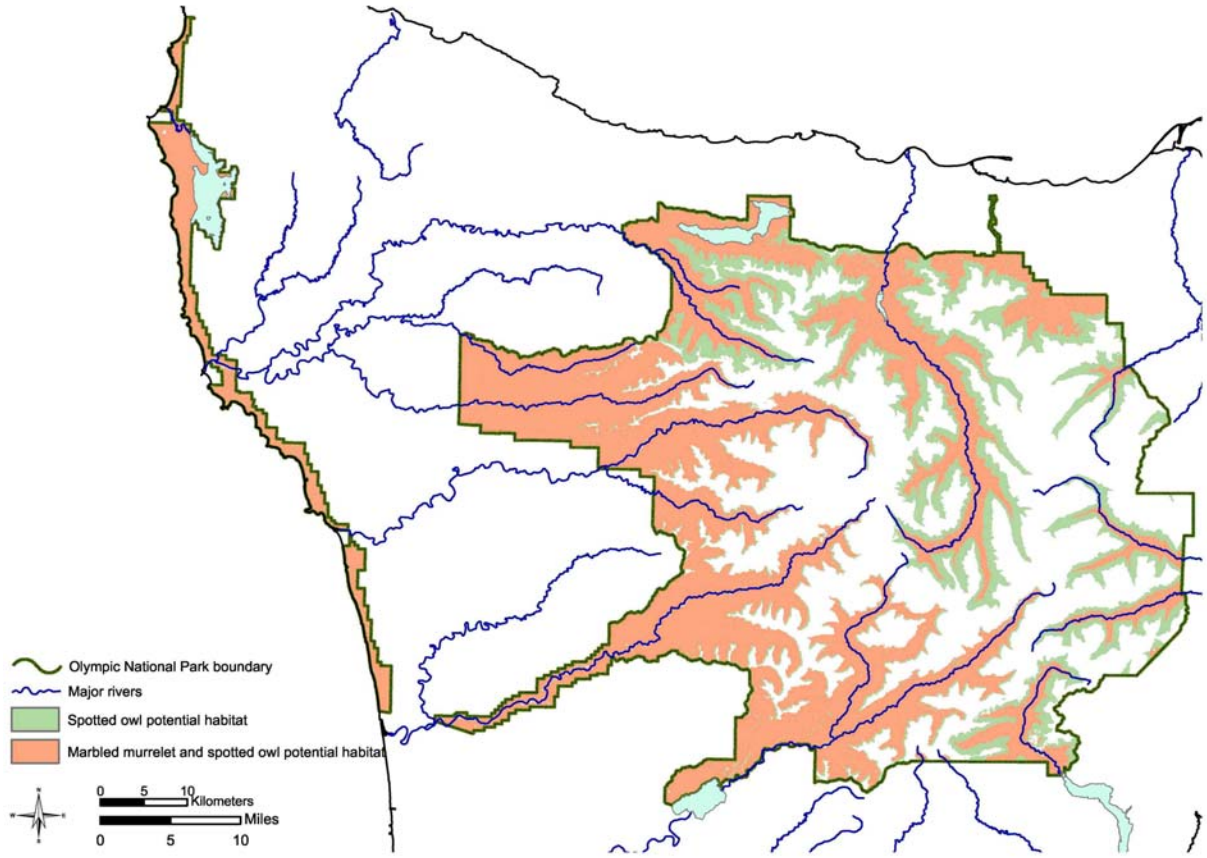
Extirpated federal candidate species include the fisher and the endangered gray wolf. A full listing of state and federal wildlife species of concern is in appendix G.

Marbled Murrelets (*Brachyramphus marmoratus*). The marbled murrelet is a pigeon-sized seabird that lives primarily in the near-shore marine environment but nests in old-growth forests up to 50 or more miles inland. Suitable nesting habitat for murrelets consists of old-growth coniferous stands that are multilayered with moderate to high canopy closure. Potential habitat of this type occurs along the major drainages in lower elevations in the park, overlapping most of the suitable habitat for the northern spotted owls (figure 1). Murrelets will occasionally nest in younger stands if remnant large trees or deformities provide large enough limbs.

Murrelets occur within all the major drainages below about 3,000 feet in elevation within the park. Habitat considered suitable for murrelet occupation includes forested areas to 3,500 feet on the east side of the park, and to 3,000 feet on the west side of the park, including the Sol Duc and Skokomish drainages.

Considering these areas, approximately 453,000 acres of forested area within the park is considered suitable marbled murrelet habitat. The park represents the largest contiguous block of suitable nesting habitat remaining within the listed range of marbled murrelets in the lower 48 states. Inland surveys have been conducted according to Pacific Seabird Group protocols in all developed areas and in a sampling of backcountry valleys. Murrelet presence was documented at every site surveyed. Approximately 83% of sites surveyed in the park were occupied.

FIGURE 1: SPOTTED OWL AND MARBLED MURRELET HABITAT



The park is located in two different murrelet recovery zones (zone 1: Puget Sound and 2: Western Washington Coast Range). The line of demarcation between the two zones essentially bisects the park in on a northwestern to southeastern diagonal.

For purposes of analysis, the murrelet breeding season in Washington is broken into two periods: early breeding season is April 1 through August 5, and late breeding season is August 6 to September 15.

Northern Spotted Owls *(Strix occidentalis caurina)*. Northern spotted owls have large home ranges containing extensive acreage of old-growth forest to meet their habitat needs. There is extensive suitable habitat for spotted owls in the park, primarily in lower elevations of major drainages. Spotted owl habitat is similar to that for marbled murrelets but extends to higher elevations in the park (figure 1). The park's interior (exclusive of the Pacific coastal section and the Queets River corridor) contains about 494,000 acres of forested areas that are considered potential spotted owl habitat. The park represents the largest contiguous block of suitable nesting habitat remaining within the listed range of northern spotted owls. One concern is the trend of lower elevation areas increasingly being used by barred owls rather than spotted owls.

For purposes of analysis, spotted owl breeding season in Washington is broken into two

periods: early breeding season is March 1 through July 15, and late breeding season is July 16 to September 30.

Bald Eagles ***(Haliaeetus leucocephalus)*****.** 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. 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.

Special Status Fish

There are five species of fish that have special status within Olympic National Park. There is also critical habitat and essential habitat designated within or near the park.

Critical Habitat for bull trout was designated for the Coastal-Puget Sound population of bull trout on the Olympic Peninsula, in both marine and stream/shoreline habitat (effective October 26, 2005). Effective January 2, 2006, critical habitat was designated for 12 Evolutionary Significant Units (ESUs) of West Coast Salmon. Included in this designation was critical habitat for the Ozette Lake sockeye salmon, Hood Canal summer chum, and the Puget Sound Chinook salmon.

In addition to the critical habitat, the park also includes essential fish habitat for salmon. The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with the National Oceanographic and Atmospheric Administration Fisheries Service on activities that may adversely affect essential fish habitat. Freshwater essential fish habitat in Olympic National Park includes all streams, rivers, lakes, ponds, and wetlands that support Hood Canal summer chum, Puget Sound Chinook, and Ozette Lake sockeye salmon.

Bull Trout (federally threatened; critical habitat) — Quinault, Queets, Hoh, Elwha, Greywolf, and North Fork Skokomish River basins. Unknown in Dosewallips and Duckabush basins**.** The U.S. Fish and Wildlife Service has designated threatened status for all populations of bull trout. Critical Habitat for bull trout was designated for the Coastal-Puget Sound population of bull trout on the Olympic Peninsula.

The designated portions of Olympic National Park include portions of the marine habitat in the coastal strip of the park, and numerous rivers and streams in or adjacent to the park, including the Elwha, Hoh, South Fork Hoh, North Fork Quinault, Quinault, North Fork Skokomish, Queets, and the Gray Wolf rivers.

The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, and the introduction of nonnative species.

Bull trout exhibit four diverse life history strategies that include stream-resident, fluvial, adfluvial, and likely anadromous forms. Stream-resident forms inhabit small headwater streams and may reach sexual maturity at a small size. The fluvial form inhabits large rivers, attains a large size, and typically spawns in tributary streams. Adfluvial bull trout mature in lakes or reservoirs and migrate into tributaries to

spawn. The anadromous bull trout is likely to occur in western Washington in rivers.

Habitat components that influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrates, and migratory corridors. Maintaining bull trout habitat requires stream channel and flow stability (USFWS endangered species Web site).

Puget Sound Chinook Salmon (federally threatened; critical habitat and essential fish habitat) — Elwha, Dosewallips, Greywolf, and North Fork Skokomish River basins**.** The Puget-Sound chinook salmon Evolutionary Significant Unit (ESU) was listed as threatened on March 24, 1999 (NMFS 1999). The ESU encompasses all naturally spawned runs of chinook salmon that occur below impassable natural barriers in the Puget Sound region from the North Fork Nooksack River in northeastern Puget Sound to the Elwha River on the Olympic Peninsula, including the Elwha, Dosewallips, and Grey Wolf river basins in the park. Hatchery chinook in the Dungeness River (spring run) and Elwha River (fall run) also are considered part of the ESU. Chinook that inhabit Lake Cushman and the North Fork Skokomish River Basin are included in the Puget Sound ESU.

Puget Sound Chinook salmon critical habitat was designated in the Hood Canal Subbasin, on the Dosewallips River, Duckabush River, and in the Dungeness/Elwha Subbasin on the Elwha, Dungeness, and Gray Wolf rivers.

Overall, abundance of Chinook salmon in this ESU has declined substantially from historical levels, and spring chinook populations are chronically low in abundance. Several factors such as habitat degradation, water diversions, harvest, and artificial supplementation along with various natural events (e.g. ocean conditions, weather patterns and environmental variability) have adversely impact Chinook populations.

Chinook salmon in the Puget Sound ESU all exhibit an ocean type life history (Myers et al. 1998). The ocean-type migrate to the sea during their first year of life, usually within three months of emergence, spend most of their life in coastal waters, then return to their natal streams in the fall only a few days to weeks prior to spawning (Healey 1991).

Hood Canal Summer Chum Salmon. (federally threatened; critical habitat and essential fish habitat) — Greywolf and Dosewallips river basins. The Hood Canal summer chum salmon ESU was listed as threatened on March 25, 1999. The ESU includes all naturally spawned populations of summer-run chum salmon in Hood Canal and it tributaries as well as populations in Olympic Peninsula rivers between Hood Canal and Dungeness Bay. In the park, Hood Canal summer chum may occur in the Greywolf and Dosewallips rivers (to Dosewallips Falls).

Summer-run chum salmon are those stocks that spawn from mid-August through December or January. In general, summer-run chum salmon are most abundant in the northern part of the ESU, where they spawn in lower reaches of main river stems. Chum salmon have the largest range of natural geographic and spawning distribution of all the Pacific salmon species (Bakkala 1970). Chum salmon spawn in streams and rivers of various sizes, with fry migrating to sea soon after emergence. The summer chum salmon of the Hood Canal population enter freshwater to spawn from August to mid-October. Chum salmon spend only a short time in fresh water after emergence, and primarily rear in the estuarine near-shore areas where they feed before starting their long-distance oceanic migrations.

Habitat degradation, water diversions, harvest, and artificial supplementation along with various natural events (e.g. ocean conditions, weather patterns and environmental variability) have adversely impacted chum salmon populations.

Ozette Lake Sockeye (threatened; critical habitat and essential fish habitat) - Ozette basin. Ozette Lake sockeye salmon were listed as threatened on March 25, 1999 (NMFS 1999). The ESU includes all naturally spawned populations of sockeye salmon in Ozette Lake, Ozette River, Coal Creek, and other and tributaries flowing into Ozette Lake. Within the park, Critical Habitat was designated for the Ozette Lake sockeye salmon in the Hoh/Quillayute Subbasin, in the Ozette River and Ozette Lake and several of its tributaries.

Spawning in Ozette Lake generally occurs from mid November through early February, and sometimes April, and is currently restricted to submerged beaches where upwelling occurs along the shore, or to the mouth of tributaries flowing into the lake (Dlugokenski et al. 1981). Spawning occurs in the Ozette River, or in Coal Creek, a tributary to the Ozette River.

In Ozette Lake, high water temperatures and low summer flows in the Ozette River may adversely affect migration by altering timing of the runs (LaRiviere 1991). Declines in abundance have been attributed to a combination of introduced species, predation, loss of tributary populations, a decline in quality of beach-spawning habitat, temporarily unfavorable ocean conditions, habitat degradation, artificial supplementation, and excessive historical harvests (Jacobs et al. 1996).

Puget Sound/Strait of Georgia coho salmon (candidate) — Quinault, Queets, Quillayute, and Elwha basins. This species was classified as a Species of Concern on April 15, 2004. The ESU includes all naturally spawned populations of coho salmon from drainages of Puget Sound and Hood Canal and the eastern Olympic Peninsula (east of Salt Creek), and other areas not on the Olympic Peninsula.

In Olympic, adult fish enter the rivers from September through early January, with some arriving as late as February. Spawning takes place from October into January, primarily in side channel habitats. Juveniles live for about a year in the river systems before migrating to the ocean from late March through mid-June.

Other Sensitive Fish Species. In addition to the federally listed threatened and endangered species, critical habitat, and essential fish habitat, Olympic National Park includes some of the last remaining intact habitat for populations of Washington state listed species. These include river lamprey (*Lampetra ayresi*), Olympic mudminnow *(Novumbra hubbsi*), pygmy whitefish (*Prosopium coulteri*), eulachon *(Thaleichthys pacificus*), all species of rockfish (marine waters only), and Pacific herring (*Clupea pallasi*) (marine waters only).

WILDERNESS VALUES

THE WILDERNESS ACT

The Wilderness Act of 1964 established a national wilderness preservation system to be composed of federally owned areas designated by Congress as "wilderness areas." By law these wilderness areas

> . . . shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness. (16 U.S.C. 1131).

OLYMPIC WILDERNESS

For more than 100 years, the Olympic Mountains have been described as wilderness. Since the early accounts of exploration into the interior Olympics in the late 19th century, wilderness has been the underlying concept in what is now the park. In the early 1900s, development of the Olympic wilderness began with U.S. Forest Service construction of trails, shelters and ranger stations, not so much for the "pleasure seekers" but for the administrative use of the forest. Private developers made a few inroads into the interior Olympics with the construction of hunting chalets, roads, and cabins into the 1930s. Many more were planned.

With the creation of Olympic National Park in 1938, plans to develop wilderness changed to plans to preserve it. In a speech given that year, Secretary of the Interior Harold Ickes stated that the preservation of wilderness conditions within the park would be the primary management objective. However, no significant changes of direction emphasizing wilderness management occurred during the first 20 years of the park's existence. The National Park Service inherited from the U.S. Forest Service a system of trails similar to what exists today. Also within these lands were trail shelters, several private cabins on leased lands, ranger stations, and a telephone system.

As a requirement of the 1964 Wilderness Act, the National Park Service conducted a study, held public hearings, and wrote an environmental impact statement on possible wilderness designation for roadless areas in Olympic National Park. In 1974, 95% of the park was proposed as a wilderness area. The recommendation was sent to Congress, and a Senate bill was introduced. Although the bill was never acted upon, the proposed lands were managed as de facto wilderness until the wilderness was officially designated by Congress on November 16, 1988. President Reagan signed the legislation into law, establishing the "Olympic Wilderness" and thus ensuring the preservation and protection of this incomparable ecosystem in its natural condition. A total of 876,669 acres, about 95% of the park, was designated as the Olympic Wilderness, and another 378 acres were designated as Potential Wilderness Additions. (See wilderness map.)

The Olympic Wilderness is exceptionally diverse, with glacier-covered mountains, subalpine lakes and meadows, heavily forested river valleys, old-growth coniferous forests, and the wild Pacific coastline all contributing to the grandeur. These wilderness lands are of inestimable value. Their designation has secured for the American people the inheritance of a near-pristine, naturally functioning ecosystem for each succeeding generation to protect and enjoy.

Generally, the wilderness includes most of the park's undeveloped lands. Areas within the frontcountry zones of the park but outside designated wilderness include lands north of Lake Crescent, south of the Queets road, the north shore of Lake Quinault, areas east of the North Fork Quinault road and north of the Graves Creek Road, and park lands west of the Staircase road. Waterways outside designated wilderness include the stretches of park rivers adjacent to roads (except the Dosewallips River which is within designated wilderness), and the park's large lakes (Lake Crescent, Ozette Lake, Lake Mills).

The coastal strip, detached from the rest of the park, is approximately 43,000 acres. About 36,000 acres are north of the Hoh River and are mostly designated as wilderness (70%). The remainder, in the vicinity of Kalaloch, is non-wilderness and administered primarily for recreational purposes. The park boundary extends seaward to the lowest low tide line and includes the intertidal beaches and rocky tidepools.

Major road corridors with 200-foot buffers extending from the centerline, minor road corridors with 100-foot buffers, developed areas such as campgrounds and lodges, and private lands or inholdings are also not within designated wilderness.

The park's trails are the most conspicuous human imprint on the wilderness. There are approximately 611 miles of maintained trail within the wilderness. There are approximately 767 trail bridges, including puncheon bridges and 12 miles of boardwalk and/or puncheon. Several other structures maintained in the wilderness, primarily along trail corridors, including six ranger stations, several ranger station tents, historic shelters, numerous privies, "bear wires" for safe storage of food away from wildlife, and other administrative and emergency facilities such as radio repeaters and temporary research equipment. More than 1,300 campsites are scattered throughout the wilderness.

Natural Resources in Wilderness

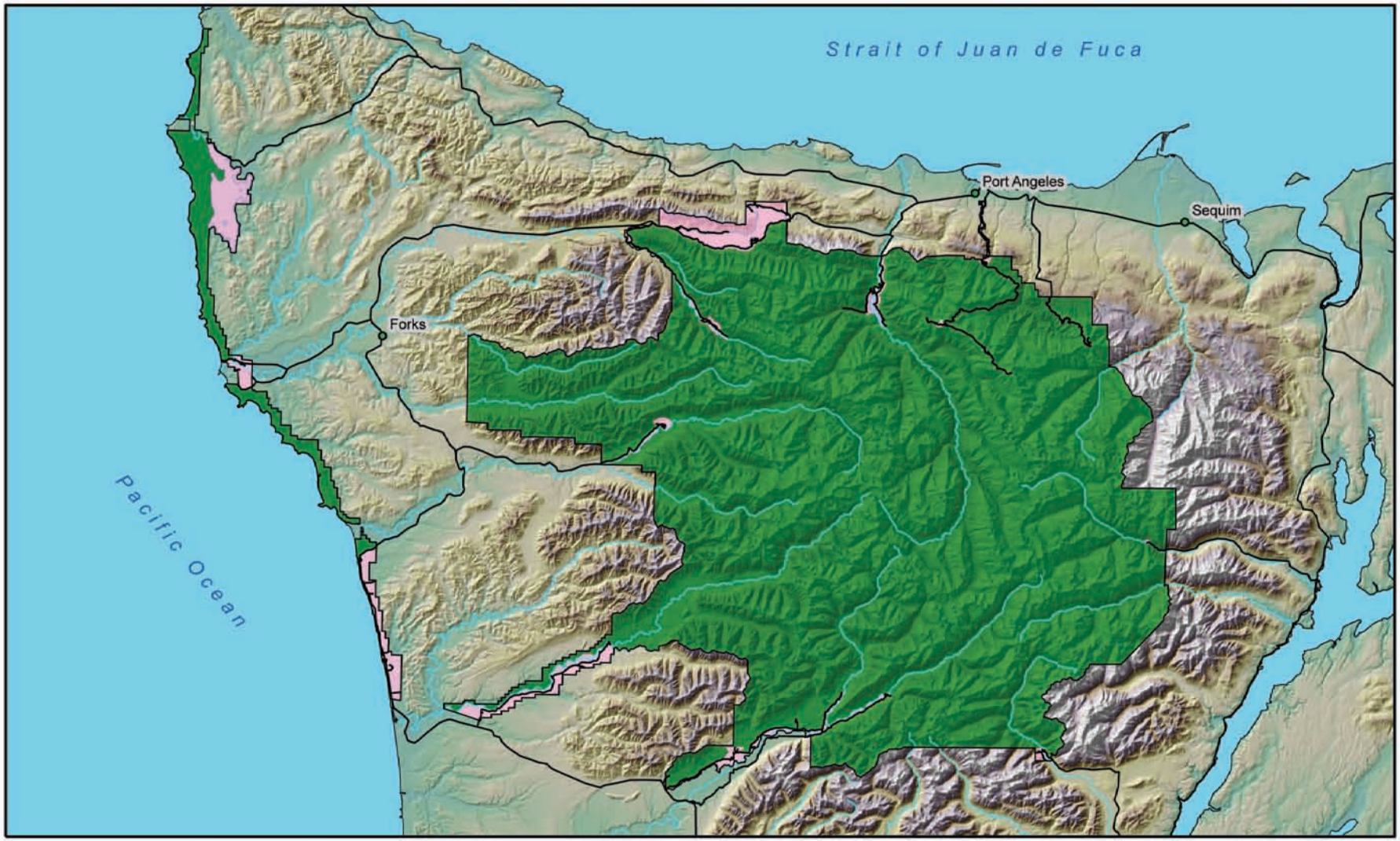
Natural resources are a defining element of the wilderness resource and need to be managed within the context of the whole ecosystem. The majority of the park's natural resources fall within the wilderness, since the park is 95% wilderness. Without natural resources, including endemic species, the wilderness experience would not be possible. Previous discussions on natural resources in this chapter apply to wilderness.

Cultural Resources in Wilderness

National Park Service policies incorporate cultural resource stewardship requirements into the management standards for wilderness areas. The policies reflect the requirements of the wilderness Act, as well as specific legislation regarding cultural resource protection such as the National Historic Preservation Act and the Archeological Resources Protection Act. In accordance with National Park Service *Management Policies 2001* (6.3.8), "Cultural resources that have been included within wilderness will be protected and maintained according to the pertinent laws and policies governing cultural resources, using management methods that are consistent with the preservation of wilderness character and values."

The 1974 environmental impact statement prepared for the establishment of wilderness within Olympic National Park affirmed that existing historic properties in the park (and those designated in the future) would not be adversely affected by wilderness designation. Cultural resources are located in designated wilderness, including historic structures (trailside shelters, ranger stations, cabins), cultural landscapes, and archeological sites. In a comprehensive wilderness management plan that will follow this general management plan, the park would continue a policy that existing and potential national register properties

Designated Wilderness Within Olympic National Park



would not be adversely affected by the wilderness designation.

Visitor Use

In 1963 overnight use of the wilderness was approximately 41,000 visitor use nights (number of visitors multiplied by the number of nights equals visitor nights). This figure more than doubled in 1975 to 105,000 visitor nights. From 1975 to the mid-1980s, use figures showed a gradual but steady decline (some of this decline can be attributed to more accurate gathering of statistics). A general decline was also noted in other wilderness and backcountry areas in the western United States. In the late 1980s and early 1990s use began to increase again. An all-time high in overnight wilderness use was recorded each year between 1991 and 1995 with 124,000 visitor use nights in the Olympic Wilderness in 1995. In the late 1990s, use decreased from the overall high by about 25%. By 2003, use levels were approaching 94,500 visitor use nights.

Day hiking and backpacking are Olympic's principal wilderness activities. Though a small proportion of the wilderness is found in the coastal portion of the park, about 40% of the total overnight wilderness use in the park occurs there. This is largely due to the uniqueness of the coastal wilderness experience, with its level hiking and year-round, snow-free access. There are more sights and sounds of human presence than in the interior wilderness because it is such an exceptional resource and, due to the size of the coastal wilderness, the density of use can be higher near trailheads and in more popular coastal destinations.

There are a variety of experiences available in the coastal wilderness. Activities such as overnight camping and beach hiking, exploring tidepools and coastal forests, wildlife watching, and more intrinsic experiences such as experiencing nature, listening to the waves, solitude, and reconnecting with the natural environment can occur in the coastal wilderness. Beach travelways include areas that can be inaccessible due to high tides, areas that require crossing steep beach headlands, and scrambling over algae-covered rocks.

The interior of the park accounts for approximately 60% of the overnight use of wilderness. The interior wilderness offers a variety of pristine resources and unique and interdependent communities, including old-growth forests, subalpine lake basins, and glacier-covered mountain peaks. The expansive vistas and rugged peaks, huge forests, and abundant wildlife in this vast wilderness create an experience unequaled in the lower 48 states.

Visitors can hike through the wilderness on trails used by the first explorers, and view homesteads, shelters, and other historic features. Visitors to the coastal wilderness can view petroglyphs and rock middens, and may find other reminders of prehistoric and historic life.

Visitors can experience a variety of opportunities, from hiking on well-maintained trails throughout the various landscapes, to exploring the remote, isolated deep interior of the wilderness, where map and compass skills are necessary. Accomplished backpackers can travel for multiple days through the park, leaving civilization behind and immersing themselves in the untamed lands. Opportunities are available for stock use, hand-powered boating, and wilderness mountaineering and alpine scrambling.

Stock use currently accounts for 1.5% of visitor nights in the wilderness. Stock teams are also utilized extensively for the administration of the wilderness and support activities such as trail and facility maintenance. Boating is rising in popularity on park lakes, rivers, and streams. Most park rivers and lakes suitable for boating are outside or on the edge of designated wilderness. Fishing is also a

popular activity for many backpackers and day hikers.

A number of visitors participate in wilderness mountaineering and alpine scrambling. Non-technical scrambling, glacier travel, and off-trail high elevation traverses are popular activities. Of the major Olympic peaks, Mount Olympus, Mount Deception and The Needles, Mount Constance, The Brothers, and The Sawtooths receive the most ascents. Mount Olympus is the major park mountaineering objective, and one of the most remote peaks in the lower 48-states.

Commercial services that contribute to public education and the visitor enjoyment of wilderness values are provided in Olympic National Park. Some of these services include day hiking, backpacking, and climbing guides; horse, llama, and mule packers; photography; and education and wilderness skills.

Few accurate figures are kept on wilderness day use. It is quite significant, probably exceeding overnight use several times over. Day use ranges from short walks on nature trails to occasional one-day "marathon" cross-park hikes.

In addition to NPS project-related aerial operations, non-NPS aircraft, such as military, commercial, and private sector aircraft, fly over the wilderness. The quality of the wilderness experience can be adversely impacted by air traffic, especially on the east side and along the coast.

CULTURAL RESOURCES

HISTORIC OVERVIEW

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. Prehistoric economy included hunting, fishing, traveling throughout the area to trade materials, gathering resources, and practicing traditional spiritual activities.

After Washington Territory was separated from Oregon Territory in 1853, Indian land title was extinguished by three treaties, and the lands were opened to settlement and development by Euro-Americans. The Olympic Peninsula was America's last frontier of westward expansion in the contiguous 48 states. Explorations penetrated the Olympic Mountains by way of the major river valleys on both the east and west sides of the peninsula in the closing years of the 19th century. U.S. Army expeditions and privately funded exploratory efforts, including the Press Expedition funded by the Seattle Press newspaper, mapped drainages of the Dosewallips, Duckabush, Skokomish, Humptulips, Wynoochee, Satsop, Wiskah, the North and East Forks of the Quinault River, and the Queets River and reached the summit of Mount Olympus in 1890. Reminders of these expeditions exist in place names for rivers, canyons, valleys, and mountains, including Mounts Anderson, Bretherton, Church, Steel, and Henderson; and O'Neil Pass, Creek, and Peak. Sections of trail blazed by these early explorers are now part of the current trail system in the park.

Other early explorers included mountaineering groups and recreational hikers. In the early 20th century, ascents of Mount Olympus were achieved by members of the National Geographic Society of Washington, D.C., the American Alpine Club, and the Explorers Club of New York City. In August 1907 a party of mountaineers achieved the summits of East Peak, Middle Peak, and West Peak of Mount Olympus.

Settlement of coastal areas and lowlands on the Olympic Peninsula by Euro-Americans began in the 1850s. By the time Euro-American settlers arrived on the Peninsula, four Indian reservations were established at the mouths of coastal rivers — the Makah, Quillayute, Hoh, and Quinault. Settlement first occurred in low elevation areas around large inland lakes, in the major river valleys, and along the coast. Lakes Crescent, Ozette, Quinault and Cushman were favored sites in the late 1880s and 1890s. Lands on the lower segments of the Elwha, Sol Duc, Bogachiel, Hoh, Queets, and Quinault rivers were also claimed by early settlers. Farming, except in the most favorable locations, usually failed to provide the subsistence needs for homesteaders, and most settlers engaged in other activities for at least some of the year. Very few early settlers remained on their homesteads for extended periods, and by 1919 few traces of settlement history within the present-day Olympic National Park remained.

The timber industry had early beginnings on the Olympic Peninsula. The first commercial mill was established in 1855, and within 10 years, 16 mills were scattered the length of Puget Sound. During the next 30 years lumbering became a major industry for many coastal settlements. As logging operations developed and accessible timber was taken from tidewater rivers and

coastal areas, timber interests began looking to the inland forests. Advances in technology, including the development of railroad logging, enabled timber operations to gradually move inland.

Mineral explorations occurred on the Olympic Peninsula until the end of the 19th century. Discoveries of gold, iron, and copper were reported from major river valleys, the Lake Cushman area, the mountains, and along the ocean beaches. In the late 1890s the Elwha River valley was prospected for gold, and several manganese claims were staked west of Mount Angeles near Hurricane Ridge and at the west end of Lake Crescent. The North Fork of the Skokomish River was also prospected for iron and copper. Prospecting for gold, oil, and natural gas also occurred along the coast. Oil and natural gas were reported in 1891 along the coastal sea cliffs. Oil drilling was initiated near the mouth of the Hoh River in 1914. The period of oil exploration ended with the U.S. entry into World War I. Vestiges of this mining legacy remain along the coastal strip.

In 1897 the Olympic Forest Reserve was created. This action closed more than 2 million acres to entry and private acquisition, including nearly all of the Olympic Mountain Range and almost two-thirds of the Olympic Peninsula. In 1905 the administration of Olympic Forest Reserve became the responsibility of the U.S. Forest Service, which managed the area for nearly 40 years. In 1907 legislation was passed changing the names of forest reserves to national forests to clarify the management philosophy of the multiple resource use of these lands. In 1909, to protect the region's native elk, President Theodore Roosevelt signed a proclamation establishing Mount Olympus National Monument, consisting of 610,000 acres in the center of Olympic National Forest.

In the forest's first decade of management, trails and other structures were built, including trails to Sol Duc Hot Springs, along the shore of Lake Crescent, and the South Fork of the Skokomish River. The Storm King Information Station was also built at Lake Crescent.

In 1911, in response to severe fires in the Olympic National Forest, the U.S. Forest Service began establishing a unified system of communications, ranger stations, fire lookouts, and trails to promote efficient and effective forest management. This system worked as an integrated whole to meet the larger goal of forest use and protection. One of the most important routes into the interior was the Elwha-Quinault route — a natural north to south route crossing the low divide between the Elwha River and the North Fork of the Quinault River.

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. Olympic Hot Springs (Boulder Creek Hot Springs) was the site of resort development in the early 1900s. There was also recreational development in the mountainous interior of the Olympic Peninsula, particularly in the Quinault watershed. Quinault Lake was also the site of early recreational development in the 1890s.

Presidential proclamations in 1912 and 1929 reduced the size of Olympic Forest Reserve by a total of over 700,000 acres or 20%. Most of the deletions were in the heavily forested western sections from Ozette Lake south to Jefferson County. Many of these acres were bought by lumber companies or acquired through Homestead Act of 1863 entry claims or the Timber and Stone Act of 1878 entry claims.

Railroads were constructed in the Pacific Northwest starting in the early 1900s. On the

Olympic Peninsula, permanent and temporary railroads were constructed to transport spruce logs to mill sites for use in the production of airplanes for World War I. The most ambitious permanent rail route was the Lake Crescent Olympic Spruce Railroad No. 1. This route skirted the precipitous shoreline of Lake Crescent with 10 miles of deeply cut grade and two tunnels. The 36-mile railroad, an engineering feat, was constructed in less than four months - four times faster than usual for a comparable job. Eight thousand men were involved in the construction. However, the railroad was completed on November 30, 1918, nineteen days after the war was over. The line was eventually surplused and served as a branch line for hauling timber from the Soleduc. It did not contribute to the military efforts until the 1940s when it hauled timber for military use during World War II. The line was abandoned and rails removed in 1954.

Following World War I, tourists to the Olympic Peninsula began visiting the national monument in their cars. The south shore Lake Crescent road was completed in 1922, ending ferry service on Lake Crescent. As recreational use of the national monument continued to grow in the mid-1920s, private companies, including the Olympic Chalet Company and the Olympic Recreation Company, were successful in obtaining permits from the U.S. Forest Service to construct recreational facilities in the interior of the national monument. In January 1929 the U.S. Forest Service issued a permit for the development of 5 acres of land in the upper East Fork Quinault, known as the Enchanted Valley area, to the Olympic Recreation Company. By 1930 the Low Divide Chalet was completed at the headwaters of the North Fork Quinault River. The company also constructed Nine-Mile Shelter located halfway between the end of the Quinault Road and Low Divide. In August 1931 the Enchanted Valley Chalet was completed. Early recreational development was prone to fiery disasters, and many early structures were lost. The current Quinault Lodge, built in 1926, is sited on the ground occupied by at least two earlier structures.

In 1931 the Olympic Loop Highway (U.S. Highway 101) was completed connecting the Lake Crescent segment with the rest of the road. A road was completed to Olympic Hot Springs in the 1930s. In 1940 resort buildings at the hot springs were destroyed by fire. Several successive efforts to rebuild a resort operation failed, and in late 1972 many of the resort structures were removed.

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; and Fairholme at the western end of the lake. Singers Tavern (now Lake Crescent Lodge) was built at Barnes Point in 1915. Singers Tavern was the site of meetings conducted to discuss the creation of Olympic National Park in the 1930s. The wood frame structures of the Lake Crescent resorts were subject to fires, and several resorts rose from the ashes of former structures around the margins of Lake Crescent. Among these was the resort known as Rosemary, which was built near the meadow where Marymere formerly stood. By the mid 1930s there were 12 resorts around Lake Crescent.

During the 1930s, the New Deal emergency work programs of the Franklin Delano Roosevelt administration extended miles of trails and roads in the Olympic National Forest. Civilian Conservation Corps (CCC) crews built as many as eight shelters on the Hoh, Queets, and Quinault rivers. Examples of public works projects in the park include roads along the Elwha River, and roads to Olympic Hot Springs,

Deer Park, and between Heart O' the Hills and Coleman's Ranch.

Other projects were construction of ranger stations, trails, campgrounds, and the public works camps, such as the CCC community kitchens at Elwha and Altair, and CCC camps at Elwha, Snider (10 miles west of Lake Crescent), Lake Cushman, and Quinault. Public works projects did much to encourage the recreational development in the national monument, and were also responsible for the construction of park administrative facilities, including park headquarters. By 1935 the Forest Service had completed 962 miles of trails and associated facilities including campgrounds and overnight shelters. The Forest Service and CCC legacy remains evident in the park's trail system, recreational and administrative trailside structures, and shelters. Shelters are considered character-defining features of the Forest Service trail system.

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. A portion of the coastal strip, the Queets Corridor, and a section of the Bogachiel Valley were added to Olympic National Park in 1953 by presidential proclamation signed by President Harry Truman.

The strategic location of Olympic National Park on the northwestern peninsula of the contiguous United States contributed to military presence in the park during World War II. The U.S. Army, Navy, and Coast Guard all became involved in the accelerated mobilization of defense of the Northwest Coast. The Coast Lookout System was instituted along the rugged Pacific coastline. At the height of Coast Guard activity in the Ozette Lake area, 10 beach patrol outposts and three coastal lookout towers were in operation. After the summer of 1943, military coverage along the coast was scaled back. Coast Guard units were stationed in the La Push area (Toleak Point, Mosquito Creek, Mora, and Third Beach) and Kalaloch. A total of 13 aircraft warning service observation stations were located in existing fire lookouts including Blue Mountain above Deer Park, Dodger Point, Hurricane Ridge, Enchanted Valley, Pyramid Peak, Warkum Point, Indian Pass, and Geodetic Hill.

Following World War II there was a dramatic increase in visitation. Travel on the Olympic Loop Highway increased, and the demand for resort lodging along the coastal strip escalated. In the late 1940s there were concessioner operations at Kalaloch, Ruby Beach, Mora, La Push, and Ozette Lake. Early recreational development at Kalaloch, known as Becker's Ocean Resort, was included in the coastal strip acquisition area in 1953. In 1978 the National Park Service purchased the Becker property, renamed it Kalaloch Lodge, and leased it to a concessioner for operation.

In 1956 the National Park Service undertook a nationwide design and construction initiative, known as "Mission 66," which was intended for completion by 1966. This program was developed largely to address the need for new facilities and infrastructure to accommodate the increasing visitation. Development at the park's Hurricane Ridge and in the Hoh Valley began as part of the Mission 66 program. Breaking with the emphasis on rustic design that had previously characterized NPS architecture, Mission 66 designers incorporated modern building materials and design elements. The new architectural style became known as "Park Service Modern." Visitor centers emerged during this period as centralized facilities serving visitors and park administrative needs (NPS 2000b).

Mission 66 historic districts are located at park headquarters, Hoh, Heart O' The Hills, Hurricane Ridge, Kalaloch, and Mora. Mission 66 features are also present at park campgrounds at Altair, Elwha, Fairholme,

Graves Creek, July Creek, Staircase, and the ranger station at Quinault.

Skiing was among the last recreational sport activities to become popular in the Olympic Mountains. The Civilian Conservation Corps developed a recreational skiing area at Deer Park, which opened during the 1936–37 winter season in what was then Olympic National Forest. Under National Park Service administration, Deer Park continued in operation until 1957, when it was replaced by new facilities and the new paved road to Hurricane Ridge. The road opened in 1957, and the ski area opened for the first time on January 1, 1958.

A DESCRIPTION OF THE PARK'S CULTURAL RESOURCES

The National Historic Preservation Act recognizes five property types: districts, sites, buildings, structures, and objects. To focus attention on management requirements within these property types, NPS Management Policies, 2001 categorizes cultural resources as archeological resources, historic structures, cultural landscapes, ethnographic resources, and museum objects. Cultural resources may be linked to historic events or noteworthy people; they may be embodiments of technical accomplishment, design, or workmanship; they may be sources of information important in historical or archeological research; or they may be important in the cultural system of an ethnic group (NPS Director's Order # 28). The rich human history of the Olympic Peninsula is reflected in the abundance of cultural resources within the park. Every cultural resource in the park has a place in the history or prehistory of the Olympic Peninsula.

Archeological Resources

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. Prehistoric archeological resources may be terrestrial or submerged.

In this document 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.

More than 650 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.

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.

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.

Historic Structures

A historic structure is "a constructed work . . . consciously created to serve some human activity" (NPS Director's Order 28). Historic structures are usually immovable, although some have been relocated and others are mobile by design. Historic structures at Olympic National Park include buildings, lodges, cabins, a chalet, homesteads, historic districts, shelters, ranger stations, guard stations, Civilian Conservation Corps community kitchens and campgrounds, dams, fire lookouts, caches, railroads, boathouses, roads, fences, and other structures of historic, aesthetic, or scientific importance.

According to federal law and NPS management policies, all historic structures in which the Park Service has a legal interest are to be managed as cultural resources. Regardless of type, level of significance, or current function, every structure is to receive full consideration for its historical values whenever a decision is made that might affect its integrity. Historic structures that are central to the legislated purposes of parks, especially those that are to be interpreted, may be subjects of additional, specialized efforts appropriate to their functions and significance.

The documented historic structures in Olympic National Park are associated with the exploration and settlement of the Olympic Peninsula, recreational development, and the federal land management history of the park. Many of the historic structures in the park represent the activities of both the U.S. Forest Service and the National Park Service; while others embody recreational development in the scenic Olympic Peninsula and the perseverance of homesteaders and settlers. The park has approximately 130 historic structures. See "Appendix E: List of Classified Structures."

Cultural Landscapes

The National Park Service defines a cultural landscape as a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a

historic event, activity, or person or exhibiting other cultural or aesthetic values.

Four kinds of cultural landscapes, not mutually exclusive, are recognized. A historic site is a landscape significant for its association with a historic event, activity, or person. A historic designed landscape is a landscape significant as a design or work of art, was consciously designed and laid out either by a master gardener, landscape architect, architect, or horticulturist to a design principle, or by an owner or amateur according to a recognized style or tradition. A historic vernacular landscape is a landscape whose use, construction or physical layout reflects endemic traditions, customs, beliefs, or values in which the expression of cultural values, social behavior, and individual actions over time is manifested in physical features and materials and their interrelationships including patterns of spatial organization, land use, circulation, vegetation, structures, and objects. An ethnographic landscape is an area containing a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures, each with their own special local names.

Although Olympic National Park has documented some cultural landscapes, documentation, evaluation, and registration of cultural landscapes in the park is not complete. The park has documented four cultural landscapes (headquarters, Humes Ranch, Rosemary, and Lake Crescent Lodge). In addition, 27 historic sites have cultural landscape resources that have not been fully documented. These may be added to the list of cultural landscapes that may meet national register criteria. See "Appendix E: List of Cultural Landscapes."

Two 1984 and 1987 cultural landscape studies provide brief overviews of four cultural landscapes in the park — Lake Crescent Lodge, Rosemary Inn, park headquarters, and Humes Ranch (NPS 1984).

Ethnographic Resources

Ethnographic resources are expressions of human culture and the basis of continuity of cultural systems (NPS Director's Order #28). Ethnographic resources can include sites, structures, objects, landscapes, or a natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a traditionally associated group.

Park ethnographic studies have found that the Olympic Peninsula and its waters are crucial for subsistence activities as well as important as a place of power and identity for the Native American groups on the peninsula. Indian lifeways here involved harvesting river and ocean fisheries and traveling into the mountains to gather plant products such as huckleberries, thimbleberries, roots, and wood. Olympic Indians also hunted game and conducted spiritual activities by traveling to the high lakes and mountain peaks. The Olympic Mountains were important as places of power and were highly regarded as spirit quest sites. Most tribes recognize the mountainous interior as a spiritual place. The park staff has recorded different names for spiritual mountain beings recognized by the Olympic Peninsula tribes. In addition, most tribes had settlements inland along the major river valleys, and many peninsula tribes traveled through the mountains to visit different tribal communities. Both riverine and marine fisheries resources continue to be important to all of the Olympic Peninsula tribes. For most, the major tribal economy is fishing, and many tribes operate fish hatcheries. The National Park Service will continue to consult with the associated tribes to learn about possible traditional cultural property sites and how to preserve them.

Museum Collections

Olympic National Park holds a variety of distinctions relating to both the cultural and natural diversity of this unique landscape. The park's collections reflect that diversity with almost half a million objects. The cultural collections contain objects relating to the

archeology, ethnography, and the history of the area now within the park. The natural collections contain a variety of paleontological, geological, and biological voucher specimens. The collection also maintains archival collections for the park with holdings in park records, original data forms from research projects, historic photographs, historic objects, and memorabilia. To house the collections within the available space, the museum has compact storage with moveable aisles. A dissection scope with photographic capabilities, a compound scope, and a communal worktable are provided for research and collection maintenance activities. Collection materials are stored in appropriate cabinets. Archives are stored in special archival quality boxes on shelves within the collection.

Natural History Collection. The purpose of the natural history collection is to provide on-site documentation of park resources. The collections are frequently used by both park staff and outside researchers. Each year field crews use the collections on a regular basis. The following disciplines are represented in the park's natural history collection.

Paleontology: Paleontological resources are a small component of the collection. Fossils are present on park lands; however, current research on fossils has been limited. These collections could be expected to increase in the future.

Geology: Geological specimens are best represented by the Rowland Tabor voucher collection, produced during research on the geology of the Olympic Mountains. Moderate growth is possible in the geology collection.

Biology: Biological specimens comprise most of the natural history collection. Herbarium specimens from vascular and nonvascular research projects are the most numerous and most often examined. Loans to outside researchers are frequently made for taxonomic revisions. There is a small reference collection of fish and herpetological specimens. Park collections of plants and vertebrates have also been deposited in other institutions, mainly the University of Washington's Herbarium and Burke Museum. Insects and other invertebrates are poorly represented. Future research could add significantly to invertebrate reference collections.

Cultural Collection. The purpose of the cultural collection is to preserve a portion of the national park's cultural heritage and to increase knowledge and appreciation of that heritage. Cultural objects provide opportunities for research, exhibits, and interpretive programs in the park. The following disciplines are represented in the park's cultural collection.

Archeology: Archeological artifacts and objects represent collections ranging from prehistoric to historic. They are the result of park research activities, compliance, and inadvertent finds. Park artifacts from two important sites are housed at The Burke Museum and used for teaching and research activities. Less than 1% of park lands have been systematically surveyed. Thus, archeological collections could be expected to increase with ongoing research.

Ethnography: The ethnographic collection contains a wide range of objects from baskets to paddles. For many objects, tribal association is unknown. In addition the park is housing a diverse collection of items for the Quileute Tribe. The park's ethnographic collection has provided material for various research projects. Significant growth in the ethnographic collection is not anticipated.

History: Objects with direct relationships to the park from the past to the present can be found in the history collection. Historical objects in the collection range from farm implements to photographs and include a wide range of items. Some accessions relate to notable figures in park history, such as Herb Crisler and Fanny Taylor, and contain

a variety of materials. There may be moderate growth in the history collection.

Archives: Archives are record materials generated by park activities from both cultural and natural divisions as well as archival donations to the park. The park archives include many types of records from original data forms from park research projects to original manuscript collections. Archival collections relating to the park are also found at facilities in Seattle and San Bruno, California, as well as the University of Washington Archives. A parkwide archival survey estimated the park holdings at more than 6 million items. Processed archives currently amount to approximately 140,000 items. The archives will continue to grow.

Resource Library (NPBiB, NatureBib): An archive of sorts, the museum collections area also houses the NPBib resource library. This is a specialized collection of reference material that contains data directly related to any park resources both natural and cultural. Bibliographic data for each reference is entered into the NPS NatureBib website. The museum curator manages both data entry and the resource library providing materials, as requested, to park staff or outside researchers. The resource library gets regular and frequent use and will grow at the same rate as the production of publications and reports on park resources.

Library. The park library contains a variety of reference materials used primarily by park staff, partners, and volunteers. The library acquisition policy states the top priority as providing support to the Olympic National Park Resource Education Division to enable them to best provide information to park visitors. The main library is in the Olympic National Park Visitor Center. It contains about 2,000 books and several periodicals. In addition the library also maintains more than 150 VHS videos, DVDs, and CDs that are available for use. The park slide collection is also housed in the library. Other reference materials include subject files and reprint collections. The park relies heavily on volunteers for basic museum maintenance and upkeep of the library. The library will continue to grow as books are purchased by the library and other park staff.

HISTORIC CONTEXTS AND CURRENT THREATS

A historic context is a management tool that groups cultural resources based on common themes, time periods, or geographic areas. At Olympic National Park cultural resources are defined by fourteen historic contexts that are derived from historic events and trends that occurred within the park. These contexts exist as archeological sites, historic structures, cultural landscapes; traditional cultural properties, and ethnographic resources. The most at risk categories are maritime archeological sites, traditional tribal uses, homesteads, federal land management, resorts and recreational cabins, and World War II resources.

Olympic National Park's overarching goal is to maintain all cultural resources in at least fair to good condition for future generations. Many of these resources are now in fair to good condition. However, some elements of these contexts are threatened by continued poor condition or other changes in the environment. The following identifies those contexts with the current and potential threats.

Maritime Archeological Sites

Maritime archeological sites include stratified shell midden deposits and petroglyph sites and represent one of the park's most significant and threatened class of archeological resources. Threats include coastal erosion and visitor use. Past mitigation has occurred at these areas, and has included such actions as excavation, bank stabilization and revegetation. Public education and interpretation, coupled with increased monitoring and ranger patrols, has occurred in

the past to curb the impacts of visitation and tidal debris on coastal petroglyph sites, particularly at the Wedding Rocks site.

Traditional Tribal Activities

Native plants on an untrammeled landscape are central to traditional tribal activities. The plants and landscapes may have flourished over the past 10,000 years because of native fire and harvest techniques. The park has investigated the relationship of native practices and the ecological health of the park lands to better understand important traditional landscapes. However, lack of management actions at these sites could result in a loss or degradation of these traditional landscapes.

Homesteads

Historic structures are important aspects of the remaining homestead sites. The primary threat to these structures is the lack of regular maintenance. Cultural landscapes for homesteads are important for the clearing that has occurred in these areas, and the viewsheds they provide. On certain homesteads heritage trees and plants remain. Many of these areas have suffered from longstanding deferred maintenance.

Federal Land Management Infrastructure

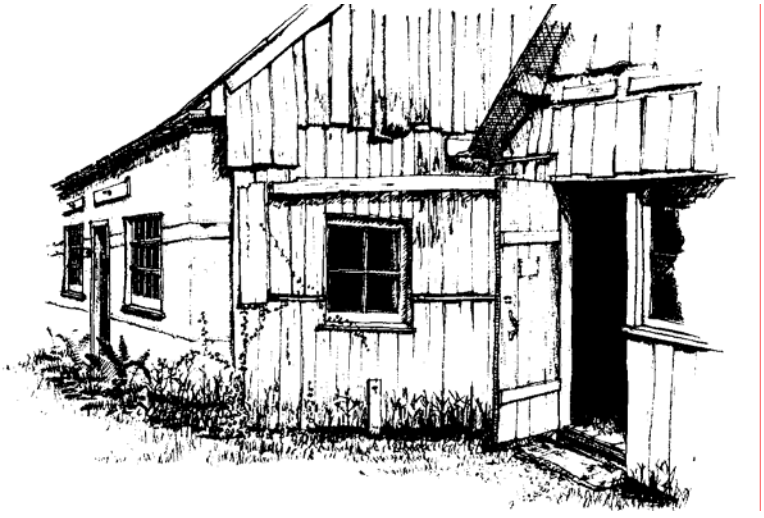
Historic structures are an important aspect of the historic federal land management infrastructure within the park. Threats to these structures include lack of regular maintenance leading to decreased structural stability. Cultural landscapes for ranger stations, headquarters, roads, and other features are important. Many of these areas have suffered from longstanding deferred maintenance.

Resorts and Recreational Cabins

Some Olympic National Park resorts and recreational cabins are historic structures and components of cultural landscapes. These structures and cultural landscapes have suffered from longstanding deferred maintenance.

World War II Resources

Historic structures are an important aspect of the historic World War II context. These structures are at risk from the lack of regular maintenance and stabilization activities.



OLYMPIC PENINSULA TRIBES

There are eight Olympic Peninsula tribes that continue to recognize a relationship to the park based on traditional land use, origin beliefs, mythology, and spiritual beliefs and practices. These tribes are Lower Elwha KIallam, Jamestown S'Klallam, Port Gamble S'Klallam, Skokomish, Quinault, Hoh, Quileute, and Makah (NPS 2003). The Port Gamble S'Klallam reservation is outside the park (on the east side of Hood Canal), but this tribe shares traditional territory with the other two Klallam tribes. The ancestors of the tribes today formerly lived throughout the Olympic Peninsula, but ceded their lands to the federal government through treaties in 1855 and now live on reservations along the shores of the peninsula. These treaties are the:

> Point No Point Treaty, January 26, 1855, with the Klallam, Chimacum, and Skokomish
>
> Treaty of Neah Bay, January 31, 1855, with the Makah and Ozette
>
> Treaty of Olympia, July 1, 1855, with the Quileute, Hoh, Queets, and Quinault.

These treaties secured certain rights to the tribes in exchange for Indian cession of lands that are now within the boundaries of Olympic National Park. The treaties were not a grant of rights to the Indians, but a grant of rights from them, and a reservation of those rights not granted (United States *v.* State of Washington, 384 F. Supp. 312 [1974]: 323). These reserved treaty rights were recognized and included in Section 4 of the bill to establish Olympic National Park (H.R. 4724) in 1938. The clause in Section 4 stipulates that "the rights reserved by treaty to the Indians of any tribe . . . shall not be affected by the establishment of the National Park." The three peninsula treaties secured the rights of the eight tribes to take "fish at usual and accustomed grounds and stations . . . together with the privilege of hunting and gathering roots and berries on all open and unclaimed lands." The treaty with the Makah also secured the right of "whaling and sealing at usual and accustomed grounds and stations." The right to fish at all usual and accustomed grounds and stations was affirmed by the United States Supreme Court (U.S. *v.* Washington, 1974, 1979). The waters within Olympic National Park have been adjudicated to be usual and accustomed fishing places of the eight Indian tribes having treaty secured fishing rights, and are open to fishing by members of these tribes in conformance with applicable tribal or state regulations conforming to the orders of the United States District Court (36 CFR 7.28(a)(8)(i)). Nothing in this plan diminishes reserved treaty rights.

The National Park Service will continue to consult with the eight Olympic Peninsula tribes on a government-to-government basis regarding actions on park lands adjacent to Indian reservations.

Historically the Klallam lived along the northern Olympic Peninsula with villages located at Hoko, Clallam Bay, Pysht, Deep Creek, and Freshwater Bay. The KIallam also had settlements along the Elwha River, in the area of Port Angeles, and along creeks east of Port Angeles. Fishing and gathering activities are an important component of KIallam subsistence. Tribal members gather shellfish, squid, and octopus at their usual and accustomed harvesting areas, which extend from Hoko River to Hood Canal. Ocean fishing is also pursued. When the Treaty of Point No Point was signed in 1855, many Klallam refused to move onto the Skokomish Reservation, and it was not until the late 20th century that reservations for the Klallam were established. Today the Klallam are divided into three reservations.

The 427-acre Lower Elwha Klallam Reservation, established in 1968, is on the east side of the mouth of the Elwha River and extends upriver about a mile. There is also a section of reservation land on the west side of the river in the area of Ranger Road. The Lower Elwha Klallam were organized under the Indian Reorganization Act in 1968. The primary economic resource for the tribe is commercial fishing, although most fishing activities are subsistence oriented. The tribe operates a salmon hatchery on the Lower Elwha River.

The Jamestown S'Klallam Reservation, established in May of 1986, is on Highway 101 at the head of Sequim Bay. The residential community of Jamestown is east of Dungeness Bay. The Jamestown S'Klallam Tribe regained official federal recognition in February 1981. The Jamestown S'Klallam operate the Seven Cedars Casino on Highway 101 at Blyn, as well as businesses in Port Angeles and Bainbridge Island. Jamestown fishery operations include an oyster aquaculture project at Dungeness and Sequim bays and fish and shellfish are an important component of subsistence.

The Port Gamble S'Klallam Reservation is on the North Kitsap Peninsula across the bay from the town of Port Gamble. The Port Gamble S'Klallam traditionally maintained homes on the west side of Port Gamble Bay until they were displaced in 1853 by the Puget Sound Mill Company lumber mill operation. Following passage of the Indian Reorganization Act in 1934, 1,234 acres of land at Point Julia was purchased from the mill company to establish a reservation for the Port Gamble S'Klallam. Fisheries resources are important, and the tribe operates a coho and chum salmon hatchery.

Members of the Skokomish Tribe historically lived on the east side of the Olympic Peninsula and used the resources of an extensive area of marine water as well as the rivers and estuaries in the Hood Canal watershed, particularly the valleys and resources of the Skokomish River. Skokomish villages were at the mouth of the Skokomish River on Hood Canal and along the river's main branch and the North Fork of the Skokomish River and its tributaries. Other Skokomish settlements were at the northern end of Hood Canal at the Quilcene, Dosewallips, Duckabush, and Hamma Hamma rivers. People from these settlements traveled by canoe and trail up the Skokomish and other rivers into the Olympic Mountains to collect berries and hunt elk, marmot, bear, and other game. After the Treaty of Point No Point in 1855, a 4,987-acre reservation was located at the head of Hood Canal, with its southern boundary located along the Skokomish River. Olympic National Park's Hood Canal District is within the ancestral area of the Skokomish. The Skokomish Tribe is a federally recognized tribe organized under the Indian Reorganization Act of 1934. Fishing on the Skokomish River and in Hood Canal remains important to the Skokomish. There is agricultural land within the reservation, and the tribe also has a hatchery on Enetai Creek. The Staircase area of Olympic National Park was used for spirit acquisition and for resource gathering in the past and continues to be important today.

Before the Treaty of Olympia, numerous Quinault villages were located along the banks of both the Quinault and Queets rivers as well as along the shores of Lake Quinault. In July 1855 the Hoh, Queets, Quileute, and Quinault tribal leaders signed the Treaty of Olympia ceding nearly one-third of the Olympic Peninsula. Subsequent acts of Congress, including the General Allotment Act of 1887, resulted in the loss of much of the Quinault Reservation land.

The Quinault Indian Reservation consists of 212,000 acres beginning south of Kalaloch and following the coastline 26 miles south to Moclips, then extending northeast to Lake Quinault's northeastern point. The reservation includes Lake Quinault. The reservation has three communities: Queets, on

Highway 101 and the Queets River; Taholah at the mouth of the Quinault River; and Amanda Park at the southern end of Lake Quinault. Quinault tribal membership includes seven distinct groups: Quinault, Quileute, Queets, Hoh, Chehalis, Chinook, and Cowlitz. Of these only the Quinault and Queets were the original inhabitants of the present-day Quinault territory, which encompasses the Quinault and Queets watersheds and the coastline near the mouths of these rivers (Wray 2002). The most important cultural resource and economic staple of the Quinault people is salmon, and the Quinault were also the southernmost whaling tribe on the Northwest Coast. The Quinault also used the resources of the forested mountains and higher elevations for spirit quests.

The Quinault Tribe did not reorganize under the Indian Reorganization Act of 1934, but instead adopted the *Bylaws of the General Council of the Indians of the Quinault Indian Reservation* in 1922, and in 1975 they approved a constitution to form the current Quinault Indian Nation government. In 1990 the Quinault Nation negotiated a tribal compact under the Self-Governance Demonstration Project enabling the Quinault people to administer its own programs and deal directly with the federal government (Wray 2002). The Quinault Indian Nation operates a fish hatchery at Lake Quinault.

Aboriginal Quileute territory extended from south of Cape Alava to Destruction Island. Inland, the Quileute people lived along the Sol Duc, Calawah, Bogachiel, and Dickey rivers, all of which join to form the short stretch of the Quillayute River before it tumbles into the Pacific Ocean at La Push. The major settlements were at the mouths of the Quillayute and Hoh rivers (Schalk 1988). The Quileute people relied upon salmon as their staple food, but also practiced seal hunting and whaling.

Following the Treaty of Olympia in 1855, in 1889 about 1 square mile at the mouth of the Quillayute River at La Push was set aside as a reservation by executive order of President Grover Cleveland. The Quileute voted to accept the Indian Reorganization Act and today are governed by the *Corporate Charter of the Quileute Indian Tribe*. Most members of the Quileute Tribe live at La Push. James Island, located just west of the mouth of the Quillayute River, is an important spiritual location for the Quileute and Hoh people and is a part of the reservation.

The Hoh are a small tribe who historically lived in at least seven river settlements along the Hoh River drainage. The main Hoh village was at the mouth of the Hoh. Following the Treaty of Olympia and the subsequent establishment of the Quinault Reservation, many of the Hoh refused to move there, and in September 1893 President Grover Cleveland signed an executive order establishing the Hoh Reservation on the lower Hoh River. Today the 443-acre Hoh Reservation is visible from the Oil City Road on the north side of the Hoh River. The Quileute and Hoh usual and accustomed fishing grounds include all waters of the Hoh, Quileute, Bogachiel, Sol Duc, Clearwater, Calawah, Dickey, Queets, and Quinault rivers and the Pacific Coast north and south of the Quillayute River.

Historically, the Makah lived in five permanent villages between the waters of the Strait of Juan de Fuca on the north and the Pacific Ocean. Although the fisheries resources of the Hoko, Ozette, Pysht, Lyre, and Twin Rivers were used by the Makah, the Makah territory was not centered on substantial rivers valleys; consequently, Makah settlement was decidedly marine rather than riverine (Schalk 1988). The traditional sea territory of the Makah extended from the Lyre River on the Strait of Juan de Fuca north to 40-Mile Bank and south to near Cape Johnson. The Makah hunted marine mammals as well as fish and shellfish, land mammals, and birds and practiced whaling.

In January 1855 the Makah signed the Treaty of Neah Bay ceding title to 300,000 acres of land and establishing the Makah Reservation, which was subsequently enlarged in 1872 and 1873. The Makah Reservation is on the northwestern tip of the Olympic Peninsula and encompasses 27,265 acres. The 719-acre Ozette Reservation is 10 miles south at Cape Alava and was set aside by executive order in 1893, but was greatly reduced in 1896 when many people moved to Neah Bay. In 1970 a 1 square-mile reservation around the Ozette archeological site was returned to the Makah Tribe and in 1984 Tatoosh and Waadah Islands were returned to Makah jurisdiction. In 1936 under provisions of the Indian Reorganization Act, the Makah adopted a constitution and bylaws.

The major tribal economy is fishing, and the tribe operates fish hatcheries at Neah Bay, Ozette Lake, Hoko, and Waatch. The Makah Tribe opened the Makah Cultural and Research Center in 1979, which houses the extensive archeological collection from the Ozette Village archeological site. The Makah possess great knowledge of ocean resources and navigation, and sea mammals were the staple of the Makah diet. The whaling tradition was an important activity for the Makah.

The waters within Olympic National Park have been found to be usual and accustomed fishing places of the eight Indian tribes having treaty secured fishing rights and are open to fishing by members of that tribe in conformance with applicable tribal or state regulations (U.S. *v.* Washington 1974, 1979).

VISITATION

During the 1980s the average annual recreation visits to Olympic National Park were about 2.6 million people. In the 1990s that average rose to just over 3.2 million recreation visits per year, representing an increase of about 24%. Figure 2 shows the total annual recreation visits from 1980-2004.

The National Park Service reports visitor use as *recreation visits*. A recreation visit is one person entering a park for any part of a day for the purpose of recreation. One person may be counted as a "visit" more than once if he/she enters the park at more than one location. Thus we use the term "recreation visit."

On a monthly basis (see figure 3) most visitation occurs from June through September with July and August receiving the highest number of visitors.

Table 7 compares the total annual recreation visits by district within the park.

Table 8 depicts the distribution of overnight stays in the park during 2004.

FIGURE 2: TOTAL ANNUAL VISITATION 1980-2004

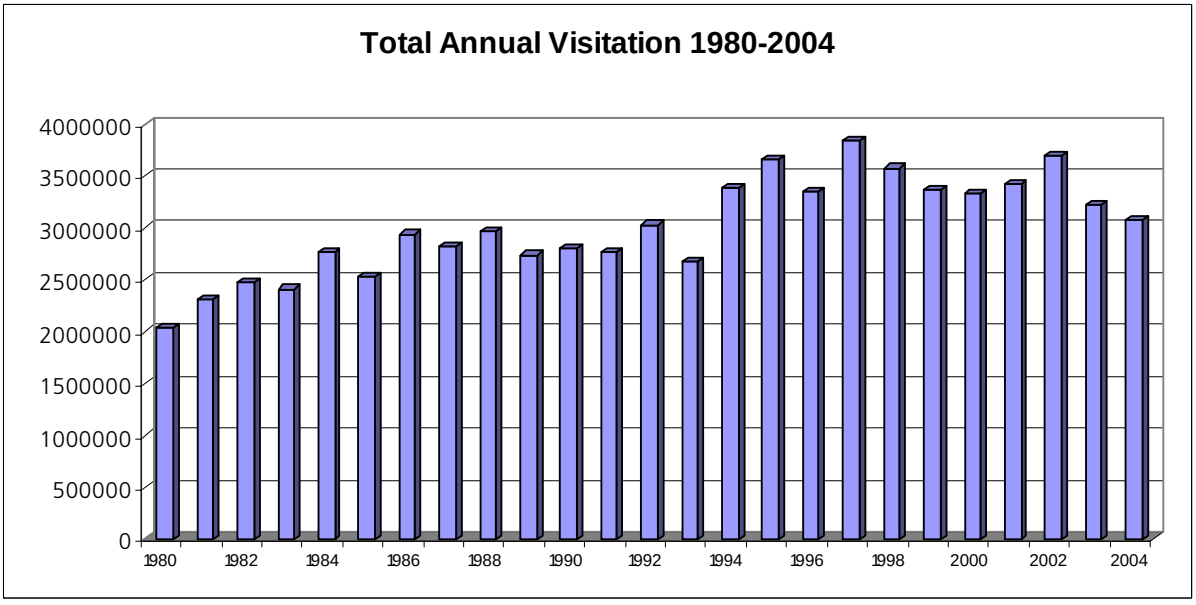


FIGURE 3: MONTHLY VISITATION (2004)

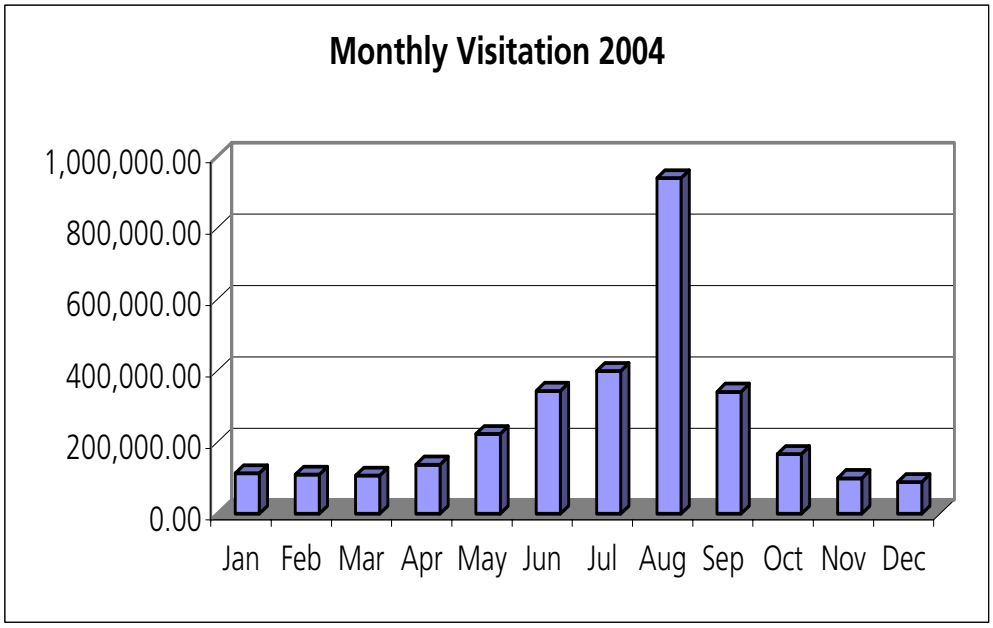


TABLE 7: TOTAL ANNUAL RECREATION VISITS BY DISTRICT, 2004

District	Recreation Visits	Visitor Center Contacts
Lake Crescent	2,140,842	12,860
Hoh	148,101	261,666
Mora	628,721	NA
Kalaloch	348,153	Not Available
Elwha	136,136	NA
Hoodsport	65,442	0
Hurricane	238,526	151,478
Ozette	59,439	NA
Quinault	235,695	2,802

TABLE 8: DISTRIBUTION OF OVERNIGHT STAYS IN THE PARK, 2004

Concession Lodging	63,069
Concession Campgrounds	9,674
NPS Campgrounds-	190,992
NPS Backcountry	75,005

In July 2000 the University of Idaho Cooperative Park Studies Unit conducted a survey of park visitors. The purpose of the study was to get a better understanding of park visitors and to learn more about what experiences visitors looked for and attained. Information was gathered about demographics, activities visitors engaged in, opinions regarding the quality of visitor services, etc.

The survey results are summarized below:

- Most of the visitor groups (64%) were family groups. Forty-three percent of visitor groups were groups of two. Thirty-nine percent of visitors were aged 36-55 years, while 18% were aged 15 years or younger.
- Two percent of visitor groups participated in a guided tour.
- Seventy-eight percent of visitors indicated that their primary reason for visiting the Olympic Peninsula was to visit Olympic National Park.
- U.S. visitors were from Washington (47%), California (8%), and 46 other states and Washington, D.C. International visitors comprised 8% of the total visitation, with Canada and Germany the most represented countries.
- Most visitors (88%) indicated that they had made one or two visits to Olympic National Park during the last 12 months.
- Most visitor groups (69%) spent one day or more at the park. Of those groups that spent less than a day at the park, 65% spent five hours or less.
- The sources of information used most by visitor groups were travel guides/tour books (42%), previous visit(s) (40%), friends/relatives (36%), live in the local area (25%), and the park website (22%).
- The most commonly visited sites in Olympic National Park were the Hurricane Ridge Visitor Center (47%), Hoh Rain Forest (44%), Lake Crescent (33%), and the main visitor center (31%). Other key sites included Sol Duc (26%), Quinault (23%), Mora/Rialto Beach (23%), and Kalaloch (20%).
- Sites visited first by visitors included the main visitor center (26%), Hurricane Ridge Visitor Center (16%), Quinault (14%), Staircase (9%), Lake Crescent (7%), and the Hoh Rain Forest (7%).
- When asked to list their favorite places in the park, those mentioned most often were Hurricane Ridge, Hoh Rain Forest, rain forests in general, trails, beaches/ coast, and Sol Duc. Reasons most often given for their favorite area included: scenery, trails, wildlife, natural beauty, unique experience, and old-growth forest.
- The most common activities were sightseeing/scenic drive (88%), walking on nature trails (77%), enjoying wilderness, solitude, and quiet (73%), viewing wildlife (72%), and hiking (71%).
- Of visitors who took all-day or half-day hikes, the most popular destinations included the Hoh Rain Forest, Hurricane Ridge, Sol Duc, Quinault, Lake Crescent, Rialto Beach, Kalaloch, Staircase, and Marymere Falls.
- The most used interpretive services included the park brochure/map (91%), entrance station/ information desks (65%), and trailhead bulletin boards (52%).
- On issues related to crowding by vehicles or by people, 34%-38% of visitors stated that they experienced no crowding at all in the park. However, between 45% and 47% of visitors said that some areas of the park were "somewhat crowded." Of visitors who identified crowded areas, Hurricane Ridge was named most often, followed by the Hoh Rain Forest and Sol Duc.

VISITOR OPPORTUNITIES

Visitor recreational opportunities, services and facilities abound in the three distinctive natural settings for which the park is renowned — the Olympic Coast, the Olympic forests, and the rugged Olympic Mountains.

At one end of recreation spectrum, 95% of the park is designated federal wilderness offering more unconfined recreation and camping. At the other end of the spectrum, there are less strenuous kinds of visitor recreational experiences, such as short nature hikes, sightseeing, and facilities for visitors such as stores, gift shops, restaurants, developed campgrounds, picnic areas, educational facilities, and exhibits. These facilities are in park front-country areas with road access. The diverse range of visitor recreation activities will be described as road-, trail-, water-, or winter-based. (Wilderness recreational activities are described in the section on "Wilderness Values.")

Law requires that programs and facilities be available to visitors with disabilities. Visitors with mobility disabilities have access to educational and lodging facilities, nine developed campgrounds, and two very short interpretive nature trails. Steep terrain and long distances on much of the park's wilderness trail system limits trail access for some visitors.

RECREATIONAL OPPORTUNITIES

Road-based Recreational Opportunities

Roads provide access to distant areas with recreational and park facilities, furnish enjoyable sightseeing experiences, and provide an opportunity for bicycling, although there are no designated bike lanes in the park. More detailed discussion on roads within the park is included in the "Visitor Access" section of this chapter.

Many visitors enjoy leisurely sightseeing driving with spectacular vistas and distinctive adjacent scenery and watching for wildlife. Most roads used for sightseeing are paved, and many have scenic overlooks or viewpoints, short interpretive nature trails, and picnic areas.

Olympic Coast Sightseeing. In the Kalaloch area 8 miles of U.S. Highway 101 offers the only opportunity to drive along the coast in Olympic National Park, with glimpses of spectacular and varied coastal scenery — crashing waves, sandy beaches, driftwood-covered beaches, sea stacks, rugged cliffs, Destruction Island and lighthouse, creek outfalls, wind-sculpted vegetation, and temperate rain forests. Sunsets and variable weather conditions can make the sightseeing even more dramatic. The scenic drive includes a series of pullouts and overlooks, beach access points, and a picnic area. Beach 4 and Ruby Beach have accessible overlooks, and the trail to Ruby Beach is accessible. Because U.S. 101 is not a park road, visitors wanting a leisurely sightseeing drive may feel less comfortable due to highway traffic. Traffic noise can be heard at the lodge and campground. Coastal erosion in two areas of U.S. 101 threatens to eventually destroy road lane sections and disrupt driving along ocean bluffs.

Lake Crescent Sightseeing. U.S. 101 travels through Olympic National Park along the south side of Lake Crescent. The dramatic setting 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 corridors. 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.

Forest Sightseeing.

Quinault — In the heart of the Quinault area, visitors are provided with a unique opportunity for exploring the southern most temperate rain forest in the United States.

Along the north shore of Lake Quinault, forests frame lake vistas and provide tantalizing hints to the forests and mountains beyond. Short nature trails through the rain forest and a historic homestead are provided. Picnic facilities are provided. Most of the South Shore Road is outside the park boundary. Facilities here include the Olympic National Forest Ranger Station, campgrounds, trails, and tribal and private facilities. Once the road enters the park, visitors can choose to drive to the Graves Creek area, where they will find opportunities for seeing pristine rain forests, the Quinault River, and wildlife. Visitors may also choose to continue around to the north side of the lake.

A loop driving experience between the North Shore and South Shore Roads has historically been provided. However, road access and bridge connections have been endangered by periodic high flow events, flooding, and the meandering nature of the Quinault River and its tributaries.

Hoh — The Hoh Valley envelops visitors in the atmosphere of the luxuriant mossy temperate rain forest and offers vistas to distant mountain peaks across the braided Hoh River. Picnic facilities and several short interpretive nature trails, including an accessible trail, are provided. Erosion resulting from the meandering nature of the Hoh River and periodic high flow events can damage the roadway and limit access in the narrow scenic corridor.

Sol Duc — The Sol Duc Road offers views of old-growth forests, and the area includes several short interpretive nature trails and a salmon viewing overlook at Salmon Cascades. There are also flooding concerns along the Sol Duc Road.

Elwha — The road into Elwha (Olympic Hot Springs Road) offers views of the Elwha River and its valley, Sweets Field, and access to picnic areas, trails, and views of Glines Canyon Dam, which is slated for removal. The Glines Canyon Dam overlook offers glimpses into a rocky canyon and provides vistas into the mountainous interior of the park.

Alpine / Mountain Sightseeing.

Hurricane Ridge — The Hurricane Ridge Road provides spectacular views of the alpine and subalpine wilderness interior of the park as well as the Strait of Juan de Fuca and Canada. Overlooks, viewpoints, and picnic facilities are provided along the road. A visitor center provides information on the panoramic alpine views, and short interpretive nature trails include sections to accommodate visitors with mobility limitations. Winter access is limited and includes shuttle bus service to the seasonal ski and winter play area.

Deer Park — Used mostly by northern peninsula residents, this unpaved road traverses lowland and montane forest environments, and travels above the tree line to provide glorious views into the mountainous interior of the park and the Strait of Juan de Fuca. There is a less developed campground and trail access from this area.

Bicycling. There are no bicycle lanes on roads within the park. Longer distance bicycling around the Olympic peninsula has

become a popular activity for experienced road bicyclists, but families may feel safer and be more comfortable with bicycling on slow-speed roads in campgrounds or developed areas that do not contain commercial traffic.

Trail-based Recreational Opportunities

The trail system provides different types of trail-based recreational opportunities for park visitors. These users may be participating in day or long-distance hiking, backpacking, stock riding, or access to activities such as fishing, orienteering, and mountaineering.

The trails have different characteristics that may make them appealing to different user groups.

Nature Trails. There are about 32 miles of wider paved or gravel nature trails that may include educational signs and appeal to more inexperienced hikers or those who may want a short self-guided interpretive hike. The nature trails are user friendly and there may be segments accessible to people with mobility disabilities.

Wilderness Trails. Most trails are in designated wilderness. There are approximately 611 miles of maintained trails in designated wilderness. More than 50% of the park's wilderness trails (approximately 365 miles) are open to stock use. Some trails (such as foot trails) are closed to stock use or riding, and others may be challenging because they receive little or no maintenance and are in steep remote terrain. Unmarked beach travelways — about 53 miles (or 7% of park trails) — may have sections with safe marked overland routes with fixed ropes or cable ladders to go over inaccessible headland areas during high tides. Beach hiking requires alertness and knowledge of tides.

Bicycle Trails. There is one trail in the park open to bicycling. Bicycling is allowed on the 4-mile multipurpose Spruce Railroad Trail along the north side of Lake Crescent, which follows a World War I railroad bed. This trail will eventually be connected to regional bike trails, providing a safer and quieter bike experience that could appeal to a broader visitor population, including families.

Water-based Recreational Opportunities

Water-based recreational opportunities abound in Olympic National Park in three different types of environments: streams or rivers, lakes, and the intertidal area.

There are boat launches and ramps at

- Lake Mills
- Elwha
- Lake Crescent (Fairholme, Log Cabin, and the Storm King Information Station);
- the Hoh entrance station;
- Queets (Hartzell Creek, Streator Crossing, and Queets Campground)
- Ozette Lake (the ranger station, Rayonier, and Swan Bay)
- Mora
- outside the park at La Push

No personal watercraft use is permitted in the park.

Fishing is regulated. State fishing licenses are required for steelhead and salmon in lakes and streams. An abundance of native fish was formerly found in many lowland streams and rivers. Many of these stocks have been depleted due to a variety of causes. To provide fishing opportunities while ensuring that native stocks are protected, nonconsumptive use and enjoyment of native species of fish, such as catch-and-release fishing, is encouraged or mandatory.

Stream / River-based Recreation. This type of recreation includes nature viewing (primarily elk and fish), fishing, and boating (rafting or kayaking). River and creek outfalls

along the coast at Mora and Kalaloch provide some additional boating, water play, and swimming opportunities. Motorized boating is allowed in the Quillayute River at Mora. There is one river rafting concession (by contract) that operates in the park. Sol Duc Hot Springs Resort includes developed hot spring pools and a swimming pool.

Motorized craft are only allowed on the Quinault River below the North Shore Quinault River bridge; in the park's coastal portions of the Quillayute, Dickey, and Hoh rivers; and at Lake Mills in the Elwha area, Lake Crescent, and Ozette Lake.

Fishing from boats and rafts is allowed on the following rivers: Ozette, Queets below Tshletshy Creek, Hoh downstream from the launch site about 0.5 mile from the park boundary near the confluence of the South Fork, the Hoh River in the coastal area, Quinault below the North Shore Quinault River bridge, Elwha below Glines Canyon Dam, and the Quillayute and Dickey rivers.

Lake-based Recreation. Lake-based recreation includes swimming, fishing, wind surfing, motorized and nonmotorized boating, and nature watching. The use of personal watercraft is not permitted in the park. To protect sensitive lake locations and fish spawning grounds, or provide for swimmer safety, there may be seasonal restrictions or closures on portions of Lake Crescent and Ozette Lake. Lake Crescent has a boat launch at Fairholme, Log Cabin, and Storm King; Ozette Lake has a boat launch at Swan Bay and Rayoneir, and a campground. Non-motorized boats can be rented at Fairholme on Lake Crescent, and at Lake Crescent Lodge and Log Cabin Resort. Hand propelled boats (canoes and kayaks) may be used in wilderness lakes or wilderness portions of lakes.

Intertidal Area Recreation. This type of recreation includes beachcombing, beach hiking or play, water play, seasonal clam digging, sandcastle building, fishing, storm watching, wind surfing, and surfing. Landing of watercraft is not permitted along the coastal strip of the park. Fishing licenses are required, as are licenses to harvest certain shellfish. The offshore islands are part of the U.S. Fish and Wildlife Refuge system and are off-limits to visitors to protect marine habitat. Campfires may be built on some beaches; visitors are advised to check on area bulletin boards and at information stations for information on where campfires are permitted.

Winter Snow-based Recreational Opportunities

The Olympic peaks, while at a relatively low elevation, receive a great deal of moisture, much of it as snow. Hurricane Ridge, at 5,230, includes a downhill ski area with two rope tows and one poma lift, a winter snow play area, and sledding areas. Ski and snowshoe rentals and lessons are available. A seasonal bus service from Port Angeles provides access to the Hurricane Ridge area during the winter operational period, but access can vary due to snow conditions. Cross country skiing and snowshoeing can occur wherever snow conditions permit, and depending on weather conditions may occur in wilderness areas at Sol Duc, Elwha, and Deer Park.

RECREATIONAL SERVICES

Several concessions and businesses under permits provide recreational services in and around the park, including: river rafting, boat rentals, winter shuttle bus service to Hurricane Ridge, guided wilderness trips, horseback riding, pack stock and guided trips, and trailhead shuttles that drop off and pick up visitors and facilitate cross park or one-way travel. Information is available at park and regional visitor centers.

FACILITIES FOR VISITORS

Visitors can choose the type of visitor experience they prefer from an array of facilities to support overnight park visits, food, and recreational activities. These facilities range from wilderness campsites and shelters to developed campgrounds, lodging, restaurants, and stores and are offered in diverse park environments.

Camping Facilities

Diverse camping opportunities are provided in the park near lakes and rivers, along the coast, in forests, and in mountain and subalpine areas. There are more than 2,000 campsites in the park; 883 are road-accessible, ranging from more developed sites with running water and flush toilets, to less developed sites with no potable water and vault toilets. Most frontcountry sites are available on a first-come, first-served basis. In the summer, reservations are available for the Kalaloch campground. There are more than 1,300 campsites located in the wilderness. Wilderness campsites include small designated camps for hikers, group camps for 7 to 12 people, stock camps, and sites at shelters. Permits are required for all overnight stays in the wilderness.

Lodging / Food Service / Supplies and Stores

Several different environments on the north and west sides of the park provide visitor services. There are additional visitor facilities, such as lodging, restaurants, gift shops, gasoline stations, and stores on the south side of Lake Quinault in Olympic National Forest; similar types of facilities are on the Quileute Indian Reservation at La Push, near Mora.

Kalaloch Lodge on the Olympic coast has cabins or motel rooms, a restaurant, a camper store, a gift shop, and gasoline.

The Lake Crescent area offers several types of facilities including the following:

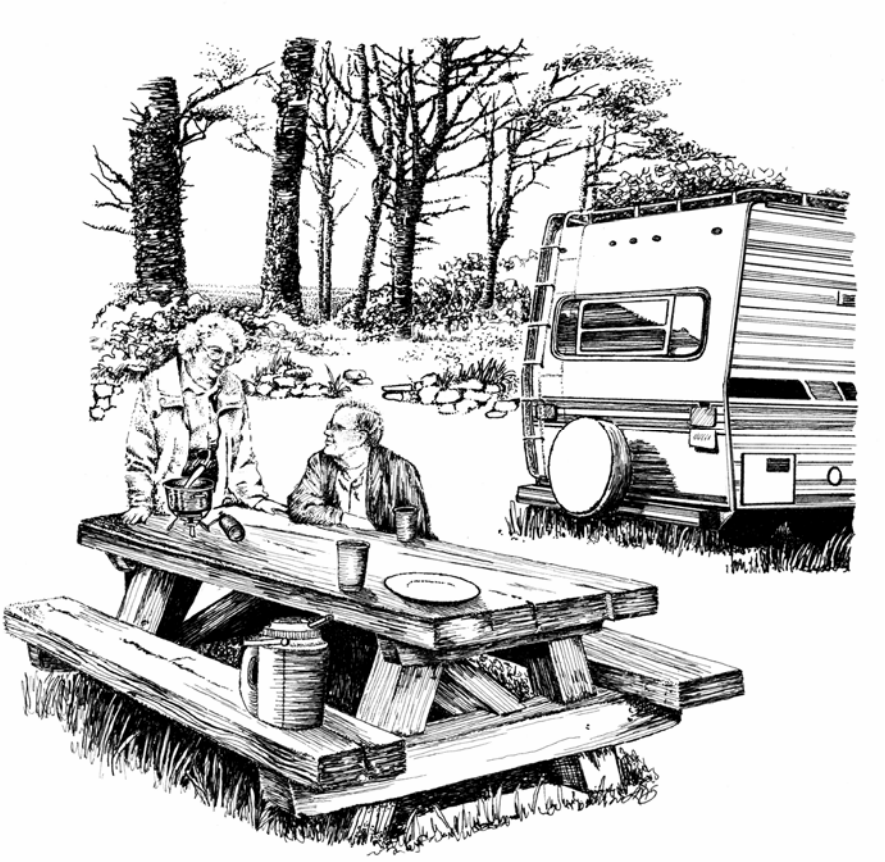
- Lake Crescent Lodge offers a historic main lodge, cottages, rustic cabins, motel rooms, a restaurant, boat rentals, and a gift shop.
- Log Cabin Resort offers cabins, a motel, A-frames, dining room, a store, boat launch, boat rentals, campground, showers, RV sites with full hookups, and laundry facilities.
- Fairholme Store offers sandwiches, snack food, a gift shop, a boat launch, boat rentals, marine fuel, and camping and fishing supplies.
- Olympic Park Institute (at historic Rosemary Inn) is a private, nonprofit educational organization that offers a wide variety of on-site and off-site educational programs.
- Camp David Jr. is a Clallam County outdoor resident recreation camp that offers cabins, a swimming beach, and large dining hall for groups with advance reservations.

The Sol Duc Hot Springs Resort offers a swimming pool and hot mineral pools for public bathing, cabins, a restaurant, a snack bar, gift shop and store, massage therapy, and RV sites with hookups.

The Olympic Mountains / Hurricane Ridge area offers a snack bar and gift shop on a seasonal basis; winter ski and snow shoe rentals, a winter downhill ski area, and a tubing area.

TABLE 9: CAMPING FACILITIES- NONWILDERNESS

FACILITY ENVIRONMENT	LAKE	OCEAN	MOUNTAINS / SUBALPINE	FOREST
Frontcountry Camping (883 sites)				
Developed campgrounds — road accessible (679)	Fairholme (88)	Kalaloch (177)		Sol Duc (82) Heart O' the Hills (106) Hoh (89) Elwha (42) Mora (95)
Less developed — most road accessible (204)	Ozette (14)		Deer Park (14)	Altair (30) Staircase (59) Dosewallips (30) Queets (20) North Fork (7) Graves Creek (30)
Total campsites per area	102	177	14	590



INFORMATION, ORIENTATION, AND INTERPRETATION

This section provides information on the park's methods for providing information, orientation, and education to a variety of audiences whether or not they visit the park.

INTERNET SITE

The park's official website provides a wealth of information for prospective visitors. The website also serves national and international audiences, including people who may never have the opportunity to visit. During the first quarter of 2004, there was an average of 2,500 daily visits to the Olympic National Park website, with visitors spending an average of ten minutes per visit. Approximately 15% of Olympics website visitors were from outside the United States.

WAYSIDE EXHIBITS, SIGNS, AND BROCHURES

There are more than 200 wayside exhibits parkwide that provide information on a variety of subjects, representing all of the three major ecosystems and cultural themes

Interpretive signs at the trailheads provide the public with information specific to the area, park natural and cultural resources, and information on park rules and regulations.

There are large kiosks at Ozette and at the entrance to the Sol Duc Road with visitor information on the natural resources and cultural history of the regions.

There are more than 10 different interpretive brochures that are provided at many trailheads throughout the park. These brochures provide information about the area's natural and cultural resources. In addition, there are self-guided interpretive trails at Madison Falls in the Elwha, Hoh Trail, and at the beginning of Staircase Rapids Trail.

VISITOR CENTERS

The main park visitor center in Port Angeles is designed to provide an overall introduction to the park. Visitor centers in the various districts also provide some general information, but focus on resources and activities in the immediate area. Each visitor center provides information, orientation, and trip planning options for visitors, and presents an introduction to the primary interpretive themes.

Olympic National Park Visitor Center / Port Angeles

The main park visitor center in Port Angeles is designed to be the first stop for most visitors. Exhibits, a movie, a children's discovery room, and a staffed information desk give first-time visitors an overall introduction to the park that will help them plan their visit. The various media, park rangers, and the cooperating association sales area also help visitors learn about the variety of resources in the park and introduce the key interpretive themes. Volunteers are a vital component in the operation of the visitor center.

Although the facility is large enough to accommodate moderate visitation loads, at peak times the parking lot often fills beyond capacity.

At the adjacent Wilderness Information Center, visitors can obtain more information about the park's wilderness and trail conditions and permitting requirements.

Hurricane Ridge

The Hurricane Ridge Visitor Center provides information about the resources and activities of this subalpine environment. The center offers spectacular views of the Olympic Mountains and opportunities for people to learn more about subalpine ecology and related themes.

The visitor center is on two levels. The exhibits, originally constructed in the early 1960s and partially modified in the 1980s, do not adequately interpret the subalpine-related themes to help visitors make meaningful connections with the resources.

Olympic National Park and Olympic National Forest Information Station in Forks

The information station in Forks provides general park and forest information and a cooperating association sales area.

Lake Crescent

The Storm King Information Station is designed to serve visitors to the Lake Crescent area of the park. It attracts some visitors traveling along Highway 101 and guests/visitors to the lodge; however, the center's primary audience is hikers going to the popular Marymere Falls.

This station offers great views of the lake. There are a few interpretive displays, and the facility does contain a small cooperating association sales outlet. Opportunities to learn about the park themes and related resources in the area are limited primarily to interactions with park staff at the station or on guided interpretive walks.

Mora

The Mora Ranger Station is open seasonally and provides area information and a small cooperating association sales area.

Hoh

The Hoh Rain Forest is a popular visitor destination in the park. The visitor center is the primary and first point of contact with visitors to this district. The facility and exhibits were originally constructed in the mid-1960s. The building is too small to accommodate current levels of visitation and is situated in a floodplain. The outdated exhibits do not adequately present the key interpretive themes as they relate to the rain forest environment.

Kalaloch

Other than a very small but frequently used seasonal visitor contact station at Kalaloch, the park does not have a visitor facility dedicated to interpreting coastal resources. The current visitor contact station is devoted to providing basic information and orientation, and is slightly detached from the hub of visitor activity at Kalaloch.

Quinault

The Quinault Rain Forest Information Station is on the north shore of the lake and is opened seasonally. It contains exhibits that interpret the human history of the area, as well as pertinent elements of the rain forest environment. Self-guiding trails lead into the forest and to the historic Kestner Homestead. Accurate interpretation of the homestead will require further study to determine the primary period of significance and if any additional media (i.e., historic furnishings, exhibits, audiovisual, oral history, etc.) may be necessary. In addition, the U.S. Forest Service

Ranger Station on the southern shore of Lake Quinault provides information both for national forest and park visitors.

Staircase

The Staircase Ranger Station is open seasonally and provides an interpretive exhibit and area information.

EDUCATION

Educational programs are presented within the park through numerous methods and at various locations.

Lecture series are often held at the Olympic National Park Visitor Center in Port Angeles in the winter and spring. Seasonal evening programs may be offered at visitor centers throughout the park, and campfire programs can occur in park campgrounds. There are scheduled interpretive walks at various locations around the park during the summer. In addition, Olympic National Park offers a Junior Ranger program for children.

Park resource education staff work with local school districts to provide programs; develop curriculum and materials for lesson plans; provide teacher workshops to present information on Olympic's cultural and natural history; and may host school groups in the park for field trips and programs, depending on staffing and availability. The park also has "Discovery Trunks" that contain materials on the park ecosystems and cultural resources. These trunks are sent by request to schools throughout the country. In addition, the resource education staff travels off-site to area events to provide information on the park to a variety of audiences, and will organize speakers, by request, for community groups and area events.

Education programs are presented for a fee through the Olympic Park Institute, which is located on Barnes Point at Lake Crescent. Olympic Park Institute provides a variety of school programs, field seminars, summer youth adventures, Elderhostel programs, conferences, and teacher training courses, as well as hiking and backpacking adventures.

There is a need to expand the number and variety of educational programs for park visitors, neighbors, area residents, and other diverse audiences.

VISITOR ACCESS AND TRANSPORTATION

VISITOR ACCESS TO THE PARK

This section summarizes the main state and federal highways that provide access to park areas (see figure 4) and internal park roads and related facilities. Access for visitors with mobility disabilities is also described. Parking lots, travel patterns, roadway conditions, management challenges, and alternative transportation sources are described. This section does not include wilderness access and boat use, which were included under previous sections.

Roadway Network

Olympic National Park lies west of Seattle across Puget Sound on the Olympic Peninsula. The interior of the park lies in the north-central area of the peninsula, and can be accessed from 10 primary locations around its boundary. The coastal portion of the park, which stretches about 70 miles from north to south, is a narrow strip of land on the west coast of the peninsula, encompassing the three park areas of Ozette, Mora, and Kalaloch and interrupted by the Ozette, Quileute, and Hoh reservations.

Visitors from population centers on the east side of Puget Sound use a number of different routes to access the park. From Tacoma, State Route (S.R.) 16 traverses the Kitsap Peninsula, and connects to U.S. 101 via Highways 3 and 104. From Seattle, visitors can take the Bainbridge Island ferry to connect to Highway 305 to S.R. 16, or the Edmonds-Kingston ferry to connect to Highway 104 and U.S. 101. Canadian visitors from Victoria may take the ferry to Port Angeles.

U.S. Highway 101. U.S. Highway 101, known also as State Route 101, originates in Olympia, runs north along the east side of the peninsula, turns west and passes through the cities of Sequim and Port Angeles. It 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 here, S.R. 12 and S.R. 8 run eastwards to connect to Olympia and Aberdeen. U.S. 101 provides connections into the park from state roadways and a number of city, county, tribal, and U.S. Forest Service roads.

In the Kalaloch area, the state owns the road right-of-way and maintains the highway. At Lake Crescent, approximately 1 mile of highway at the east end is on a state-owned right-of-way. The approximately 12 miles of roadway in the park is maintained through a cooperative agreement between the Washington Department of Transportation and Olympic National Park. Rangers patrol the highway segments within the park at Lake Crescent.

S.R. 110. Outside the park's western boundary, S.R. 110 extends westward from U.S. 101 and runs along the south side of the Sol Duc and Quillayute rivers, providing access to the coast on the Quileute Indian Reservation, and parking and trailhead access to Second and Third beaches near La Push. A spur of S.R. 110 (Mora Road) runs along the north side of the Quillayute River and provides access to the Mora/Rialto Beach area in the park.

S.R. 112. This roadway extends from U.S. 101 west of Port Angeles as far as the Makah Indian reservation in the northwest corner of the peninsula. It provides access to the Ozette/Shi Shi area of the park via the Hoko-Ozette Road, which runs in a northeast to southwest direction from S.R. 112. S.R. 112 is outside the park boundary.

S.R. 119. S.R. 119 connects U.S. 101 near Hoodsport to unpaved Forest Service Road

24, which connects to the Staircase Road, providing access to the Staircase area.

All four state routes are paved two-lane roads and have adequate carrying capacity for traffic approaching the park. U.S. 101 is in generally good condition with the exception of the coastal erosion in the Kalaloch area. State Routes 110, 112, and 119 are also characterized as being in overall good condition (Parametrix 2002a).

VISITOR ACCESS WITHIN THE PARK

There are more than 140 miles of paved and unpaved visitor use roads in Olympic National Park (Parametrix 2002a). There are no cross-park roads; however, roads do penetrate the park's perimeter and frontcountry areas, providing motor vehicle and bicycle access to a wide range of park areas.

ACCESS WITHIN SPECIFIC PARK AREAS

Road access to each frontcountry area and existing conditions is summarized below.

The level of accessibility to park areas and facilities is also summarized for each area. Access to park areas, campgrounds, and viewpoints for visitors with disabilities is possible wherever there is vehicular access; however, wilderness areas, walk-in only campgrounds, and trails are generally inaccessible. A number of short interpretive nature trails include sections that can accommodate visitors with mobility limitations, and wheelchairs are available for checkout at several locations. Where trails are noted as accessible with assistance, they are passable by individuals with sufficient upper body strength or a friend who can assist (NPS 2003f).

Headquarters and Olympic National Park Visitor Center, Port Angeles

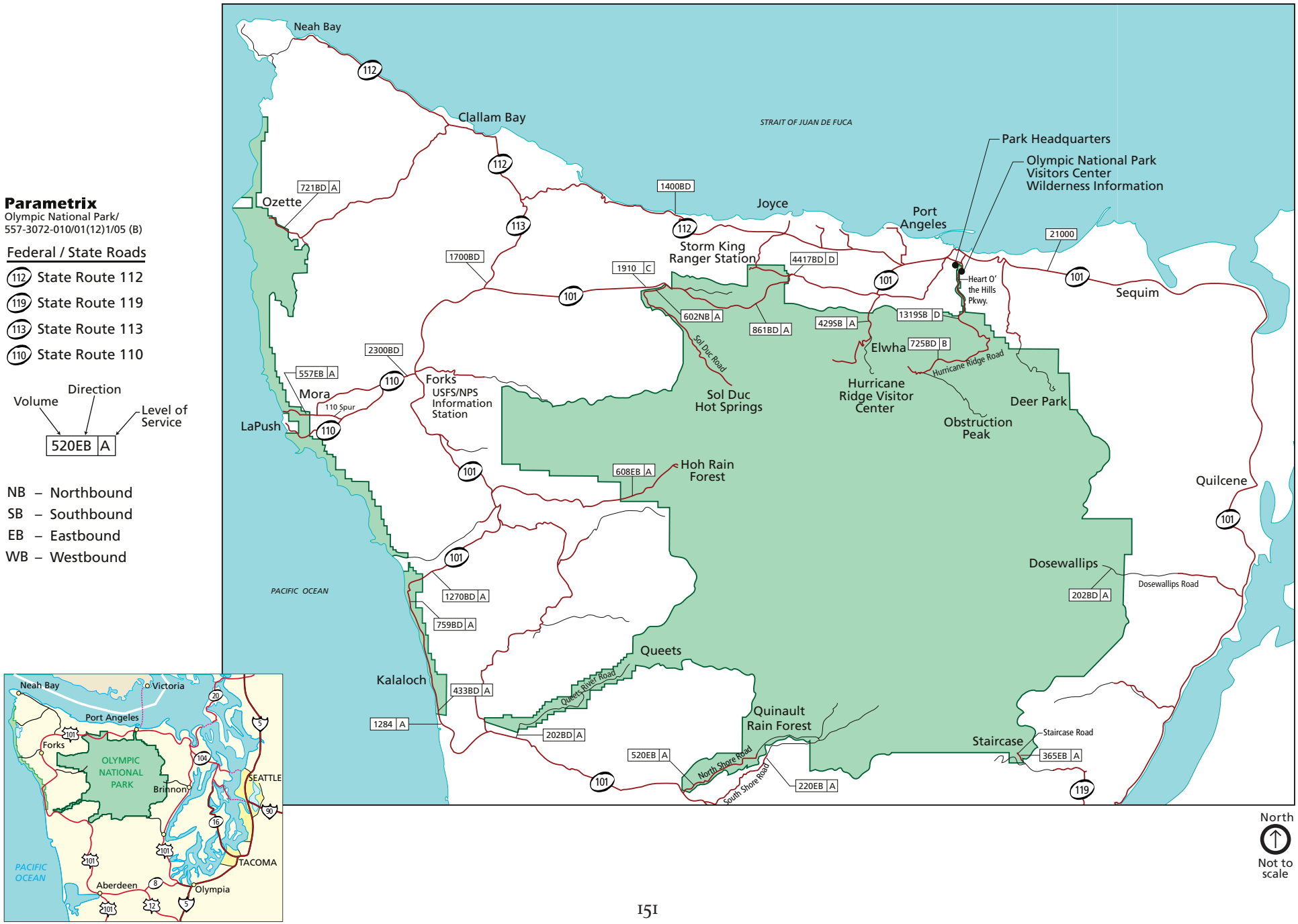
The park's principal visitor center is the gateway to the Hurricane Ridge area. The visitor center is near the southern limits of the city of Port Angeles. The Wilderness Information Center and the Peabody Creek Loop Living Forest trails are located here. The visitor center is reached via Race Street and Mt. Angeles Road. From U.S. 101, Race Street runs south for about 1 mile before becoming Mt. Angeles Road. Approximately 1,000 feet beyond is the visitor center. Both Race Street and Mt. Angeles Road are paved, two-lane roads in good condition.

Accessibility: The Olympic National Park Visitor Center and its exhibits are fully accessible to visitors with disabilities and include touch displays, a Braille exhibit, a movie, and displays with sound effects. A closed-captioned orientation film is shown on request, with a large text script available. Hearing-impaired visitors can use the Washington state relay service to obtain information. The Living Forest Trail is a 0.25-mile, compacted crushed rock loop trail that is accessible with assistance. Wheelchairs are available for checkout.

Heart O' the Hills/Hurricane Ridge

Just south of the principal visitor center, Mt. Angeles Road forks, and the westernmost fork becomes Heart O' the Hills Parkway. The parkway runs 5 miles to the Heart O' the Hills entrance station, campground, and hiking trails including Heart O' the Forest, Heather Park, and Lake Angeles. From Heart O' the Hills the road continues as Hurricane Ridge Road for 13 miles to the Hurricane Ridge Visitor Center. The parkway and Hurricane Ridge Road are paved, two-lane roads in fair condition (NPS 2003h) the Hurricane Hill trailhead is 1.5 miles from the Hurricane Ridge Visitor Center on the Hurricane Hill

Figure 4. Road Network and Daily Traffic Volumes



Road. The Hurricane Hill Road is considerably more winding and narrow, making it unsuitable for trailers or recreational vehicles. These roads provide visitors with access to picnic areas, overlooks and viewpoints, and trails including the Hurricane Ridge-Klahhane Ridge Trail, Big Meadow Nature Trail, Wolf Creek Trail, and Hurricane Hill Trail. There are a number of parking areas along the 18-mile route. One other road in this area, Obstruction Point Road, runs from the east side of the Hurricane Ridge Visitor Center for 8 miles to Obstruction Peak, providing access to a number of trails, including the Obstruction Point to Deer Park trail. It is a narrow, unpaved, gravel road that is unsuitable for RVs. It is open seasonally.

Accessibility: The Heart O' the Hills Campground has accessible restrooms at Loop A. The Hurricane Ridge Visitor Center has accessible restrooms, exhibits, and a closed-captioned film. A ramp and elevator provide access to a terrace with picnic tables, a gift shop, and a snack bar. Picnic areas 1 mile beyond the Hurricane Ridge Visitor Center have paved trails like the Big Meadow Nature Trail that are accessible with assistance. The restrooms at the picnic grounds are not accessible. The first 0.5 mile of the Hurricane Hill Trail is wheelchair accessible.

Elwha

West of Port Angeles is the Olympic Hot Springs Road that travels 1.7 miles south from U.S. 101 to the park entrance station at Elwha, and the trailhead to Madison Falls. The road continues along the east side of the Elwha River to the Elwha Campground, ranger station, and maintenance area, Altair campground, and eventually to the Glines Canyon Dam (slated to be removed). From there it continues west to the Boulder Creek trailhead. At this point, the distance from U.S. 101 is 9.6 miles. The two-lane, paved road is in overall fair condition (FHA 1999). A second road, Whiskey Bend Road, extends 5 miles from the ranger station on the east side of the river to trailheads at Whiskey Bend. It is a two-lane, narrow, gravel road. Other trailheads that these roads provide access to include Cascade Rock, Upper Lake Mills, West Lake Mills, and Geyser Valley trails.

Accessibility: From the Whiskey Bend Trailhead, approximately 0.25 mile of the Elwha River Trail is accessible with assistance, and there is an accessible vault toilet at the trailhead. The short, paved, Madison Falls Trail is accessible and leads to a 60-foot cascade on Madison Creek. Both the Elwha and Altair campgrounds have accessible restrooms and one accessible campsite.

Lake Crescent

West of Port Angeles the Lake Crescent area is one of only two park areas that are directly served by U.S. 101. The highway travels through the park for approximately 12 miles, skirting the southern edge of the lake for 10 miles, providing access to the facilities at Barnes Point, including the Storm King Information Station, Lake Crescent Lodge, the Olympic Park Institute, 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 Fairholme store.

East Beach Road is a paved, secondary road at the east end of Lake Crescent that provides access from U.S. 101 to picnic areas and the Log Cabin resort. East Beach Road turns into Piedmont Road after the resort, where it turns north for 4 miles to the town of Joyce on S.R. 112. Near the start of the Piedmont Road, the Lyre River Road extends to the west 1 mile, provides access to the East Spruce Railroad trailhead, and is paved to the Lyre River Bridge.

At the west end of the lake, the Camp David Junior Road provides access from U.S. 101 to the north shore area of Lake Crescent. The

facilities that can be accessed are the Fairholme campground, North Shore day use area, Pyramid Peak Trail, and the west trailhead for the Spruce Railroad Trail. Camp David Junior Road is 5 miles in length, paved the first 2 miles, and gravel for the remaining 3 miles.

Accessibility: The Lake Crescent Lodge main building, including the common area, store, restaurant, and lounge, are accessible. The Log Cabin Resort's restaurant is accessible. The first 0.5 mile of the Marymere Falls Trail, as far as the Barnes Creek overlook, has a gravel and dirt surface and is accessible with assistance; however, the route to the falls is not accessible. Each end of the Spruce Railroad Trail is accessible with assistance for 0.25 mile, and there is an accessible vault toilet at the east end. The Moments in Time loop nature trail is nearly 1 mile in length and has compacted crushed rock surface. It is accessible with assistance, and can be accessed from the Olympic Park Institute, 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 information station, at Loops A and C at the Fairholme campground, and at the East Beach picnic area (vault toilet).

Sol Duc

The 13-mile Sol Duc Road leads south from U.S. 101 and runs along the north side of the Sol Duc River and is open seasonally as snow conditions and weather permit. The two-lane, paved road is in good condition and leads through old-growth forest areas. This road provides access to several overlooks including the Salmon Cascades overlook, along with trailheads to the Ancient Groves nature trail, Aurora Ridge, and North Fork Sol Duc trails. Toward the end of Sol Duc Road are the Eagle Ranger Station, the Sol Duc Hot Springs Resort, and the Sol Duc campground, also open seasonally. Trailhead access is available from the resort area and Sol Duc Falls trailhead parking area, to trails including Lovers Lane, Sol Duc Falls, Seven Lakes Basin, and Mink Lake.

Accessibility: The Sol Duc Hot Springs Resort has accessible pools, cabins, main lodge, and restaurant. There is an accessible restroom at Loop A of the campground. The short crushed rock and dirt path that leads from the Sol Duc Road to the Salmon Cascades overlook on the Sol Duc River is accessible with assistance.

Ozette

Access to Ozette Lake is from the 21-mile Hoko-Ozette Road, which connects to S.R. 112. The two-lane, paved road is in good condition. Visitors are provided access to facilities at the north end of Ozette Lake, including a ranger station that is staffed in the summer months and a seasonal campground. There are also boat launches at Swan Bay, Rayonier, and near the ranger station. The Cape Alava and Sand Point trails run westward to the coast and are connected by a 2.9-mile beach walk to make a 9-mile loop trail.

Accessibility: There is an accessible restroom near the ranger station, but not in the campground.

Mora and La Push Area

These areas are accessed from S.R. 110, a two-lane, paved road in good condition. S.R. 110 begins at U.S. 101 and runs for 14 miles south of the Sol Duc and Quillayute rivers to the Quileute Indian Reservation and La Push. The Mora Road splits off S.R. 110 at Three Rivers Resort and travels north of the Quillayute River to Mora and Rialto Beach, providing access to the Mora Ranger Station, staffed during the summer, an NPS campground, the Dickey River boat launch ramp, and trails such as Slough, James Pond, and the North

Coast wilderness. The mainline S.R. 110 to La Push provides access to First Beach, including resorts, restaurants, and a boat launch that are located on the reservation, and trails leading to the Olympic National Park areas of Second and Third beaches, and the South Coast wilderness.

Accessibility: At Rialto Beach, a short, paved trail leads through the picnic area to a ramp, which is installed in summer to provide beach views. This trail is accessible with assistance, and there is also an accessible restroom at the Rialto Beach parking area and at Loop B of the campground.

Hoh

The Upper Hoh Road runs east from U.S. 101 for 18 miles and provides year-round access for visitors to the Hoh Rain Forest. The road provides access to the South Snyder-Jackson Trail at the entrance station, located 6 miles from the visitor center, as well as access to overlooks with river views, picnic areas, and short interpretive trails. The main visitor area has a visitor center, campground and hiking trails including Hall of Mosses, Hoh River, Spruce Nature, and the Mini-Trail. The two-lane road is in good condition, but vulnerable to erosion and washout due to the meandering course of the Hoh River (Parametrix 2003).

Accessibility: The visitor center, the campground restrooms, and one site at the picnic area are accessible. A 0.25-mile loop trail at the visitor center is accessible with assistance. There is a wheelchair available for checkout at the visitor center.

Kalaloch

U.S. 101 directly travels through the park in an approximately 11-mile stretch in the Kalaloch area. The scenic drive provides visitors with access to a series of overlooks and short trails to beaches including Ruby Beach at the north end, Beaches 1 through 4, Beach 6, and South Beach. There is a small visitor information center, camping and lodging accommodations, and a RV campground (with no hookups or potable water) open seasonally at South Beach.

Accessibility: Accessible facilities in this area include the Kalaloch Lodge's main building, restaurant, one cabin; an overlook, vault toilet, and the ocean viewpoint and parking lot vault toilet at Beach Four.

Queets

The Queets River Road leads approximately 14 miles from U.S. 101 along the south bank of the Queets River to a seasonal ranger station, a campground, the nearby Sam's River Trail, and the Queets River trailhead. The two-lane unpaved road is surfaced with crushed rock and is periodically maintained by park staff. Portions of the road are in the Queets River floodplain and are vulnerable to seasonal flooding.

Accessibility: There is an accessible vault toilet at the campground.

Quinault

The Quinault North Shore Road extends eastward from U.S. 101 around the north side of Lake Quinault and the Quinault River. It provides access to three primary areas. The first area encompasses Big Cedar Trail and the July Creek picnic area close to the lake, and the Quinault River ranger station, which is just east of the lake and open in the summer months. Trails in the area include the Maple Glade Loop Trail and the Kestner Homestead Trail. The road in this section is two-lane and paved to the Jefferson County-Grays Harbor line (a distance of 7.8 miles). North Shore Road continues as an unpaved road for another 5.2 miles where it continues for one

mile as a paved road and connects with South Shore Road at the Quinault River Bridge. South Shore Road also extends from U.S. 101 but follows the south side of Lake Quinault, which is outside the park boundary in the Olympic National Forest. Like North Shore Road, it is paved as far as the Jefferson County-Grays Harbor line. South Shore Road crosses the park boundary just before its junction with North Shore Road.

From the junction point at the Quinault River bridges, Graves Creek Road extends for 6 miles along the East Fork of the river to a seasonal ranger station and campground, and the East Fork Quinault and Graves Creek trailheads. Access points to trails from this location lead to the Enchanted Valley and on to Staircase and Dosewallips. Graves Creek Road is a two-lane, unpaved road and is unsuitable for trailers and RVs.

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

Accessibility: The ranger station has accessible restrooms with flush toilets and sinks. Two trails in this area are accessible with assistance. The Maple Glades Trail is a compacted crushed rock loop trail that winds through the rain forest for 0.5 mile and crosses a number of streams. The Kestner Homestead Trail is more than 1 mile in length, and connects with the Maple Glades Trail. It also has a compacted crushed rock surface. At the trailhead near the North Fork campground, there is an accessible vault toilet, but the campground is not accessible. There is an accessible vault toilet at the Graves Creek trailhead and campground.

Staircase

S.R. 119 extends northwest from U.S. 101 at Hoodsport for 9 miles and passes along the east side of Lake Cushman until it reaches U.S. Forest Service Road 24. It then continues for 5 miles as a gravel road to the park boundary, the last 4 miles skirting the north shore of Lake Cushman. There is a turn-off to Four Stream road. Staircase Road begins at the park boundary as a two-lane, paved road in good condition, and runs 1 mile along the North Fork of the Skokomish River to provide seasonal access to the entrance station, ranger station, a campground, and the Staircase Rapids Loop Trail. A bridge is currently washed out on the loop trail. The road and facilities can be closed seasonally due to snow and weather conditions. There is access to major cross-park trailheads from this location — the North Fork Skokomish Trail, Wagonwheel Lake Trail, Shady Lane Trail, and Big Cedar Trail. Two other trails in this area include Four Stream and Flapjack Lakes trails.

Accessibility: Two trails near the ranger station are accessible with assistance. The Big Cedar Tree and River Viewpoint is reached by a 0.5-mile, round trip, gravel trail that incorporates the North Fork Skokomish River, a fallen cedar, and a picnic area. A wheelchair is available for checkout at the ranger station.

Dosewallips

Dosewallips Road leads 13.5 miles westwards along the Dosewallips River from U.S. 101 at Brinnon to park facilities. The two-lane road is paved for the first 5 miles until it reaches the U.S. Forest Service boundary. At this juncture, the road continues for 7 miles to the park boundary. For its last 1.5 miles in the park, the road is unpaved and very narrow. It is unsuitable for RVs and vehicles with trailers. The road is open seasonally and leads to a ranger station, a campground, and the Dose River Trail to the Terrace Loop Trail, and

provides access to a major cross-park trailhead for two trails. The Main Fork Dosewallips Trail to Hayden Pass leads to the Elwha River, where the trail splits south to Quinault and north to Hurricane Ridge and Elwha. The West Fork Dosewallips Trail leads to Anderson Pass, then down into Enchanted Valley and Graves Creek, and the Quinault area. Lake Constance and Constance Pass trails are also in this area.

Dosewallips Road is normally a seasonal road that closes from mid-October to May; however, at the time of this writing, the road is closed at milepost 8 on U.S. Forest Service land due to a washout that occurred in 2002.

Accessibility: Dosewallips has no accessible facilities or trails.

Deer Park

About 4 miles east of Port Angeles, Deer Park Road can be accessed from U.S. Highway 101. It runs for 9 miles before reaching the park boundary, where it travels an additional 8.5 miles to the Deer Park area. The facilities at Deer Park include a ranger station, seasonal campground, two historic shelters, and the Rainshadow Loop Trail at the Blue Mountain overlook. The two trailheads provide access to the Deer Park to Obstruction Point Trail, and the Three Forks trail. The two-lane Deer Park Road initially traverses lowland areas but rises steeply for the last 9 miles. In this last section, the road is gravel and narrow and has steep sections that render it unsuitable for RVs and vehicles with trailers (NPS 2003c). The road is not maintained in winter, and is closed at the park boundary at the first snowfall.

Accessibility: The campground has accessible vault toilets.

PARKING

There are approximately 1,500 visitor parking spaces in the park, including campgrounds, public-lodging areas, and park operations areas (Parametrix 2002a). Although roads to destinations have relatively few traffic movement problems, congestion can occur during the peak seasons at parking lots. When parking lots reach capacity, parking occurs at undesignated areas along roadways. Table 10 provides existing conditions and peak use rates for parking lots in the park.

TRAVEL DISTRIBUTION PATTERNS

Most Olympic National Park visitors visit the park during the months of June through September (Parametrix 2002a). Based on road use statistics, the Hurricane Ridge area has the highest number of visitors (47%). The next highest visitor travel rates occur at the Hoh Rain Forest (44%), the Olympic National Park Visitor Center in Port Angeles (31%), and Sol Duc, (26%) (NPS 2001b). The lowest visitor travel rates are to Dosewallips, Deer Park, and Queets, due to the less developed access roads, more isolated park facilities, and seasonal closures.

During the winter and spring, most park visits occur along the more accessible and generally snow-free coastal areas of the park, and at Ozette Lake and Lake Crescent. However, winter weekend visitation to Hurricane Ridge can be high, and visitors have the option of traveling to Hurricane Ridge on a shuttle bus that operates during ski season on weekends.

TABLE 10: PARKING PEAK USE

	PARKING AREA	COMMENTS
VISITOR CENTER AND WILDERNESS INFORMATION CENTER	40 spaces (combination parking)	Fills beyond capacity during peak times.
HURRICANE RIDGE / HEART O' THE HILLS		Most crowded area in the park
Visitor Center	260 spaces in summer (220 spaces in winter due to snow storage);	Congestion during summer; fills in winter ski season
Hurricane Hill Trail	35 spaces	Heaviest congestion during summer
Switchback Trailhead	12 spaces	
Heart O' the Hills Trailhead	15 spaces,	
Siege of Ice/ Rainshadow	19 spaces	
Ancient Lake Morse	35 spaces	Double parking
Hurricane Hill Picnic Area #1	30 spaces	
Hurricane Hill Picnic Area #2	18 spaces	Also serves as overflow lot for Hurricane Hill Trail lot
Obstruction Peak	25 spaces	Gravel; fills on many summer days; peak demand has reached 40 spaces
ELWHA		
Madison Falls Trailhead	6 spaces	
Whiskey Bend Trailhead	30 spaces	
Boulder Creek Trailhead	15 spaces	
LAKE CRESCENT		
Lake Crescent Lodge	10 spaces	Day use parking area
East Beach	25 spaces (unpaved)	
Log Cabin Resort	20 spaces	Day use parking area
Log Cabin Boat Launch	15 spaces (double)	Trailer parking
Fairholme Store	8 spaces	Approximately 6 overflow spaces
Fairholme Boat Launch	15 spaces (double)	Trailer parking
North Shore Picnic Area	35 spaces (unpaved)	
Storm King Information Station	46 spaces for cars, and 9 spaces for RVs/trailers	Demand can exceed capacity; overflow parking occurs at undesignated areas
Storm King Boat Launch	16 spaces (double)	Trailer parking
Bovees Meadow	32 spaces	
Wallace Point Turnout (Hwy 101)	35 spaces	
West Spruce Railroad Trailhead	5 spaces (unpaved)	
East Spruce Railroad Trailhead	10 spaces (unpaved)	
SOL DUC		Summer visitation levels can exceed parking capacity.
Lower Kiosk	10 spaces	
Salmon Cascades Overlook	4 spaces	
Red Alder, Ancient Groves, and the Aurora Ridge Trailhead	5-10 spaces	
Eagle Ranger Station	10 spaces	

	PARKING AREA	COMMENTS
Sol Duc Hot Springs Resort	71 spaces	Heaviest use in this area; parking area is at or near capacity
Sol Duc Falls Trailhead	99 spaces	Heaviest use in this area; parking area is at or near capacity;
Amphitheater at Campground	40 spaces	Accommodates overflow from the trailhead parking area
OZETTE		Parking demand for all lots exceeds capacity during peak season
Cape Alava and Sand Point Trailhead	142 spaces	
Ranger Station Boat Launch	6 spaces	
Swan Bay Boat Launch	6 spaces	
Rayonier Boat Launch	2 spaces	
MORA/RIALTO BEACH		When parking areas are full, overflow parking occurs along the roadway
Mora Ranger Station	8 spaces	
Rialto Beach (North)	46 spaces	
Rialto Beach (South)	74 spaces (unpaved)	
LA PUSH		When parking areas are full, overflow parking occurs along the roadway
Second Beach	35 spaces	Parking lot is located outside the park
Third Beach	40 spaces	
HOH		All lots operate at or near capacity, with frequent overflow in summer months
Visitor Center	105 spaces	
Picnic Area	42 spaces	
Corral	12 spaces	
KALALOCH		Parking lots at or close to the beach areas.
Ruby Beach	54 spaces	
Beach 4	90 spaces	
Beach 6	40 spaces	
Visitor Information Center	36 spaces	
Day Use Area at Campground	75 spaces	
Kalaloch Lodge	27 spaces	
Big Cedar	16 spaces	
Beaches 1, 2, 3, and 5	10 spaces	Due to their coastal location, these lots are heavily used. Most vehicles parked are RVs or truck-trailer combinations.
QUEETS		
Sam's River Trail	no formal parking	
Queets River Trailhead	10 spaces	
QUINAULT		
July Creek Picnic Area	30 spaces	
Quinault Ranger Station	15 spaces	
North Fork Ranger Station and North Fork Trailhead	16 spaces	
Graves Creek Trailhead	30 spaces	
STAIRCASE		
Upper Parking Lot	64 spaces	These lots have a peak use of 85%; demand for parking can exceed capacity.

	PARKING AREA	COMMENTS
Ranger Station	15 spaces	These lots have a peak use of 85%; demand for parking can exceed capacity.
DOSEWALLIPS		
Ranger Station, Campground, and Trailhead	30 to 40 spaces (unpaved)	
DEER PARK		
Trailheads and Ranger Station	10 spaces (unpaved)	
Blue Mountain Overlook	15 spaces (unpaved)	

SOURCE: NPS 2003i, Parametrix 2002a, Parametrix 2003, and NPS staff.

In summer 2001 traffic counts were conducted along U.S. 101 around the park, and on access roads within the park. These counts were used to determine the highest daily volumes to park destinations during the summer. Counts for some roads were made only in one direction; for other roads traffic was counted in both directions. The peak daily number of vehicles inbound to Hurricane Ridge was 1,319; to Hoh 608 vehicles, and to Sol Duc outbound 602. Counts for Queets and Dosewallips recorded traffic in both directions for a total of 202 vehicles for each area. A winter traffic count conducted in February 2002 on the Hurricane Ridge road documented 430 vehicles per weekend day visiting the area (Parametrix 2002a).

Visitor surveys conducted in 2000 indicated that many park visitors travel on more than one park road during their stay. Twenty-three percent of visitors entered the park twice during their stay, 35% entered three to seven or more times, and 42% entered once (NPS 2001b).

ROADWAY LEVEL OF SERVICE

The Washington State Department of Transportation *Design Manual* uses a maximum amount of allowable average daily traffic (ADT) to determine level of service (LOS) conditions for a given daily traffic volume, road type, and terrain of travel, as defined below:

- LOS A — free-flow traffic. Individual users are virtually unaffected by other vehicles on the road. Nearly all drivers are free to select their desired speeds and to maneuver within the traffic stream. The general level of comfort and convenience for motorists, passengers, and pedestrians is excellent.
- LOS B — high quality, stable traffic flow. The presence of other users begins to be noticeable to drivers. The freedom to select desired speeds is relatively high, but the freedom to maneuver within the traffic stream declines slightly from "A" because the presence of others begins to affect individual behavior. Slow-moving vehicles may delay a few drivers, especially on steep grades.
- LOS C — individual travelers are substantially affected by other vehicles in the traffic stream. The selection of speed by most users is affected by the presence of other vehicles. Maneuvering within the traffic stream requires vigilance by drivers. Slow-moving vehicles delay some drivers. The general level of comfort and convenience at this level is noticeably worse than "B," and some park visitors may begin to consider their visitor experience compromised.
- LOS D — the upper end of traffic volumes that can be accommodated while maintaining stable traffic flow. Vehicle speeds and the freedom to maneuver are severely restricted for nearly all users. Drivers and pedestrians experience a poor

level of comfort and convenience. Other vehicles delay most drivers, and some visitors perceive conditions as crowded.
- LOS E — operating conditions are at or near the capacity of the roadway. All speeds are reduced to a low but relatively uniform level. There is no freedom to maneuver in the traffic stream; traffic entering the stream usually requires that drivers already on the road voluntarily yield. Comfort and convenience levels are extremely poor, and driver frustration is high. Operations at this level are usually unstable. Delays and slow speeds create a noticeable negative visitor experience.
- LOS F — forced flow. More traffic is attempting to use the road than can be accommodated. Flow is extremely unstable. Long lines form in the traffic stream, and operations are characterized by stop-and-go traffic. At this level the experience is so compromised that many visitors may reconsider their route or destination and make comments about traffic problems to acquaintances or park officials.

During summer 2001, a traffic study was conducted on roads within the park. The study found that traffic volumes in the park are generally not at levels considered congested. On the Hurricane Hill Road at Heart O' the Hills, there were sufficient traffic volumes to rate a LOS B to D score. The other the roads in the park rated LOS A (best condition), except for the area east of Lake Crescent, outside of the park, which rated LOS D (fair condition).

ADVANCED TRAVELER INFORMATION SYSTEMS

Existing traffic management strategies at the park consists primarily of advanced traveler information. Advisory radio and telephone hotlines are examples of advanced traveler information, and bicycles and charter services are examples of alternative transportation (Parametrix 2003). Advanced traveler information allows travelers to be more informed when planning trips or en route to a destination, giving travelers the ability to alter travel plans to avoid congestion.

Traveler information is currently provided for road closures and conditions, but not necessarily campground availability. This information is typically provided by telephone and through the park's website. The park advisory radio station (call sign KOD773) provides information on weather and road conditions and other park information as appropriate. The Port Angeles site is broadcast on the AM bandwidth at a frequency of 530-kHz.

A traveler information system is provided for the Hurricane Ridge area. A dedicated phone recording of Hurricane Ridge road conditions is updated at least twice daily, and more often as warranted. Other traveler information systems are available at Lake Crescent, Ozette Lake, and in the Quinault Valley. (Parametrix 2003)

ALTERNATIVE TRANSPORTATION SOURCES

Alternative transportation is another management strategy that is used at Olympic National Park, although it is not widely used by park visitors.

Public Transit

Transit use plays a limited role in providing access to the park. There are four public transit agencies serving the Olympic Peninsula: Grays Harbor Transit, Jefferson Transit, Clallam Transit, and the Mason County Transportation Authority. All services except Mason County have some stops in the park. Although the Mason County Transportation Authority has no routes that directly serve the park, some routes stop at

Hoodsport near Lake Cushman, south of Staircase (Parametrix 2002a).

Grays Harbor Transit includes stops in Quinault and North Shore. Jefferson Transit has county routes and provides connections in cities such as Port Townsend and Sequim. The West Jefferson Transit Olympic Connection route connects to buses from Clallam Transit at the Forks Transfer Center, to buses from Grays Harbor Transit at the Brannon's Grocery store near Lake Quinault, and also serves the Kalaloch area.

Clallam Transit provides service to Forks, La Push, and Port Angeles and Sequim, and travels through Olympic National Park in the Lake Crescent area, with stops at Fairholme and East Beach Road.

In conjunction with the city of Port Angeles, Clallam Transit is planning to construct the Port Angeles Gateway Multi-Modal Center, which would include a transit center and visitor information center. There is the potential to use this facility for a shuttle service to provide service to Hurricane Ridge and possibly other park destinations.

Several nonprofit and private commercial or charter carriers provide transportation services to the park. The Hurricane Ridge Public Development Authority operates a weekend winter shuttle bus service to Hurricane Ridge, generally mid-January to early March (on the same schedule as the ski school).

Several commercial carriers under permit also provide services that access park destinations. They run between the Port Angeles ferry dock and Hurricane Ridge, Sol Duc, and the Hoh, or provide other day tours. Seasonal backpacker shuttle services may be provided to park trailheads.

Bicycle Access

Bicycling is allowed on park roads; however, many park roads are narrow and winding with limited visibility and road shoulders less than 4 feet, the minimum width that the Washington State Department of Transportation considers sufficient for safe bicycling (Parametrix 2002a). Bicycles are prohibited in the wilderness and on trails, with the exception of the 4-mile Spruce Railroad Trail along the north shore of Lake Crescent. This trail will eventually be linked to a regional bicycle trail that will improve access options in this area for bicyclists.

SOCIOECONOMIC ENVIRONMENT

INTRODUCTION

Olympic National Park is in the north central and west coast of the Olympic Peninsula in the state of Washington. The park spans parts of Clallam, Grays Harbor, Jefferson, and Mason counties. Several counties make up the economic region under consideration for this planning effort. The communities in these counties are close to the park's boundaries and serve as multiple gateways to the park, providing a variety of goods and services for park visitors. Any socioeconomic impacts from the action alternatives would have the most impact on these counties. Such impacts are marginalized in areas farther from the park.

The Seattle-Tacoma-Bremerton population area is located east of the park along Puget Sound. The size of the economy of this population center combined with its separation by water tends to concentrate potentially noticeable socioeconomic impacts of actions at the park on the four-county region.

POPULATION

The four counties in the affected region for socioeconomics are predominantly rural, with large areas in federal ownership — Olympic National Park and Olympic National Forest (managed by the U.S. Forest Service). Other lands (outside the park) are held in trust by the federal government as American Indian Reservations. Forests cover most of these lands. This four-county area had a combined population of more than 207,000 persons in the year 2000. The cities and towns in table 11 account for nearly 80,000 of the area's residents; the rest are scattered among many smaller communities. The largest cities are Port Angeles on the north and Aberdeen on the south. The population of the state of Washington in 2000 was nearly 5.9 million. Washington was ranked 15th in the nation (including the District of Columbia for ranking purposes). The affected four-county area contains about 3.5% of the state's population. This area grew at a much lower rate than the state as a whole during the decade of the 1990s (15.5% compared to 21.1%).

American Indians make up the largest minority population in the affected area (8,874 persons in 2000). These individuals comprise about 4.3% of the area's population compared to 1.6% for the state. There are nine American Indian reservations in the affected four-county area (including the Jamestown S'Klallam Reservation, which is treated separately in this chapter). In addition, the populations of the reservations (table 12) do not necessarily reflect the total numbers carried on the official rolls for each tribe because some enrolled members live off the reservations and some non-Indians live on some reservations. Five of the eight reservations are on the west coast of the Olympic Peninsula and share boundaries with Olympic National Park.

In 2000, only 16 people lived on the Jamestown S'Klallam Reservation. Thirteen of the 16 people were white, and only two American Indians lived here. All 13 people in the available workforce were employed at good-paying positions; the per capita personal income was $28,234. This income is much higher than the state or national average and is more than twice as high as the highest per capita personal income of any of the other American Indian Reservations in the area. Because of these facts, this small group is not considered an economically disadvantaged population.

A complete breakdown of population by race/ethnicity is presented in table 13 below. In Grays Harbor and Mason counties Hispanic or Latino is the largest race/ethnic group.

TABLE 11: AFFECTED AREA POPULATION FOR COUNTIES AND SELECTED CITIES

Counties/Cities	1990	2000	% Change 1990 to 2000	American Indian 2000	% of Identified Area 2000
Clallam County	56,464	64,525	14.3	3,303	5.1
Forks	2,862	3,120	9.0	157	5.0
Port Angeles	17,710	18,397	3.9	300	3.3
Sequim	3,616	4,334	19.9	50	1.2
Grays Harbor County	64,175	67,194	4.7	3,132	4.7
Aberdeen	16,565	16,461	-0.6	609	3.7
Montesano	3,064	3,312	8.1	62	1.9
Elma	3,011	3,049	1.3	40	1.3
Hoquiam	8,972	9,097	1.4	351	3.9
McCleary	1,217	1,454	19.5	13	0.9
Oakville	531	675	27.1	48	7.1
Westport	1,892	2,137	12.9	66	3.1
Jefferson County	20,146	25,953	28.8	599	2.3
Port Townsend	7,001	8,334	19.0	104	1.2
Mason County	38,341	49,405	28.9	1,840	3.7
Shelton	7,241	8,442	16.6	230	2.7
Four-County Area	179,126	207,077	15.6	8,874	4.3
Washington	4,866,692	5,894,121	21.1	93,301	1.6

SOURCE: U.S. Census Bureau

TABLE 12: POPULATION OF AMERICAN INDIAN RESERVATIONS
(not including the Jamestown S'Klallam Reservation)

American Indian Reservations[A]	**1990**	**2000**
Chehalis Reservation	491	691
Hoh Reservation	96	102
Lower Elwha Reservation	137	315
Makah Reservation	1,214	1,356
Quileute Reservation	381	371
Quinault Reservation	1,216	1,370
Skokomish Reservation	614	730
Squaxin Island Reservation	157	405
Total	4,343	5,340

SOURCE: U.S Census Bureau

A. The Lower Elwha, Makah, and Quileute reservations are in Clallam County; the Hoh and part of the Quinault reservations are in Jefferson County. Most of the Quinault and all of the Chehalis reservations are in Grays Harbor County. The Skokomish and Squaxin Island reservations are in Mason County.)

TABLE 13: RACE

Race	Clallam County		Grays Harbor County		Jefferson County		Mason County		Four-County Region		Washington	
	Number	%*	Number	%*	Number	%*	Number	%*	Number	%*	Number	%*
White	57,505	89.1%	59,335	88.3%	23,920	92.5%	43,705	88.5%	184,465	89.1%	4,821,823	81.8%
Black or African American	545	0.8%	226	0.3%	110	0.4%	587	1.2%	1,468	0.7%	190,267	3.2%
American Indian and Alaskan Native	3,303	5.1%	3,132	4.7%	599	2.3%	1,840	3.7%	8,874	4.3%	93,301	1.6%
Asian	731	1.1%	818	1.2%	309	1.2%	519	1.1%	2,377	1.1%	322,335	5.5%
Native Hawaiian and Other Pacific Islander	104	0.2%	73	0.1%	34	0.1%	221	0.4%	432	0.2%	23,953	0.4%
Some other race	761	1.2%	1,527	2.3%	197	0.8%	1,036	2.1%	3,521	1.7%	228,923	3.9%
Two or More Races	1,576	2.4%	2,083	3.1%	784	3.0%	1,497	3.0%	5,940	2.9%	213,519	3.6%
Total Population	64,525	100.0%	67,194	100.0%	25,953	100.3%	49,405	100.0%	207,077	100.0%	5,894,121	100.0%
Hispanic or Latino **	2,203	3.4%	3,258	4.8%	535	2.1%	2,361	4.8%	8,357	4.0%	441,509	7.5%

SOURCE: U.S. Census Bureau

* Figures may not add to 100% due to rounding.
** People of Hispanic or Latino ethnicity may be of any race. These figures are not counted in the totals to avoid duplicate counting.

INCOME

In 1999 Washington's per capita personal income (PCPI) was nearly $23,000, about 106% of the national average (table 14). Jefferson County was the only one of the four counties to exceed the national average, yet it was only 97% of the state average. Grays Harbor County had the lowest per capita personal income, $16,800 — less than three quarters of the state average. The per capita personal income for the four-county area was $18,624, about 81% of the state average in 2000.

The per capita incomes of persons living on eight American Indian Reservations, excluding the Jamestown S'Klallam Reservation, were substantially lower than the average per capita personal incomes for each of the four counties as well as the state as a whole (table 15). Per capita personal income for these eight reservations ranged from under $8,800 (45% of the Clallam County average) to $13,400 (74% of the Mason County average). Comparing the reservations' per capita personal income to the statewide per capita personal income, these reservations ranged from a low of 38.2% to a high of 58.3%.

The total personal income for the four-county region was more than $4.8 billion in the year 2000 (table 16). This figure represents only 2.6% of the state's total personal income of about $184.5 billion, while the region had 3.5% of the state's population. Low per capita incomes and a less than proportional share of Washington's total personal income indicate a region that may be economically disadvantaged.

TABLE 14: PER CAPITA PERSONAL INCOME COUNTIES, STATE, AND U.S.

Area	1989 $	1999 $	% of State Average 1999
Clallam County	$12,798	$19,517	85.0%
Grays Harbor County	11,787	16,799	73.1
Jefferson County	13,551	22,211	96.7
Mason County	12,050	18,056	78.6
Washington	$14,923	$22,973	100.0%
United States	$14,420	$21,587	94.0%

SOURCE: U.S Census Bureau

TABLE 15: PER CAPITA PERSONAL INCOME FOR AMERICAN INDIAN RESERVATIONS
(not including the Jamestown S'Klallam Reservation)

American Indian Reservations	1989	1999	% of Respective County Average 1999	% of Respective State Average 1999
Chehalis Reservation	$ 5,871	$ 9,097	54.2%	39.6%
Hoh Reservation	$ 5,234	$10,008	45.1%	43.6%
Lower Elwha Reservation	$ 4,959	$ 8,769	44.9%	38.2%
Makah Reservation	$ 7,577	$10,986	56.3%	47.8%
Quileute Reservation	$ 5,324	$ 9,589	49.1%	41.7%
Quinault Reservation	$ 7,662	$ 9,621	57.3%	41.9%
Skokomish Reservation	$ 7,331	$10,475	58.0%	45.6%
Squaxin Island Reservation	$ 6,789	$13,401	74.2%	58.3%

SOURCE: U.S Census Bureau

TABLE 16: TOTAL PERSONAL INCOME

Area	1990 (Thousands)	2000 (Thousands)	% Washington Total for 2000
Clallam County	$ 1,008,899	$ 1,573,934	0.85%
Grays Harbor County	$ 1,012,630	$ 1,471,312	0.80
Jefferson County	$ 371,767	$ 706,938	0.38
Mason County	$ 574,647	$ 1,050,952	0.57
Four-County Area	$ 2,967,943	$ 4,803,136	2.60%
Washington	$98,143,118	$184,517,693	100.0%

SOURCE: Bureau of Economic Analysis, Bearfacts and Regional Economic Information System

MAJOR INDUSTRIES BY EARNINGS

Services, government (all levels), and retail trade provided nearly two-thirds of all earnings for Clallam County in 1999 (table 17). (Earnings are the sum of wage or salary income and the net income from self-employment. Earnings represent the amount of income received regularly before deductions for income taxes, social security, etc.) The earnings for Clallam County represented 0.6% of the total for Washington ($135.5 million). Manufacturing, services, and government (all levels) were the three largest industrial sectors for Grays Harbor County. Each provided more than one-fifth of total earnings for the county. Total earnings represented more than 0.6% of the state total. Jefferson County had the least earnings in 1999, 0.2% of the state total. This is to be expected as this county has the smallest population of the four. Government (all levels) accounted for one-quarter of all earnings in the county. Services and manufacturing combined with government to account for nearly two-thirds for the earnings in the county. The government sector provided nearly 29% of the total earnings in Mason County. When services and manufacturing are added to the government sector, they account for more than 65% of total earnings for the county. Again, this county provided a very small part of total earnings for Washington, only 3%.

Overall, the three most important economic sectors for the four-county area were services ($520 million, 21.9%), manufacturing ($409 million, 17.2%) and local government ($398 million, 16.8%). These three sectors provided more than half of all earnings in the region. The total earnings for the region were $2,373,755,000, about 1.75% of the state total.

MAJOR INDUSTRIES BY EMPLOYMENT

The affected region had more than 95,000 jobs in 1999 (table 18). This figure represented less than 3% of the state total (more than 3.5 million jobs). Services, retail trade, and government (all levels) were the sectors employing the most workers in Clallam and Grays Harbor Counties. These sectors provide two-thirds of the jobs in Clallam and three-fifths of the positions in Grays Harbor. Each county accounted for about one-third of the total positions in the region. Jefferson and Mason had about 13% and 18% of the total state employment. Services, retail trade, and government provided more than 50% of all positions in these two counties.

Services (26,151 jobs, 27.4%), retail trade (17,661 jobs, 18.5%), and local government (11,278 jobs, 11.8%) accounted for more than 57% of all jobs in the region.

TABLE 17: EARNINGS BY INDUSTRY FOR 1999
(Thousands of Dollars)

Industry	Clallam County	% of Total	Grays Harbor County	% of Total	Jefferson County	% of Total	Mason County	% of Total	Four-County Area	% of Total
Farm	$ 1,574	0.2%	$7,829	0.9%	$2,337	0.8%	$ 937	0.2%	$12,677	0.5%
Agricultural Services, Forestry, & Fishing	18,636	2.4	(D)*	(D)*	7,824	2.8	9,782	2.1	36,242	1.5
Mining	1,440	0.2	(D)*	(D)*	(D)*	(D)*	10,126	2.2	11,566	0.5
Construction	70,376	9.2	61,449	6.9	7,267	9.8	40,089	8.6	199,181	8.4
Manufacturing	81,652	10.7	201,315	22.5	41,584	14.9	84,170	18.1	408,721	17.2
Transportation & Public Utilities	37,325	4.9	46,629	5.2	10,441	3.7	21,534	4.6	115,929	4.9
Wholesale Trade	20,207	2.6	25,037	2.8	(D)*	(D)*	12,349	2.7	57,593	2.4
Retail Trade	98,682	12.9	110,587	12.4	34,107	12.2	46,815	10.1	290,191	12.2
Finance, Insurance, & Real Estate	34,975	4.6	37,197	4.2	12,580	4.5	18,577	4.0	103,329	4.4
Services	174,903	22.8	192,429	21.5	65,370	23.4	86,842	18.7	519,544	21.9
Federal Government, Civilian	23,304	3.0	12,918	1.4	11,029	3.9	6,511	1.4	53,762	2.3
Federal Government, Military	15,450	2.0	5,066	0.6	1,890	0.7	2,628	0.6	25,034	1.1
State Government	49,685	6.5	37,268	4.2	12,765	4.6	41,836	9.0	141,554	6.0
Local Government	$137,669	18.0%	$132,036	14.8%	$46,626	16.7%	$82,101	17.7%	$398,432	16.8%
Total	$765,878	100.0%	$869,760	100.0%	$273,820	100.0%	$464,297	100.0%	$2,373,755	100.0%

SOURCE: Bureau of Economic Analysis

*Estimates are not shown to avoid disclosure of confidential information. Estimated values are included in totals.

TABLE 18: FULL-TIME AND PART-TIME EMPLOYEES* BY MAJOR INDUSTRY FOR 1999

Industry	Clallam County	% of Total	Grays Harbor County	% of Total	Jefferson County	% of Total	Mason County	% of Total	Four-County Area	% of Total
Farm	448	1.4%	604	1.9%	194	1.5%	313	1.8%	1,559	1.6%
Agricultural Services, Forestry, & Fishing	901	2.8	(D)	(D)	583	4.4	648	3.6	2,132	2.2
Mining	71	0.2	(D)	(D)	(D)	(D)	28	0.2	99	0.1
Construction	2,282	7.2	1,790	5.5	1,086	8.3	1,184	6.7	6,342	6.7
Manufacturing	2,511	7.9	4,809	14.8	1,269	9.7	2,152	12.1	10,741	11.3
Transportation & Public Utilities	1,039	3.3	1,210	3.7	271	2.1	475	2.7	2,995	3.1
Wholesale Trade	670	2.1	781	2.4	(D)	(D)	479	2.7	1,930	2.0
Retail Trade	6,182	19.4	6,063	18.6	2,415	18.4	3,001	16.9	17,661	18.5
Finance, Insurance, & Real Estate	2,491	7.8	2,079	6.4	1,074	8.2	1,428	8.0	7,072	7.4
Services	9,275	29.1	8,613	26.5	3,920	29.9	4,343	24.4	26,151	27.4
Federal Government, Civilian	477	1.5	248	0.8	184	1.4	143	0.8	1,052	1.1
Federal Government, Military	504	1.6	293	0.9	111	0.8	189	1.1	1,097	1.2
State Government	1,326	4.2	1,000	3.1	312	2.4	1,040	5.8	3,678	3.9
Local Government	3,737	11.7	3,722	11.4	1,456	11.1	2,363	13.3	11,278	11.8
Total	31,914	100.0%	32,520	100.0%	13,125	100.0%	17,786	100.0%	95,345	100.0%

SOURCE: Bureau of Economic Analysis

*Some data are not shown to avoid disclosure of confidential information. Estimated values are included in totals.

UNEMPLOYMENT

Washington had relatively low unemployment in 1990, when the rate was less than the national unemployment rate (table 19). The percentage of unemployed persons in Washington rose to 6.2% while the national average dropped to 5.8% in 2000. The unemployment rates in the regional counties have been notably higher than both the state and national rates for the selected years. However, only Mason County had a worsening situation in 2000 when its rate increased by more than a percentage point. The unemployment rate for the four-county area meant that one out of 13 people in the labor force was unemployed in 1999.

The employment situation among the American Indian population of the region was much worse than for the counties' populations as a whole. Very high unemployment rates for both 1990 and 2000 indicate that meaningful employment for this group has been a chronic problem. Between 12.4% and 34.0% of the populations on the area's reservations were unemployed in 2000 (table 20). The lowest unemployment rate for any reservation was twice that of the state as a whole.

POVERTY

The national average for persons living in poverty in 1989 was 13.1% (table 21.). The poverty rate for Washington was more than two percentage points lower, 10.9%. For 1989 and 1999, the poverty rates in the four counties were all higher than the state rates. For three of the counties poverty rates were comparable to the national rates or lower. Only Grays Harbor had poverty rates that were notably higher (more than three percentage points) than the national rates. Combined, the four counties had a poverty rate of 13.3% in 1999; this figure represented more than 27,000 people living in poverty.

TABLE 19: UNEMPLOYMENT RATES

Area	1990	2000
Clallam County	8.7%	7.7%
Grays Harbor County	9.3%	8.3%
Jefferson County	7.2%	6.7%
Mason County	7.0%	8.3%
Four-County Area	8.4%	7.9%
Washington	5.7%	6.2%
United States	6.3%	5.8%

SOURCE: U.S Census Bureau

TABLE 20: UNEMPLOYMENT RATES FOR AMERICAN INDIAN RESERVATIONS

(not including the Jamestown S'Klallam Reservation)

Area	1990	2000
Lower Elwha Reservation	47.7%	14.6%
Makah Reservation	14.3%	23.7%
Quileute Reservation	30.2%	27.4%
Chehalis Reservation	13.8%	12.4%
Quinault Reservation	20.9%	14.7%
Hoh Reservation	22.6%	34.0%
Skokomish Reservation	18.0%	23.3%
Squaxin Island Reservation	27.3%	16.8%

SOURCE: U.S Census Bureau

TABLE 21: PERCENT OF PEOPLE LIVING IN POVERTY

Area	1989	1999
Clallam County	12.5%	12.5%
Grays Harbor County	16.4%	16.1%
Jefferson County	13.5%	11.3%
Mason County	13.2%	12.2%
Four-County Area	14.2%	13.3%
Washington	10.9%	10.6%
United States	13.1%	12.4%

SOURCE: U.S Census Bureau

TABLE 22: PERCENT OF PEOPLE LIVING IN POVERTY ON AMERICAN INDIAN RESERVATIONS
(not including the Jamestown S'Klallam Reservation)

Area	1989	1999
Lower Elwha Reservation	33.9%	26.6%
Makah Reservation	31.2%	31.3%
Quileute Reservation	55.4%	34.5%
Chehalis Reservation	40.9%	24.4%
Quinault Reservation	32.4%	31.5%
Hoh Indian Reservation	50.0%	42.0%
Skokomish Reservation	46.1%	27.6%
Squaxin Island Reservation	29.9%	26.8%

SOURCE: U.S Census Bureau

People living on the eight American Indian Reservations suffered from poverty rates that were two to three times higher than the county averages (table 22). Although these rates diminished somewhat from 1989 to 1999, between 24.4% and 42.0% of the residents were living in poverty in 1999.

Lower than average per capita incomes and higher unemployment and poverty rates indicate that the American Indians living in the region are economically disadvantaged when compared to the general population.

VISITOR USE

Table 23 presents recreation visits to the park for the last 15 years. The National Park Service reports visitor use as *recreation visits*. A recreation visit is one person entering the park for any part of a day for the purpose of recreation. One person may be counted as a "visit" more than once if he/she enters the park at more than one location. Over this period, the park averaged more than 3.2 million recreation visits. In 12 out of 15 years, the park hosted over three million recreation visits. Visitation has varied over the years but there is an upward trend; even with the more than 12% decline in visitation in 2003 and the further 4.7% decline in 2004.

Visitation grew at an average annual rate of less than one percent during this recent period. The linear trend line in figure 5 represents a simple regression of the number of visits by time (year) as the independent variable. Table 24 shows projected visitation using this simple regression analysis. This simplistic analysis attributes approximately one-third of the variation to the single independent variable: year (Adjusted R^2 = 0.32). The average change in visitor use, from 2004 to 2008, projected with this regression analysis is about 0.4% each year, or 53,000 recreation visits.

TABLE 23: RECREATIONAL USE AT OLYMPIC NATIONAL PARK

Year	Recreation Visits
1990	2,794,903
1991	2,759,673
1992	3,030,195
1993	2,679,598
1994	3,381,573
1995	3,658,615
1996	3,348,723
1997	3,846,709
1998	3,577,007
1999	3,364,266
2000	3,327,722
2001	3,416,069
2002	3,691,310
2003	3,225,327
2004	3,073,722

SOURCE: NATIONAL PARK SERVICE

TABLE 24: PROJECTED RECREATIONAL USE AT OLYMPIC NATIONAL PARK

Year	Projected Recreation Visits
2005	3,742,000
2006	3,794,000
2007	3,847,000
2008	3,900,000
2009	3,952,000

SOURCE: National Park Service and Bureau of Reclamation

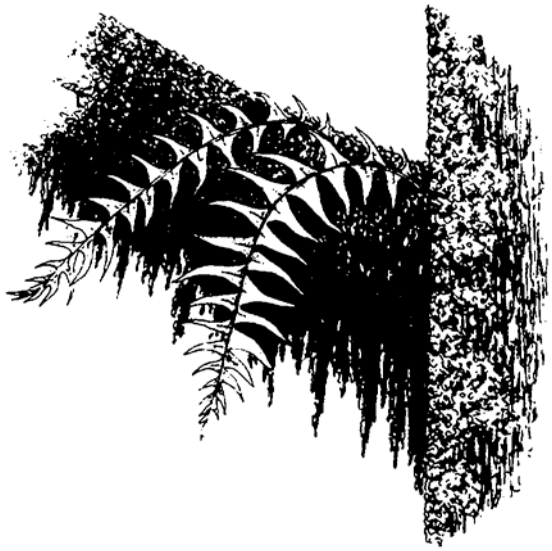
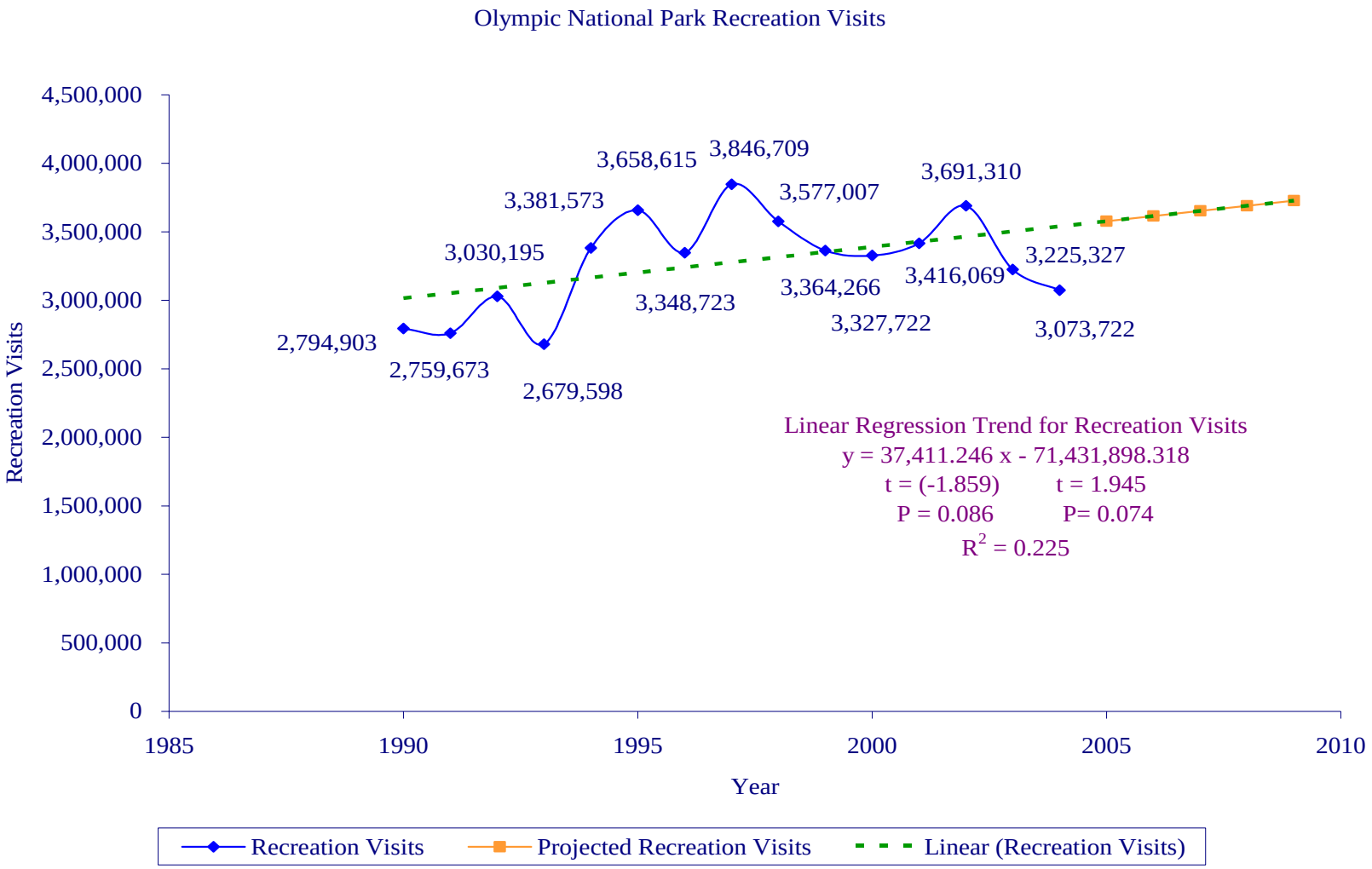


FIGURE 5: VISITOR USE — HISTORICAL USE AND PROJECTED



SOURCE: National Park Service and Bureau of Reclamation

PARK OPERATIONS

Olympic National Park is managed by a park superintendent, deputy superintendent, and several division chiefs housed at the headquarters area at Port Angeles. Management of the park is organized into several functional divisions: Administration, Natural Resources Management, Cultural Resources Management, Resource and Visitor Protection, Resource Education, and Maintenance. Staff in each division are stationed at park headquarters and at developed areas throughout the park. In 2005, there were 130 permanent, full-time employees. The 2001 *Olympic National Park Business Plan* identified $6.6 million in unmet needs parkwide at that time. Since then, a reduction of 30 additional FTEs has occurred in the park (one FTE represents a full year of work, whether performed by one full-time employee or multiple part-time or seasonal employees).

The administration division is responsible for the park budget, fiscal and real property management activities, revenue and fee management, contracting, information technology services, concessions management, and human resources. These employees are housed in the headquarters area complex.

The natural resources management division is responsible for preserving and managing the natural resources of the park and coordinating scientific research. They are responsible for resource inventory, monitoring and evaluation, impacts restoration and mitigation, fish and wildlife management, and wilderness preservation and monitoring. These employees are housed in a headquarters complex and there is a field office at Lake Crescent.

The cultural resources management division is responsible for preserving and managing the park's cultural resources. They are responsible for cultural resources inventory and identification, monitoring, mitigation, preservation, research, maintaining the museum collections, and coordination with the state historic preservation office and area tribes.

The resource and visitor protection division manages for resource protection and visitor safety and experience. Responsibilities include various visitor management and resource protection duties, including enforcing laws, providing emergency medical services, fighting wildland fires, management visitor use in the park, performing search and rescue activities, and wilderness management and permitting. Some employees are housed at the headquarters area, at the Wilderness Information Center, and there are field offices for employees in developed areas around the park.

The resource education division facilitates the connections between park resources and the public through the operation of the park visitor centers, programs, exhibits, written materials, off-site programs, and the park's website.

The maintenance division conducts periodic maintenance on the park's infrastructure and equipment. The primary maintenance facilities are at the headquarters complex, though there are additional maintenance functions and facilities associated with the park developed areas. Approximately 1% of the park consists of road accessible frontcountry developed areas with various infrastructure, including water, wastewater treatment facilities, electric utilities, phone and radio operations, trails, roads, parking lots, campgrounds, and administrative and public use buildings and structures within the park. In addition, some infrastructure exists within the park wilderness area. The maintenance division also manages the park housing program.

Along with the permanent employees, many seasonal employees are employed during the summer for many of the divisions to supplement current park staff and to provide for improved visitor services during the busy season