

3.2.4 Terrestrial Resources

3.2.4.1 *Affected Environment*

3.2.4.1.1 *Vegetation Communities/Cover Types*

The Project lies within the Western Hemlock Zone, which typically occurs below elevation 3,500 feet and is associated with relatively warm climate conditions and highly productive soils (Franklin and Dyrness, 1988). The terrestrial resources study area includes all lands within the Project boundary; riparian habitats along the Oak Grove Fork and Clackamas River downstream to Carver Bridge (RM 8) and the lower 1,000 feet of select tributary stream to these rivers; off-channel habitats along the Oak Grove Fork; all lands within 0.12 mile of the Oak Grove pipeline, Frog Lake, Lake Harriet, North Fork Reservoir, Faraday Lake, and Estacada Lake; all lands within 0.25 mile of Timothy Lake; and all non-Project PGE-owned lands upstream of River Mill dam, which total approximately 10,518 acres. Lands within the Project boundary comprise approximately 36 percent of the study area. Forty-three cover types occur within the terrestrial resources study area that can be summarized into nine primary categories: upland conifer forest; upland deciduous forest; riparian; wetland; non-forested upland; rock and cliff; developed and disturbed; Project rights of way (ROWs); and riverine and lacustrine (Table 3.2.4.1-1) (EDAW, 2002a). Upland conifer forest is the dominant general vegetation type in the terrestrial study area followed by riparian cover types. Wetlands are relatively uncommon, occupying only 1 percent of the study area; most are associated with Timothy Lake, the Oak Grove pipeline, and the Upper Oak Grove Fork. Riverine and lacustrine cover types, which include the Project reservoirs, account for 28 percent of the study area.

Upland Conifer and Deciduous Forest

Upland conifer forests of different ages dominate the vegetative landscape of the Project study area (EDAW, 2002a), and occupy more than 27 percent of the area included within the Project boundary (Table 3.2.4.1-1). Douglas fir and western hemlock are the most common tree species throughout the Project area. Deciduous forest types dominated by red alder, black cottonwood, and willow species are generally restricted to riparian zones along the Clackamas River, Oak Grove Fork, and associated tributaries. The area around Lake Harriet contains a mix of Douglas fir, western hemlock, Pacific silver fir, western red cedar, and red alder.

Table 3.2.4.1-1. Acreage of vegetation cover types within the Project boundary.¹

Cover Type	Timothy Lake	Oak Grove Fork above Lake Harriet	Lake Harriet	Oak Grove Fork below Lake Harriet	Oak Grove pipeline and Frog Lake	Davis Ranch	Oak Grove Fork to North Fork Reservoir	North Fork Reservoir	Faraday & Estacada Lakes to River Mill dam	River Mill dam to Eagle Creek	Grand Total
Upland Conifer Forest	582.03		22.81	1.42	247.79	8.85	21.39	71.67	71.08		1027.05
Upland Deciduous Forest					6.14		4.78	29.61	0.54		41.07
Riparian	7.77	2.06	3.52	0.01	4.63		25.77	32.92	65.53	0.10	142.31
Wetland	28.67	0.11	3.79		15.00	7.48		0.10	0.20		55.36
Non-forested Upland					4.27						4.27
Right Of Way							120.52	7.53	7.17		135.22
Riverine/Lacustrine	1415.63		20.17		16.78		38.43	311.58	197.54	0.09	2000.22
Rock and Cliff	5.17			0.03	5.10		4.46	0.38	0.19		15.33
Developed and Disturbed	107.72		3.77		80.09	4.42	38.19	32.98	68.07		335.25
Grand Total	2147.00	2.17	54.06	1.46	379.81	20.76	253.56	486.76	410.31	0.19	3756.08

¹Table adapted from EDAW, 2002a.

Most of the upland conifer forest in the Project area is in the mid-seral successional stage, roughly 125 to 200-years-old. Mid-seral forests at the Project contain low-to moderate coverage of understory vegetation, which typically includes Oregon grape and swordfern or rhododendron and beargrass associations. Some mature and old growth forest occurs, primarily in the vicinity of Timothy Lake, but also in small patches near North Fork reservoir and Frog Lake. Patches of early-seral stage conifer forest, created by timber harvest and natural disturbances such as fire and landslides, are scattered throughout the Project study area and comprise approximately 11 percent of the forest cover.

Riparian Communities and Wetlands

Riparian areas are defined as zones of interaction between surface water and surrounding uplands or hillslopes and differ from upslope areas in that they contain a well developed understory vegetative community (Diaz and Mellen, 1996). Riparian habitats generally contain higher vegetative and structural diversity than upslope areas, because associated water bodies provide openings for light to penetrate, stimulating development of shrub and herbaceous vegetation. Riparian vegetation communities comprise roughly 13 percent of the Project study area (EDAW, 2002a) and slightly less than 4 percent of the area within the Project boundary.

Riparian habitat along the Upper Oak Grove Fork is primarily (72 percent) riparian conifer forest. Because much of the Upper Oak Grove Fork is confined within a steep-sided canyon, conifer forest plant associations with more mesic species are common such as western hemlock/swordfern or western hemlock/Alaska huckleberry/bunchberry (EDAW, 2002a). Occasional riparian deciduous forest communities contain alder in the overstory with vine maple, thimbleberry, or salmonberry creating a dense shrub understory (EDAW, 2002a).

Along the mainstem Clackamas River, the riparian habitat is highly variable. In contrast to the conifer-dominated riparian zones along the Oak Grove Fork, deciduous communities dominate the riparian zone along the mainstem Clackamas River. The cobble/gravel bars that occur periodically along the Clackamas River channel support a variety of riparian habitat types, ranging from willow shrub patches to alder forests. Shrub canopy in riparian areas along both rivers is dominated by vine maple, red alder, and thimbleberry (EDAW, 2002a).

Sampling in riparian habitats along the Oak Grove Fork and the mainstem Clackamas River in 2000 documented significant differences in tree canopy cover, tree height, and snag and log size and density. For example, riparian habitats along the Oak Grove Fork contain larger trees and logs and a greater density of snags and logs when compared with riparian habitats along the mainstem

Clackamas River (EDAW, 2002a). Riparian habitats along the Oak Grove Fork meet USDA Forest Service standards and guidelines for snags and down wood (see section 3.1.2) while those along the mainstem Clackamas River do not (EDAW, 2002a). This difference could be related to higher levels of disturbance along the mainstem Clackamas River. Riparian habitats along much of the Clackamas River have been fragmented and disturbed by the presence of roads and dispersed and developed recreation sites. In particular, riparian habitats downstream of River Mill dam have been adversely affected by human activities and presence of invasive plant species.

Project reservoirs do not contain extensive wetland or riparian habitats, as typically occur with natural open water ecosystems. Instead, the shorelines of Project reservoirs mostly juxtapose mid-successional upland conifer forest and contain little riparian and wetland habitat. Of notable exception is the north arm of Timothy Lake where a wide transition zone between the water and forest contains extensive, vegetatively diverse emergent and scrub-shrub wetland communities. These wetlands provide some of the most valuable plant and wildlife habitat in the Project area and contain two USDA Forest Service sensitive plant species (see section 3.2.5).

The Terrestrial Resources Workgroup (TRWG) developed pre-Project vegetation cover type maps for Timothy Lake and the surrounding 0.25 mile area, which totals 3,120 acres, to estimate the amount and types of habitat present in the area prior to construction of the lake (EDAW, 2003f). Prior to construction, the area that is now Timothy Lake was mostly forested (78 percent) while wetlands and riparian vegetation comprised the majority of remaining lands (20 percent) (EDAW, 2003f). The creation of Timothy Lake inundated (i.e., converted to open water) approximately 1,410 acres of land, including 1,107 acres of forest, 262 acres of wetlands, 24 acres of riparian habitat, and 17 acres of other upland vegetation cover types (EDAW, 2003f). In addition to these direct habitat conversions, the lands immediately surrounding the lake have undergone substantial changes since creation of the lake. For example, the dominant wetland cover type in the Timothy Lake area has shifted from palustrine forested wetland (58 percent of total wetlands in 1946) to palustrine emergent wetland (67 percent of total wetlands in 2002). High quality palustrine emergent wetlands have developed along the lake shoreline, particularly along the north arm of the lake. Also, timber harvest and recreational development converted between roughly 55 to 60 percent of old-growth and mature conifer forest types around the lake to low-impact recreational development (campground with conifer forest overstory) or mid-successional forest. Current (mapped in 2002) habitat types around the Lake include a mix of open water, emergent and scrub-shrub wetlands, riparian vegetation, and mid- and late-successional forest (EDAW, 2003f).

Emergent wetland habitat dominates both sides of the Oak Grove pipeline through Oak Grove Meadows, covering roughly 14 acres. This wetland is composed primarily of reed canarygrass, although several small, excavated ponds support other submerged aquatic and emergent wetland plant species. Forested wetland habitat, consisting primarily of red alder with an understory of skunk cabbage, occurs in two locations along the pipeline. Other small wetlands associated with mountain seeps or low-lying pothole areas are interspersed throughout the Project area. These areas include a four-acre alder-dominated forested wetland located immediately upstream of Lake Harriet; narrow fringes of sedge and rush-dominated emergent wetland along portions of the shoreline of Faraday Lake; and a small emergent wetland along Highway 224 near North Fork Reservoir.

Project Rights-of-way

Project rights-of-way for transmission lines comprise roughly two percent of the terrestrial study area (EDAW, 2002a). ROWs for Project-use roads (i.e., roads used for operation and maintenance of the Project) and the Oak Grove pipeline comprise approximately six percent. Table 3.2.4.1-2 summarizes the lengths and areas of all Project ROWs. Project-use roads do not have extensive vegetated ROWs. Vegetation immediately adjacent to Project-use roads varies with respect to location at the Project, but is typical of roadside vegetation in the region. Infestations of exotic and invasive plant species such as Scot's broom, Canada thistle, bull thistle, and St. John's wort occur in some areas alongside Project-use roads (Table 3.2.4.1-3).

The ROWs that contain the transmission lines and the Oak Grove pipeline are approximately 100 feet wide (see Figure 1.0-3). PGE manages vegetation in the ROWs to maintain early successional shrub and tree stands that are dominated by western hemlock saplings, salal, swordfern, and Oregon grape. These ROWs also contain scattered populations of exotic and invasive plant species such as Scot's broom, Canada thistle, bull thistle, English ivy, Himalayan blackberry, perennial peavine, tansy ragwort, and St. John's wort (Table 3.2.4.1-3).

Other Project-related Linear Features

The Faraday Canal and the Faraday-North Fork Fish Ladder are linear features associated with the Project located downstream of the North Fork Reservoir (see Figure 1.0-3). These features are 0.75 and 1.9 miles in length, respectively. These areas do not have ROW associated with them other than access roads that are included in the Project-related roads summary above.

Table 3.2.4.1-2. Summary of Project rights-of-way within the Project boundary, including transmission lines, the Oak Grove pipeline, and Project-use roads².

River Segment	Transmission Line ¹	Oak Grove pipeline ¹	Project-use Roads ²
<i>Timothy Lake to the confluence with the Oak Grove Fork</i>			
Length (mi)	0	0	1.2
Area (sq. mi)	0	0	0.01
<i>Oak Grove Fork to Harriet Diversion dam</i>			
Length (mi)	0	0.4	11.9
Area (sq. mi)	0	0.01	0.12
<i>Harriet Diversion dam to Three Lynx</i>			
Length (mi)	0.7	5.8	28.7
Area (sq. mi)	0.01	0.12	0.29
<i>Three Lynx to North Fork Reservoir</i>			
Length (mi)	11.8	0	13.4
Area (sq. mi)	0.24	0	0.13
<i>North Fork Reservoir to the west end of Faraday Diversion dam</i>			
Length (mi)	5.9	0	34.9
Area (sq. mi)	0.12	0	0.35
<i>West end of Faraday Diversion dam to West of River Mill dam</i>			
Length (mi)	0	0	2.2
Area (sq. mi)	0	0	0.02
TOTAL length (mi)	22.8	6.4	92.3
TOTAL area (sq. mi)	276	76	559

¹ Areas for the transmission lines and the Oak Grove pipeline were determined assuming a 100-foot wide right-of-way.

² Project-use roads include roads used by PGE for Project maintenance and operation. Road distances were obtained primarily from the MHN Access Travel Management Plan (ATM); lengths for roads not included in the ATM were generated using PGE's Computer Aided Mapping and Resource Inventory System (CAMRIS), data on Project use roads are presented in Marheine and Concannon (2003). The area calculations assume a 50-foot ROW for all roads (including road and shoulder). Many Project-use roads extend beyond the current Project boundary. Values in this table include outlying roads that extend beyond the Project boundary.

Table 3.2.4.1-3. General occurrence, density¹, and abundance² of exotic and invasive plant species in the Project study area.

Species	Highway 224 Corridor	Pipeline	Oak Grove Fork	FS Rd 57	Timothy Lake
Canada thistle <i>Cirsium arvense</i> Abundance= 15	D1	D1, D2, D3	D1	D1	D1
Bull thistle <i>Cirsium vulgare</i> Abundance= 9	D1	D1	D1	D1	D1
English ivy <i>Hedera helix</i> Abundance= 6	D1, D2, D3	D2	--	--	--
Himalayan blackberry <i>Rubus discolor</i> Abundance= 9	D1, D3, D4	D1, D2	--	--	--
Perennial peavine* <i>Lathyrus latifolia</i> Abundance= 3	D1	D3, D4	--	--	--
Robert's geranium <i>Geranium robertianum</i> Abundance = 5	D2	--	--	--	--
Scot's broom* <i>Cytisus scoparius</i> Abundance= 53	D1, D2, D3, D4	D1, D2	--	--	D1
St. John's wort <i>Hypericum perforatum</i> Abundance= 68	D1	D1, D2, D3	D1, D3	D1, D3	D1, D2, D3
Tansy ragwort <i>Senecio jacobaea</i> Abundance= 27	D1	D1	D1	D1	D1, D2
Toadflax <i>Linaria sp.</i> Abundance= 1	--	--	--	--	D1

Source: EDAW, 2003c

* Species not rated by the ODA but judged by the FS to be a threat to biodiversity

¹ Density = Not Observed; D1: trace-0.4/square mile; D2: 0.5-4/square mile; D3: 5-17/square mile; and D4: >17/square mile

²Abundance = number of populations recorded within specified reaches

Invasive and Exotic Species

The Oregon Department of Agriculture (ODA) maintains a state list of exotic noxious weeds, also referred to as invasive and exotic plants, which are defined by law as non-native, undesirable, and difficult to control (ODA, 2003). Invasive and exotic plant species pose a threat to native plant communities and wildlife habitat, because they have few natural predators and can be aggressive competitors, allowing them to spread quickly and often outcompete native plants on which native wildlife depend. *The Pacific Northwest Region Invasive Plant Program: Preventing and Managing Invasive Plants – Record of Decision* (Regional ROD) was published in October 2005 (USFS 2005b). The Regional ROD adds guidance regarding invasive plant management to all National Forest Land and Resource Management Plans in Oregon and Washington. The guidance includes invasive plant prevention and treatment/restoration standards intended to help achieve stated desired future conditions, goals, and objectives. Currently, the decision is in the Forest Plan amendment appeal process. The Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon published a *Draft Environmental Impact Statement – Site-Specific Invasive Plant Treatments* in May 2006 (USFS, 2006). This document tiers to the Regional ROD and proposes invasive plant treatments on 208 sites (approximately 13,000 acres) using integrated weed management techniques. A final EIS is expected to be published in October 2006 and a decision to implement the treatments proposed in the document is expected in January 2007.

Surveys for invasive and exotic plant species in the Project study area in 2001 and 2002 documented 10 invasive and exotic species (see Table 3.2.4.1-3). Most occurrences of these species were in association with Project facilities, such as roads, ROWs, and other disturbed areas. The corridor along State Highway 224, both a public highway and Project-use road that is outside the Project boundary, contains 9 of the 10 species documented. The area around Timothy Lake contains 6 of the 10 species (see Table 3.2.4.1-3). Overall, most of the invasive and exotic species in the Project study area are widespread and common, but occur in scattered infestations in low to moderate densities (EDAW, 2003c).

Surveys for aquatic weeds in Timothy Lake in 1996 identified one aquatic weed species, *Bidens beckii*, but this species was determined not to be an invasive threat because it is relatively slow growing and appeared to be contained in one location (PSU, 1996). No other aquatic weed species have been documented in Project reservoirs. Fluctuating water levels (e.g., prolonged periods of inundation and subsequent dewatering) in Project reservoirs may deter the establishment and spread of aquatic weed species (Corps, 1989).

Aquatic nuisance animal species known to occur in reservoirs and lakes in Oregon such as zebra mussel, mud snail, and mitten crab have not been documented at the Project and are not thought to occur there at this time (TRWG meeting, March, 2004).

3.2.4.1.2 Wildlife Communities

The area within the Project boundary contains over 3,750 acres of relatively undeveloped land and water, much of which is part of the MHNF. The MHNF manages this area and the surrounding areas for timber production, and protection and maintenance of wildlife habitats and species, scenic values, and recreation. Terrestrial wildlife habitats and communities in the Project area are typical of those found in undeveloped landscapes at similar elevations along the west slope of the Cascades.

Topography, water resources, vegetative diversity, and the structural complexity of the vegetative communities in the Project area are important elements contributing to wildlife use and species composition at the Project. Over 300 animal species are known to occur or potentially occur in the Project vicinity (ODFW, 1993). Birds are the most diverse group of animals in the vicinity of the Project with potentially more than 200 species. In addition, 18 species of amphibians, 13 species of reptiles, and 72 or more species of mammals have the potential to occur in the vicinity of the Project. In the following sections, we describe the wildlife communities in the Project area according to vegetation community and highlight the unique or noteworthy wildlife communities and species that occur.

Upland Forests

In terms of area, the dominant wildlife habitats in the Project vicinity are upland conifer and deciduous forests. Upland forests serve various functions for wildlife that vary with the vegetative and structural diversity of the forest and the presence of micro- and macro-habitat components. Some wildlife species are forest generalists, occurring in all forest habitats associated with the Project, while others are forest specialists, occurring in specific forest cover types and seral stages that offer unique habitat components such as old growth, snags, or nesting cavities. In general, over 230 wildlife species are known to occur in forested habitats typical of the Project vicinity. Most of these 230 species are neotropical migrant and resident songbirds that nest throughout forested habitats, utilizing all seral stages and forest vegetation communities. While the overall area of mature and old growth forest is relatively low in the Project vicinity, remaining stands contain highly valuable habitat features for wildlife including abundant snags and down wood and large, old trees for nesting. Mature and old growth conifer forest

stands near Timothy Lake provide suitable nesting habitat for a variety of forest interior dwelling bird species, including the federally threatened northern spotted owl (see section 3.2.5). Bat species also use old trees in the Timothy Lake area and elsewhere at the Project for roosting and reproduction purposes.

Black-tailed deer winter in some of the larger upland forest communities in the Project vicinity, including those near Three Lynx, Frog Lake, and Ripplebrook Campground. Large mammals such as elk and black-tailed deer typically utilize open shrubby gaps, riparian and wetland areas, early successional second growth forests, and meadow areas below elevation 3,000 ft on south- and west-facing slopes and elevation 2,500 ft on north- and northeast-facing slopes as foraging habitat in winter (Witmer et al., 1985). Upland forests and adjacent meadows and riparian areas provide quality foraging habitat for elk and black-tailed deer throughout the year. Upland forests in the Project vicinity also provide suitable habitat for a variety of smaller mammals including the ermine, western gray squirrel, Townsend's chipmunk, snowshoe hare, bobcat, coyote, and several species of rodents (PGE, 1999).

Riparian Communities and Wetlands

Riparian communities provide important habitat for a variety of wildlife species. In the Project area, riparian areas include zones along the mainstem Clackamas River and Oak Grove Fork and associated tributaries as well as the borders of Project reservoirs, particularly Timothy Lake. Riparian areas generally provide higher vegetation density and structure than surrounding habitats and when combined with proximity to water, provide abundant food, cover, and nesting opportunities for many wildlife species. Fruit and mast-producing shrubs such as huckleberry and alder are locally abundant, particularly in the riparian zones along the mainstem Clackamas River, and provide valuable forage for birds and mammals. Forbs and deciduous shrubs in this area also support grazing and browsing by black-tailed deer and elk. Invertebrate density is generally high in riparian zones, providing food for insectivorous wildlife species such as birds and bats. Mammalian predators, including black bear and cougar, are attracted to riparian habitats because of high prey densities, and they occasionally use riparian habitats as travel corridors (USFS, 2002b).

The complex structure of riparian habitats provides loafing and nesting habitat for birds as well as protective cover for other species of wildlife. Due to topography and presence of water, riparian areas are generally cooler in summer and warmer in winter than surrounding upslope areas and so provide important thermal cover for wildlife, particularly big game, during extreme weather (Diaz and Mellen, 1996). Birds comprise the largest group of riparian-associated animals in the Project vicinity, with over 138 species known to occur or

potentially occur. Riparian vegetation provides nest sites, protective cover, foraging opportunities (e.g., insects, berries, seeds, etc.), and perch sites for birds preying on insects and fish in adjacent waters. Characteristic bird species of riverine riparian habitats in the Project vicinity include the common merganser, belted kingfisher, and American dipper, while bird species typical of reservoir riparian habitats include the tree swallow, violet-green swallow, and common nighthawk. Riparian-dependent mammals include beavers, otters, muskrats, several species of shrews and voles, and various species of bats.

Project reservoirs provide large amounts of open water loafing and foraging habitat for migratory waterfowl and other aquatic bird species including ring-necked ducks, mallards, Canada geese, western and pied-billed grebes, and common loons. With the exception of Timothy and Faraday lakes, the other Project reservoirs provide limited nesting opportunities for waterfowl due to the minimal extent of wetlands and other herbaceous habitats in and adjacent to the water.

In contrast to the other Project reservoirs, Timothy Lake provides valuable habitat for a unique assemblage of wildlife. Dispersed and developed recreation influences wildlife usage at Timothy Lake, particularly along the south shore. Portions of the North Arm are also affected to some extent by recreation; however, to a much lesser extent than other portions of the lake. Despite these effects, the North Arm of Timothy Lake is unique among lands within the Project boundary in that it provides a diversity of high quality nesting, breeding, foraging, migratory, and loafing habitats for all groups of terrestrial wildlife species found at the Project, including invertebrates, amphibians, reptiles, mammals, and birds. An important ecological feature of the North Arm wetlands is the stillwater breeding habitat that provides for amphibians, which is relatively limited in the Project vicinity. Six species of amphibians breed in the emergent wetlands and stillwater pools at the North Arm, including the long-toed salamander, northwestern salamander, rough-skinned newt, Cascades frog, treefrog, and red-legged frog (EDAW, 2003a). The North Arm wetlands support the most diverse amphibian species assemblage known within the Project area (EDAW, 2003a).

Several mammal species including the river otter and beaver breed and overwinter at Timothy Lake. Twelve species of bats potentially occur in the vicinity of the Lake, and natural bat roosts and reproduction sites (i.e., standing trees with voids between the bark and trunk) likely exist in the mature and old-growth conifer forests in the area. Field surveys documented bat use in four structures associated with the Timothy Lake Lodge in 2002 (Concannon, 2003).

Timothy Lake and its surrounding emergent wetlands and the two small man-made islands in the northeastern portion of the lake provide nesting habitat

for several species of waterfowl, including goldeneyes, mallards, ring-neck ducks, and wood ducks. Timothy Lake supports one or more nesting pairs of osprey and provides stopover habitat for a wide variety of migratory waterbirds, as do the other Project reservoirs. Bald eagles occasionally forage in Timothy Lake, particularly in the north arm area. A bald eagle nest was discovered near Timothy Lake in 2004 but it remained unoccupied during the 2004 breeding season (Stillwater Sciences, 2005). The closest active known bald eagle nest to the Project area is located 3 miles away at Clear Lake (USFS, 2002a). The unoccupied bald eagle nest near Timothy Lake could be an alternate nest for the Clear Lake nesting pair (Stillwater Sciences, 2005). The North Arm area is potentially the best bald eagle foraging and breeding habitat at the Project, partly because of the seasonal abundance of waterfowl, a preferred food resource for this species, and partly due to the lake's fish resources (USFS, 2002a).

Wetland habitats, other than those at the north arm of Timothy Lake, are relatively rare at the Project and so provide valuable habitat for wetland-dependent wildlife species at the Project. The Oak Grove Meadows and Little Crater Meadows provide valuable emergent wetland habitats, particularly for songbirds and mammals. These mid-elevation meadow habitats provide important stopover and breeding habitat for migratory and resident songbirds. Little Crater Meadows, which is located outside the Project boundary and approximately 0.5 mile northeast of North Arm, supports a breeding population of sandhill cranes, a state- and USDA Forest Service-listed sensitive species (see section 3.2.5) (USFS, 2002c). Black bears also forage on huckleberry and alder in the meadows (PGE, 1999).

The drainages adjacent to and along the Oak Grove pipeline and pothole areas in the Oak Grove Meadows provide stillwater breeding habitat for northwestern salamander, rough-skinned newt, tree frog, and red-legged frog (EDAW, 2003a). These meadows also serve as calving grounds and summer habitat for elk from March through July. The vegetative diversity at the meadows provides high quality forage and protective cover close to water. ODFW survey data which was obtained from the MHNF, document a decline in elk population density in this area over the last ten years (ODFW, 2004). Experts suggest that the reduction of early seral stages from reduced logging may be contributing to the population decline (ODFW, 2004).

Project Rights-of-Way

Project ROWs are linear features that are actively managed or used for Project purposes and include transmission lines, Project-use roads, and the Oak Grove pipeline (see Figure 1.0-3). The TRWG identified the need for information on Project ROWs and how they affect habitat connectivity and wildlife movement

and mortality at the Project, and PGE conducted several studies to address this issue. The Pipeline/North Fork Fish Ladder/Faraday Canal Connectivity Study (EDAW, 2003d) evaluated wildlife accessibility to the Oak Grove pipeline and identified the locations of and distances between wildlife crossing opportunities. The Project-use Roads Study (Marheine and Concannon, 2002) identified and described all Project-use roads at the Project.

Roughly 22.8 miles of transmission lines occur at the Project (see Table 3.2.4.1-2, Figure 1.0-3). These transmission lines lie within ROWs that are roughly 100-ft wide and are maintained in early-successional shrub and tree stands. These areas provide nesting and foraging habitat for wildlife species that specialize in early successional habitats. Also, large mammals and birds utilize these areas as travel corridors between preferred habitats. Early successional habitats are relatively rare at the Project and so transmission line and the pipeline ROWs provide wildlife habitat diversity in the predominantly mid-successional forest landscape.

There are roughly 92 miles of Project-use roads associated with the Project (Marheine and Concannon, 2002) (see Table 3.2.4.1-2). Roads can adversely affect wildlife, particularly wintering big game, by fragmenting natural habitats and reducing habitat effectiveness. To address this issue, PGE inventoried and mapped all roads within a 162-square mile study area that encompassed the Project and surrounding area (Marheine and Concannon, 2002). A total of 586 miles of roads are located in the study area, most of which are USDA Forest Service roads and not related to the Project. Project-use roads (those roads that are used by PGE to access, maintain, and operate the Project facilities) contribute 16 percent to the overall open road density for the overall Project area and 46 percent to the density in the Lower Oak Grove Fork portion of the study area (Marheine and Concannon, 2002). Project-use roads do not represent the majority of open roads, however, overall open road density in the Project study area exceeds MHNF standards and guidelines of 2.0 linear miles/square mile for known deer and elk winter range and 2.5 linear miles/square mile outside winter range (Table 3.2.4.1-4) (Marheine and Concannon, 2002).

Table 3.2.4.1-4. Open road¹ and Project-use road density in the Project vicinity.

Sub area	Open Road Density² (Summer /Winter)	Project-use Road Density² (Summer/Winter)
Timothy Lake	2.4/2.4	0.05/0.05
Upper Oak Grove Fork	2.4/2.4	0.3/0.3
Lower Oak Grove Fork	2.4/2.3	1.2/1.1
Clackamas River	2.1/2.1	0.5/0.5
North Fork	3.3/3.3	0.5/0.5

Source: Modified from Marheine and Concannon, 2002

¹ Open road density includes all roads

² Linear miles/square mile

The Oak Grove pipeline is 6.4 miles long (see Table 3.2.4.1-2, Figure 1.0-3). Similar to the transmission lines, the pipeline lies within an approximate 100-ft wide ROW that is maintained in early successional vegetation and provides habitat for species adapted to these habitats. A portion of the pipeline ROW runs through Oak Grove Meadows, which provides valuable upland and wetland meadow habitats that support breeding and migratory birds, big game mammal species, and breeding amphibians. There are no natural barriers that prevent wildlife from moving along both sides of the Oak Grove pipeline; however, only portions of the pipeline are considered crossable by wildlife. The distance between available crossing locations for small and/or large animals can be as long as 2,303 ft, however, most (>60 percent) are less than 1,000 ft apart (EDAW, 2003d). The pipeline is not considered a barrier to large animal movement since these animals typically travel long distances and so can move along the pipeline until they reach a crossing opportunity. The pipeline may act as a barrier to small animal movement since some small animals, such as amphibians and small mammals, are not known to travel long distances. For some small, less mobile species, the pipeline may eliminate movement across an area, isolating subpopulations. The magnitude of this effect on populations of small animals at the Project is unknown (EDAW, 2003d).

Other Project-related Linear Features

The Faraday Canal is roughly 0.75 mile long and approximately 25 ft wide (see Figure 1.0-3). Because it lacks fencing, much of the canal is accessible to wildlife. A vehicle bridge approximately 1,000 ft from the east end of the canal provides the primary wildlife crossing opportunity; however, the water velocity in the canal is relatively low so some animals likely cross the canal by swimming. The canal is also earthen-sided for much of its length, which allows animals to

enter and exit easier. PGE has not documented any wildlife mortality related to the canal. The Faraday Canal is not considered a major impediment to wildlife movement. Animal movement is likely modified, but not completely blocked by the canal (EDAW, 2003d).

The North Fork Fish Ladder is 1.9 miles long (see Figure 1.0-3). There are no natural barriers that prevent wildlife from moving along both sides of the ladder; however, crossing the ladder is difficult or impossible for most terrestrial wildlife. All but the lower 100 feet of the fish ladder is fenced, limiting wildlife access to the ladder, although some wildlife can burrow under or jump over the fence in some locations. Wildlife are occasionally trapped in the fish ladder. PGE estimates that approximately five deer die annually in the fish ladder. Nine deer and two coyotes died in the fish ladder between April 1998 and June 2001 (EDAW, 2003d). PGE installed two escape ramps in the fish ladder in 2001, and since then, only two deer deaths have been reported. The fish ladder acts much like the pipeline with respect to connectivity, modifying large animal movement patterns to some degree and potentially isolating some subpopulations of smaller, less mobile wildlife such as terrestrial salamanders and small mammals.

Wildlife Management

The MHNH Land and Resource Management Plan (LRMP) designated several habitat areas for bald eagles (A-13), northern spotted owls (A-8), pileated woodpeckers, and pine martens (B5). However, the Northwest Forest Plan amended these designations and replaced the A-8 and B-5 management areas with a system of Late-Successional Reserves (LSRs), which now form the management direction for these species. The MHNH still retains the A-13 areas for bald eagles. The USDA Forest Service allocates and manages these habitat areas for protection or recovery of their associated species. Several A-7 special old growth habitat areas also occur around Timothy Lake and along the mainstem of the Clackamas River. The USDA Forest Service manages these areas to retain old growth habitat components and preserve old growth habitat functions and values.

There are several small bald eagle habitat areas and one large area near Timothy Lake identified as a potential bald eagle recovery area in the Mt. Hood Forest Plan. These areas are designated and managed by USDA Forest Service to promote critical habitat components for the bald eagle, including mature forest with snags/perch trees adjacent to water and/or a food source.

3.2.4.2 Environmental Effects

The Proposed Action includes many measures that could affect terrestrial resources, including the proposed changes in flow management and reservoir

operations, as well as measures designed to protect or enhance terrestrial and recreational resources at the Project. In this section, we evaluate the potential effects on terrestrial vegetation and wildlife communities.

In terms of area or magnitude, the Proposed Action does not include any measures that would cause significant, direct losses of vegetation or wildlife (i.e., no measures would cause the removal of large areas of vegetation or critical wildlife habitats). Disturbance or loss of vegetation associated with proposed new construction would not be significant since new construction projects are limited to upgrading existing recreational facilities, trails, and campsites. With the exception of the three new campgrounds, all new construction would occur in small areas, generally less than one acre in size, most of which have been previously disturbed by Project- or recreation-related activities. Removal or alteration of existing vegetation would be minimal and limited to undisturbed areas immediately adjacent to the construction sites. All ground- or vegetation-disturbing activities would follow guidelines identified in the Vegetation Management Plan (PGE, 2006), developed in consultation with USDA Forest Service, USFWS, and ODFW as part of the Settlement Agreement (PGE, 2006), to minimize short- and long-term adverse effects to vegetation communities and associated wildlife and wildlife habitat. The guidelines also include specific measures for controlling the spread of noxious weeds and invasive/exotic plant species at the Project.

The Proposed Action provides for the support of the TRWG to coordinate implementation of terrestrial resource license conditions throughout the life of the new license and to facilitate consultation between PGE, the agencies, and Tribes. Ongoing support of the TRWG would also assist identification of any new terrestrial resources issues that may arise during the course of any new license.

Flow Management at Timothy Lake

The Proposed Action involves maintaining the water surface elevation in Timothy Lake between 3,189.0 and 3,191.5 ft from Memorial Day through Labor Day. During this period, PGE would operate Timothy Lake to minimize water level fluctuations, with no drawdown below 3,190.0 ft before August 1. Under the existing license, PGE has tried to maintain Timothy Lake at either full pond (elevation 3,190.0 ft) or the surcharge level (elevation 3,191.9 ft) between June 1 and Labor Day, provided these elevations are reached by June 1. Though PGE attempts to maintain stable water levels during this period, maintenance at Timothy dam or at Project facilities downstream can cause the lake level to fluctuate within limits allowed by the current license (3,189.0 to 3,191.9 ft).

Maintaining a stable water level at Timothy Lake between elevation 3,189.0 and 3,191.5 ft between Memorial Day and Labor Day with no drawdown below 3,190.0 ft before August 1 and initiating the annual drawdown in early September would resemble current operations and the condition to which vegetation and wildlife species have adapted at Timothy Lake (i.e., a seasonal wetland with varying water levels during the growing season). Timothy Lake surface water elevation data between the years 1957 and 2000 show that Lake levels between June 1 and August 31 have varied considerably, but for the most part remained within the range of 3,188.0 and 3,191.9 ft. During the years from 1978 to 1992, lake levels were below 3,190.0 ft for over 95 percent of the period from June 1 to August 31. In 1993, PGE began exercising their right to maintain the lake at the surcharge level of 3,191.9, and so water levels typically ranged between 3,190.0 and 3,191.9 from 1993 to 2000 during the summer period.

Under the Proposed Action, PGE would initiate the annual Timothy Lake drawdown in September, as conducted under the current license. This would resemble conditions to which species at Timothy Lake have been exposed since creation of the Lake and so would not cause a significant change in the ecosystem or adversely affect wildlife adapted to the Timothy Lake ecosystem. For the most part, the wildlife breeding season at Timothy Lake is complete by early September, although some young-of-the-year may still occur in the area.

Relatively immobile organisms, such as amphibian hatchlings and tadpoles that have not yet metamorphosed into larvae, juveniles, or adults, occur in wetlands and temporary ponds along the margins of Timothy Lake, particularly in the North Arm. Six species of amphibians breed in these temporary pools and wetlands along the margins of Timothy Lake, including two federally listed species of concern: red-legged frog and Cascade's frog (see section 3.2.5.2). PGE conducted surveys in July and August 2003 to document the presence, developmental stage, location, and habitat utilization of amphibians in the North Arm wetlands during that time period. Surveys documented salamander adults and larvae and frog tadpoles and juveniles in the North Arm wetlands: over 90 percent of individuals observed were adults, larvae, or juveniles that are mobile and can move in response to changing habitat conditions (EDAW, 2004). In August, a few relatively immobile tadpoles still occurred in their natal wetlands or breeding pools, but we assume that by early September amphibian metamorphosis is complete and individuals are mobile enough to move in response to changing water conditions. Under the Proposed Action, PGE would monitor the amphibian population around Timothy Lake during the August drawdown. If impacts to the amphibian population due to drawdown are discovered, then drawdown would be delayed from August 1st until August 15th.

Changes to flow management from Timothy Lake would alter flows in the Upper Oak Grove Fork by increasing year-round minimum flows from 10 cfs to 30-60 cfs or inflow, whichever is less, and steadily increasing flows in September and October followed by higher flow releases from November through February, as opposed to releasing extreme high flows in September and October as practiced under the current license. For the most part, inflow into Timothy Lake exceeds 30 cfs much of the year. Therefore, the proposed change to a new minimum flow of 30+ cfs or inflow would not alter flow releases much from the existing situation. Thus, the proposed changes in flow are unlikely to significantly affect riparian vegetation along the Upper Oak Grove Fork and associated tributaries. In the portion of the Upper Oak Grove Fork closest to Timothy Lake dam, the channel is highly defined and riparian vegetation is minimal, so flow/stage changes would not significantly affect riparian vegetation. Further downstream towards Lake Harriet, the system becomes more alluvial and supports more riparian vegetation; however, the effect of the increased minimum flow would be felt even less in this area due to the addition of water to the Upper Oak Grove Fork through accretion and input from tributary streams. Limiting extreme flows in fall would reduce erosion of fine and coarse sediments required by riparian vegetation for establishment, potentially improving habitat conditions for riparian vegetation.

There are numerous side-channel habitats and 20 small off-channel wetlands between Timothy Lake and the mouth of Oak Grove Fork (EDAW, 2002a). The flow management regime associated with the Proposed Action would wet some side-channel habitats, possibly eliminating some riparian vegetation that has encroached into the side channel, depending on the amount and velocity of water entering the side channel. Increased flows could reduce riparian vegetation by changing some side channel wetlands to flowing side channel habitats. Off-channel habitats would be unaffected by the Proposed Action's flow management regime, as flows over 350 cfs would be required to wet these areas.

The Upper Oak Grove Fork provides breeding and/or post-breeding summer habitat for eight amphibian species that occur in the water column as well as the riparian area along the water's edge through early fall (EDAW, 2003a). Increased minimum flows below Timothy Lake would likely benefit aquatic amphibian species adapted to higher flow conditions to some degree, such as the Pacific giant salamander, through the likelihood of a more consistent flow regime and some increased instream habitat availability. These flows would not reduce summer habitat for other amphibian species that utilize the margins and side channel habitats of the Oak Grove Fork, including federal species of concern such as red-legged frogs and Cascades frogs. Tributary streams in the area between Timothy Lake and the mouth of Oak Grove Fork are steep so only the splash zones at the tributary mouths would be affected by proposed flows. Accordingly, amphibian species occurring in these areas would not be significantly affected.

Flow Management at Lake Harriet

The Proposed Action would raise the normal operating water level of Lake Harriet by one foot and increase the minimum flow from Lake Harriet into the Lower Oak Grove Fork to at least 70 cfs year-round and up to a maximum of 100 cfs during the period from October 1-15 of normal to dry years and April 1 through October 15, primarily to enhance fishery resources (PGE, 2006). Increasing the operating level of Lake Harriet by 1 ft would not significantly affect vegetation or wildlife species. Although cold water corydalis occurred at a site across from Lake Harriet Campground in the late 1980s, it is no longer present. Currently the Lake Harriet shoreline is very steep and contains only limited vegetation consisting of species common to the region. Wildlife use of Lake Harriet is primarily limited to foraging and loafing by waterfowl and some passerines and no wildlife nesting or other significant habitat occurs within the zone affected by the pool raise. The TRWG evaluated the potential effects of the proposed pool level raise on shoreline vegetation using field surveys and GIS analysis and determined that probably less than 0.24 acre of forested wetland, 0.09 acres of riparian habitat, 0.18 acres of developed recreation area and less than 0.2 acres of mid-successional conifer forest would be inundated (0.67 acres total) by the proposed pool level rise (PGE, 2005). Most of this area would convert to open water but some of the area would remain as vegetated wetlands. This wetland impact is relatively minor when considering that over 100 acres of riparian wetlands occur along the Oak Grove Fork and associated tributaries between Timothy Lake and the confluence with the mainstem Clackamas River. Also, some open water habitat created from the proposed pool level rise could eventually revert to vegetated wetlands since it is likely that sediment would accumulate in portions of the newly inundated areas.

Increasing minimum flows from Lake Harriet year-round could potentially affect riparian vegetation in the Lower Oak Grove Fork, which is generally more alluvial and thus more sensitive to flow/stage changes than the Upper Oak Grove Fork. Increasing minimum flows downstream of Lake Harriet would re-water some side channel habitats. Riparian vegetation that has encroached in these side channels, as well as in the main stem, could be scoured out by the higher flows and replaced by instream habitat. Amphibians are unlikely to be adversely affected by these changes, and could potentially benefit by the increased habitat provided by the re-watered side channels.

Augmenting Gravel Downstream of Lake Harriet and River Mill and Enhancing LWD Downstream of Lake Harriet, Faraday Diversion dam, and River Mill

Although augmenting gravel and LWD in Project-affected reaches is aimed at improving fish habitat, these measures could indirectly benefit riparian

vegetation and wildlife by increasing potential habitat for riparian plant species. Project dams and associated diversion structures currently reduce the instream delivery of LWD and coarse sediment into and through downstream areas because maintenance necessitates removal of LWD and sediment above Project structures (USFS, 1996a, b). Reduction of LWD and sediment can adversely affect riparian habitat, as these features and the nutrients they carry are important for establishing riparian vegetation. Enhancement of gravel and LWD could increase riparian habitat at the Project by providing additional microhabitats and substrate for new plant growth.

Habitat Connectivity and Species Disturbance Plan

The Proposed Action includes implementation of a Habitat Connectivity and Sensitive Species Disturbance Plan which would be developed in consultation with the USDA Forest Service, USFWS, and ODFW as part of the Settlement Agreement (PGE, 2006), and would incorporate the following measures:

- Installation of six earthen ramps along the Oak Grove pipeline to provide crossing opportunities for wildlife.
- Installation of up to 20 low profile crossings over the Oak Grove pipeline to provide small animals additional crossing opportunities.
- Installation of two wildlife bridges along the North Fork Fish Ladder to provide crossing opportunities for wildlife and an exit point for entrapped animals.
- Installation of an 8-ft-high wildlife exclusion fence along the uphill side of the lower portion of the North Fork Fish Ladder between the separator and upstream access road.
- Development of a management plan for any new bald eagle nests identified within the term of any new license within 0.25 mile of Project facilities or within 0.5 mile in a direct line of sight of Project facilities.
- Contribution of \$500 annually to the USDA Forest Service to help fund the volunteer program for maintaining and monitoring wildlife use of nest boxes installed around Timothy Lake.

Installation of wildlife crossings along the Oak Grove pipeline and the North Fork Fish Ladder could improve wildlife movement and habitat connectivity at the Project, provided the crossings are designed so that wildlife could easily utilize the crossings. The pipeline and fish ladder are non-natural linear features that impede wildlife movement across the landscape and thus reduce habitat connectivity (i.e., the extent to which the landscape pattern of the ecosystem provides for biological flows that sustain animal and plant populations). Connectivity is a key attribute for a functional ecosystem because it allows

wildlife to move, disperse, migrate, and interbreed with other sub-populations. The effects of reduced habitat connectivity are greatest on species with limited dispersal ability and patchy distribution, particularly small mammals and amphibians. For such species, non-natural linear features such as the pipeline or the fish ladder can act as barriers to movement, potentially isolating subpopulations. However, it is likely that the pipeline and fish ladder change wildlife movement patterns, rather than preventing movement by most species (EDAW, 2002d). This change in movement pattern causes animals to potentially expend more energy to find a site where they can safely cross a structure, but in most cases does not isolate sub-populations or threaten the long-term fitness and survival of individuals or sub-populations (Schumaker, 1996). Field surveys conducted by PGE in 2000 and an on-site inspection by the TRWG in 2002 confirmed that several species of wildlife currently cross the pipeline, particularly big game and invertebrates. Obvious game trails parallel much of the pipeline and it appears that deer and elk travel along the pipeline to reach existing crossing areas. It is unlikely that most small mammals or terrestrial amphibians climb over the pipeline, but likely cross under or over the pipeline at available passages and crossings.

There is no evidence that a particular species has been affected to a significant degree (i.e., population persistence or viability) by Project-induced loss of connectivity. The impact of reduced connectivity on wildlife at the Project is unknown, but would be the greatest on species with limited dispersal ability and patchy distributions, such as small mammals and terrestrial amphibians. There is a lack of documentation on movement distances of such species. Despite their small size, amphibians and reptiles may be less vulnerable to habitat fragmentation than mammals (Lidicker and Koenig, 1996). They can survive for long periods of time without food and many species are adapted to extended movement and migration through rough terrain (Lidicker and Koenig, 1996; Tressler, 2002b). Adult ensatina males have been documented moving up to 137 ft over a 2-year period (Nussbaum et al., 1983). Conversely, the Oregon slender salamander may move less than 6 ft over a lifetime (Lidicker and Koenig, 1996). Some amphibian species have been documented to move as much as one mile (Corkran, 2001). The longest section of the Oak Grove pipeline without a crossing opportunity is 0.5 miles (EDAW, 2002d).

The Proposed Action includes installation of 6 earthen ramps and 20 low profile overhead crossings along the Oak Grove pipeline to provide crossing opportunities for wildlife. The low profile overhead crossings would consist of jute mat or other suitable material laid over the pipeline. The earthen ramps would be made with fill - soil/gravel/vegetative debris on one or both sides of the pipeline. Low profile crossings would be used in areas with limited vehicle/machinery access. Fill crossings would be placed in locations selected by the

TRWG, in consultation with the Cultural Resources Workgroup, that allow the vehicle and machinery access needed for material placement. The installation of wildlife crossings over the pipeline would significantly reduce the distance between crossing opportunities, thereby providing greater connectivity for small and large animals.

Improving connectivity could help meet the management goals defined in the MHNH Plan and the Northwest Forest Plan of maintaining habitat connectivity so that dispersal, migration, and interbreeding among sub-populations can occur.

Habitat conditions associated with some wildlife crossings are not suitable for all wildlife species. Ungulate (e.g., deer) use of wildlife crossings is strongly correlated with vegetative structural diversity at the approach and exit of the crossing while carnivore (e.g., bobcat and coyote) use of crossings is better correlated to broader landscape variables such as topography and territoriality (Clevenger and Waltho, 2002). Lack of cover and suitable microclimate on the approaches to some crossings and on the crossings themselves may deter some animals from using them or make some animals more susceptible to predation while, or immediately after, crossing (prey funnel). PGE would consult with the TRWG to develop crossing designs that are amenable to the widest variety of species possible and to ensure wildlife crossings do not increase the potential for predation.

Cavity nesting species including brown creeper and pileated and hairy woodpeckers nest in the Timothy Lake area and elsewhere at the Project. While overall snag densities around Timothy Lake meet *Mt Hood National Forest Land and Resource Management Plan* (USFS 1990) standards, the number of snags in the vicinity of developed campgrounds is considerably less than in surrounding areas due to the need to ensure safety for campers in these areas. Accordingly, the continuation of PGE's provision of funds to support maintenance and monitoring of the nest boxes around Timothy Lake would benefit these and other cavity nesting bird species as well as provide opportunities for wildlife viewing in the Timothy Lake area used by the recreating public. The magnitude of this benefit is unknown and would depend on the extent to which natural cavities are limited in the area. Regardless, the nest boxes would provide additional nesting habitat for cavity nesters. A significant positive correlation exists between snag density (i.e., cavity availability) and the abundance of primary and secondary cavity nesting bird species in Pacific northwest coniferous forests (Ohmann et al, 1994). We recommend that PGE be responsible for monitoring and maintaining bird nest boxes around Timothy Lake instead of just providing funds to the Forest Service to do this work. PGE may hire the Forest Service (or provide funds which the Forest Service may use to run a volunteer program) but should be ultimately responsible for the success of maintaining bird nest boxes around the lake.

The Habitat Connectivity and Sensitive Species Disturbance Plan includes a schedule for Project-related inspection and maintenance activities along Project ROWs to avoid disturbance to sensitive wildlife species. These scheduling restrictions do not apply to the entire Project area. Rather, they apply to specific locations within the Project area known to support sensitive species. Scheduling windows include:

- Avoidance of deer and elk wintering habitat between December 1 and March 31.
- Avoidance of loud noises or extensive disturbance within 65 yards of suitable Northern spotted owl habitat between March 1 and July 15.
- Avoidance of activities within one mile of the Big River peregrine falcon nest between January 15 and July 31.
- Consultation with the TRWG prior to performing scheduled or danger tree management and emergency repair activities during the above described wildlife exclusion periods.

PGE developed this schedule in consultation with resources agencies to ensure adequate protection for sensitive species. Additional discussion of the effects of the Habitat Connectivity and Sensitive Species Disturbance Plan on listed species is included in section 3.2.5.

Terrestrial Resources Monitoring Plan

The Proposed Action includes implementation of a Terrestrial Resources Monitoring Plan (PGE, 2006), which is a long-term monitoring program aimed at assessing the potential ongoing impacts of Project-related activities on select sensitive and/or rare species. The monitoring plan would address the following resources:

- cold water corydalis in the Oak Grove Fork;
- amphibians and wetlands at the North Arm of Timothy Lake; and
- sensitive plant species that are known to occur within the Project area.

Monitoring would help detect potential issues or conflicts between Project operations/management and select species and would facilitate optimization of vegetation management activities to minimize potential impacts to sensitive species. PGE would consult with members of the TRWG to develop monitoring plans for select species and habitats.

Vegetation Management Plan

The Proposed Action includes implementation of a Vegetation Management Plan that includes the following measures:

- Procedures and methods used by PGE to control and manage vegetation, including the use of approved herbicides to control undesirable species.
- Procedures for re-vegetating disturbed soils or poorly vegetated areas resulting from Project-related activities.
- An integrated weed management program for managing exotic and invasive vegetation at Project-related facilities and along Project ROWs.
- Procedures for mitigating the removal of live, dead or diseased trees and down wood resulting from Project-related activities.

The vegetation management plan for Project ROWs focuses on maintaining functioning riparian reserves and establishing and maintaining native, low-growing vegetation within the ROWs. The plan defines vegetation management practices that maintain or improve existing habitat quality of Project ROWs. The plan includes guidelines for herbicide use and vegetation management practices along Project ROW's, measures that ensure the protection of wildlife and plant populations, guidelines for felling hazard or danger trees to provide down wood for wildlife habitat, and ROW maintenance and inspection practices that protect breeding wildlife. The plan establishes ROW maintenance schedules that accommodate protection of sensitive wildlife species. For example, to minimize disturbance to breeding peregrine falcons, routine vegetation clearing along transmission lines would exclude areas within one mile of a nest between January 15 and July 31. Similar consideration was given to deer and elk wintering grounds and routine activities would generally avoid these areas between December 1 and March 31. The maintenance restrictions would benefit these and other wildlife species by minimizing disturbance during the seasons when individuals are most vulnerable to disturbance.

The Vegetation Management Plan allows use of specific herbicides on Project Lands to control the presence and spread of invasive non-native plants. Herbicide use would be limited to noxious weed control and used in accordance with the Noxious Weed Control Program that was developed in consultation with USDA Forest Service as part of the Vegetation Management Plan and Settlement Agreement (PGE, 2006). The Noxious Weed Control Program would focus on the identification and prevention of invasive vegetation species. The program includes strategies to identify and control new infestations, treatments for existing infestations, and inventory and monitoring. Prevention and monitoring activities would utilize best management practices to prevent the introduction of invasive

species into the Project area. For example, existing infestations would be treated prior to scheduled maintenance to reduce the likelihood that maintenance activities would spread the infestation. Measures included in the Proposed Action that would require land disturbance would follow necessary precautions to control the spread of noxious weeds and exotic/invasive plants. Under the Proposed Action, PGE would prepare a Noxious Weed Risk Assessment for all maintenance and construction projects involving ground disturbance to identify the best management practices and monitoring necessary to prevent noxious weed infestations.

Integration of the Vegetation Management Plan and Noxious Weeds Control Program into Project operations for the duration of the next license term would benefit native plants and wildlife by monitoring and controlling competition from invasive and noxious species.

Safety and power line reliability issues require that PGE fell trees that pose a potential hazard or danger to Project staff, facilities, or structures, including power lines. PGE proposes four different management techniques for danger trees and slash material removed from transmission line ROWs: 1) leave felled hazard trees on site to provide down wood habitat for wildlife; 2) scatter slash material on site; 3) chip and scatter slash material on site; or 4) pile on site and burn. Leaving felled trees and wood chips would benefit wildlife, particularly small mammals and terrestrial amphibians, because down wood is a critical habitat component for such species and is somewhat limited in the ROWs and other selected portions of the Project (EDAW, 2003b). On site placement of wood material would only occur in instances with no safety concerns or fire hazards.

Wetlands Mitigation Plan

The Proposed Action includes a provision to raise the water level of Lake Harriet one foot, from 2,038 ft to 2039 ft. This action would inundate approximately 0.67 acre of wetland and result in the loss of available terrestrial wildlife habitat over the course of the new license term (PGE, 2006). In addition, the creation of Timothy Lake inundated roughly 262 acres of wetland and these areas will continue to be unavailable to terrestrial wildlife and plant species that use these habitats. Accordingly, the Proposed Action includes implementation of a Wetlands Mitigation Plan (PGE, 2006), which includes three measures to restore and protect wetlands in the vicinity of the Project:

- restoration of wetlands on PGE's Davis Ranch property;
- enlargement and restoration of wetlands at Promontory Park; and
- protection of North Mountain wetlands.

PGE has agreed to expand and/or enhance existing wetland habitat at PGE's Davis Ranch property and Promontory Park. The Davis Ranch wetland mitigation would involve minimizing areas where equipment or gravel are stored, vegetation planting, weed control, and monitoring of the restoration project effectiveness. The Wetland Mitigation Feasibility report indicates that the Davis Ranch enhancement project could include enhancement of small areas of the existing wetlands to support red-legged frog breeding habitat (EDAW, 2004). The wetlands at Promontory Park were created as a result of beaver activity and PGE proposes to enlarge the existing Promontory Park wetlands through regrading and vegetation planting (PGE, 2006).

These restoration measures at Davis Ranch and Promontory Park would increase the quality and/or quantity of wetlands at or in the vicinity of the Project and provide amphibians and other wetland-dependent wildlife additional habitat. All wetland restoration measures would include monitoring and maintenance to evaluate and ensure the success of the restoration efforts.

A Wetland Feasibility Study conducted in 2004 (EDAW, 2004b) evaluated the potential for wetland protection, restoration, and enhancement projects at sites throughout the Clackamas River watershed. Aside from the Davis Ranch and Promontory Park sites, no other sites within the watershed were deemed suitable (EDAW, 2004b). Insofar as no other suitable wetland protection, restoration, or enhancement projects occur in the Clackamas River watershed, PGE proposes, and the Settlement parties recommend, that PGE make a one time contribution of up to \$800,000 to the Western Rivers Conservancy to acquire a 320-acre parcel of land (the North Mountain wetland site) located near North Mountain in the headwaters of the Little Sandy River in the Bull Run watershed. This site is less than half the distance from Timothy Lake (17 miles) compared to the nearest other proposed mitigation site that lies within the Clackamas River watershed (Clackamas Prairie) and was not logged in 2005 as previously reported. After acquisition, the Western Rivers Conservancy would transfer this parcel to the Forest Service. If acquisition and transfer of this site are not feasible, PGE would attempt to substitute a project of comparable value and file an implementation report and schedule with the Commission. If no substitute can be identified, PGE would report back to the Commission.

Recreation Improvements

The Proposed Action includes a Recreation Management Plan (PGE, 2006) that consists of several measures that could affect terrestrial resources:

- construction of a new 50 site campground between the existing Hoodview and Gone Creek campgrounds between 10 and 15 years after issuance of a license;

- construction of two new small (accommodate 12 to 25 people each) group sites in a location to be determined in consultation with the USDA Forest Service between 5 and 10 years after issuance of a license;
- reconfiguration of Timothy Lake campgrounds;
- relocation and improvements to the Timothy Lake Trail;
- rehabilitation of the two dispersed sites near the North Arm of Timothy Lake that were identified for closure by the USDA Forest Service;
- improvements to Lake Harriet walkways and fishing and boat access;
- improvements at Promontory Park campgrounds; and
- development of educational signage and interpretive materials.

Construction of the new 50 site campground and the two small campgrounds would adversely impact terrestrial vegetation and wildlife through vegetation removal associated with construction and habitat disturbance during construction and operation. Because the exact location and footprint of the campgrounds is unknown at this time, we are unable to analyze the impacts of these new campgrounds on terrestrial resources. Consultation with USDA Forest Service regarding location and design of these campgrounds, as proposed by PGE, would reduce the potential for significant adverse impacts on terrestrial resources. The Proposed Action provides for the support of the TRWG to coordinate implementation of terrestrial resource license conditions and address any issues that arise throughout the life of the new license. Accordingly, the TRWG would have the opportunity to provide input on the location and operation of the new campgrounds, further reducing the potential impacts to terrestrial resources.

The reconfiguration of the Timothy Lake campgrounds would improve access for recreational vehicles and native vegetation would be planted to provide more separation between campsites. These modifications would enhance the quality and quantity of terrestrial habitat in these areas by encouraging vehicular access in designated areas (discouraging off-road use) and providing additional habitat for wildlife species that currently inhabit the Timothy Lake campgrounds.

Modifications to the Timothy Lake trail, including reconstruction and/or relocation of some segments, redefining segments within developed campgrounds and day use areas, and modifying areas that currently are eroding would likely result in minor direct losses of vegetation, although this effect would be at least partially offset by the benefits of managing trail use and rehabilitating eroding areas. The recreation facility inventory conducted at the Project indicated that the lack of clearly designated trails within the developed campgrounds is resulting in damage to vegetation from off-trail use (EDAW and Frayer, 2004). More distinct trails and improved signage would discourage off-trail use and help protect vegetation and wildlife resources around Timothy Lake. Reconstructed or

rehabilitated trail segments that occur within Riparian Reserves would be designed to meet USDA Forest Service Aquatic Conservation Strategy objectives (USFS, 1994) and would include measures to maintain habitat effectiveness and protect sensitive habitats and species.

Conducting rehabilitation measures for selected dispersed campsites at North Arm would improve conditions for vegetation and wildlife by returning these areas to a natural state and facilitating regrowth of native vegetation.

Proposed improvements to the Lake Harriet camping and day use areas include adjusting the fishing dock and shoreline access points to accommodate universal design standards and the higher lake level and providing an appropriate access route (i.e., walkway) to improve shoreline access for anglers. Site visits to Lake Harriet by the TRWG in 2004 determined that adjusting the fishing dock and shoreline access points would not affect terrestrial resources, as the Lake Harriet shoreline is largely unvegetated, with very minimal wetland vegetation and occasional upland trees and shrubs along the shoreline. In addition, wildlife use of Lake Harriet is generally limited to common, disturbance-tolerant species. The walkway would not require filling any portion of Lake Harriet. The walkway and shoreline access points would not adversely affect vegetation or wildlife and could potentially benefit the limited vegetation communities occurring there by directing use to walkways.

Improvements to Promontory Park include improving an existing walking trail at North Fork and moving the existing boat ramp at Estacada Lake to a new location along the south shore. Improving the walking trail could positively affect vegetation communities by funneling traffic onto the trail. At Estacada Lake, the existing boat ramp would be closed to accommodate the new fish ladder and a new ramp would be constructed on the south shore. The Estacada Lake shoreline is largely unvegetated and wildlife usage is limited to common, disturbance-tolerant species so this modification would not adversely affect terrestrial resources.

As part of an overall program for interpretation and education at the Project, PGE would develop educational signage and interpretive materials highlighting noxious weed control, TES and S/M plants and animals, and habitat protection. Visitor-related activities that affect terrestrial resources at the Project include off-trail hiking, collecting or disturbing vegetation or wildlife, and using down wood for firewood. Educating visitors about the effects of these activities on terrestrial vegetation and wildlife communities at the Project could benefit these resources by encouraging positive land stewardship and discouraging potentially damaging human activities.

3.2.4.3 *Unavoidable Adverse Impacts on Terrestrial Resources*

The Proposed Action would not cause significant unavoidable adverse impacts on terrestrial resources. The continued inundation of Project reservoirs would limit the extent of wetlands and other vegetation communities along the shoreline. Project dams would continue to limit downstream sediment transport, which could limit growth and establishment of riparian vegetation in some locations.

3.2.5 Listed Threatened, Endangered, and Other Rare Species

3.2.5.1 *Affected Environment*

3.2.5.1.1 *Federally Listed Threatened and Endangered Species*

Five federally listed species, one candidate for federal listing, and seven federal species of concern occur in the vicinity of the Project (Table 3.2.5.1-1; Stillwater, 2005). Several other rare species listed by the ODFW and managed and monitored by the USDA Forest Service and the Oregon Natural Heritage Program (ONHP) also occur in the vicinity of the Project (Table 3.2.5.1-1).

In 1994, the U.S. Department of the Interior, Bureau of Land Management, and the USDA Forest Service adopted standards and guidelines for the management of habitat for late-successional and old-growth forest-related species within the range of the northern spotted owl collectively known as the Northwest Forest Plan (USFWS and USDI-BLM, 1994). The Northwest Forest Plan included mitigation measures for the management of approximately 400 rare and/or isolated species, commonly referred to as Survey and Manage Species. For the MHNH, there are 33 Survey and Manage Species with the potential to occur.

Steelhead (*O. mykiss*)

Two runs of steelhead are present in the Clackamas River Basin, winter-run and summer run. Steelhead from the Clackamas River Basin are part of the Lower Columbia River evolutionary significant unit (ESU). In March 1998, the NMFS determined that the Lower Columbia River ESU should be listed as Threatened (63 FR 13347).

The winter steelhead run has a wild component and two hatchery stocks. The hatchery stocks created an early winter steelhead run, which generally returns to the basin from January to April. The wild run returns later, between February and June (see Figure 3.2.3.1-2). Although winter steelhead are known to spawn throughout most of the Clackamas River Basin, the upper watershed provides more extensive spawning and rearing habitat (Stillwater Sciences, 1999).

Winter steelhead fry emerge between June and early August and rear in the river system for one to four years. They range throughout most of the Clackamas River Basin as they grow and will often move high into steep and fast-flowing stream reaches. Production of steelhead smolts is closely related to the amount and quality of large pools. Juvenile winter steelhead generally undergo smoltification in the spring and emigrate downstream from March through June.

Table 3.2.5.1-1. Listed threatened, endangered, and other rare species occurring or potentially occurring in the vicinity of the Project¹.

SPECIES/ESUs	Scientific Name	USFWS/ NMFS ^{1,5}	ODFW ²	USDA Forest Service ³	ONHP ⁴	ODA ⁶
FISH (4)						
Steelhead	<i>Oncorhynchus mykiss</i>	T	SC	--	1	--
Chinook salmon (<i>UWR ESU</i>)	<i>Oncorhynchus tshawytscha</i>	T	--	--	1	--
Coho salmon (<i>LCR ESU</i>)	<i>Oncorhynchus kisutch</i>	T	E	--	1	--
Bull trout	<i>Salvelinus confluentus</i>	T	SC	--	1	--
AMPHIBIANS (5)						
Cascade torrent salamander	<i>Rhyacotriton cascadae</i>	--	SV	X	4	--
Oregon slender salamander	<i>Batrachoseps wrighti</i>	SoC	SU	X	1	--
Cascades frog	<i>Rana cascadae</i>	SoC	SV	--	4	--
Red-legged frog	<i>Rana aurora aurora</i>	SoC	SU	X	4	--
Western Toad	<i>Bufo boreas</i>	--	SV	--	4	--
BIRDS (6)						
Northern spotted owl	<i>Strix occidentalis</i>	T	T	--	1	--
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	T	--	4	--
Greater sandhill crane	<i>Grus canadensis</i>	--	SV	X	4	--
Harlequin duck	<i>Histrionicus histrionicus</i>	SoC	SU	X	2	--
Northern goshawk	<i>Accipiter gentiles</i>	SoC	SC	--	4	--
Peregrine falcon	<i>Falco peregrinus</i>	--	E	X	2	--
MAMMALS (1)						
Townsend's big-eared bat	<i>Corynorhinus townsendii townsendii</i>	SoC	SC	X	2	--
PLANTS (6)						
Cold-water corydalis	<i>Corydalis aquae-gelidae</i>	SoC	--	X	1	C
Pale blue-eyed grass	<i>Sisyrinchium sarmentosum</i>	SoC	--	X	1	C
Northern bladderwort	<i>Utricularia ochroleuca</i>	--	--	--	2	--
Stiff clubmoss	<i>Lycopodium annotinum</i>	--	--	--	4	--
Tall bugbane	<i>Cimicifuga elata</i>	--	--	X	1	C
Nuttall's larkspur	<i>Delphinium nuttallii</i>	--	--	--	2	--
LICHENS (1)						
Methuselah's beard lichen	<i>Usnea longissima</i>	--	--	X	3	--

¹ E=Listed as Endangered, T=Listed as Threatened, P=Proposed for federal listing. C=Candidate for federal listing, SoC=Federal species of concern. NMFS manages steelhead and chinook salmon. The USFWS manages all other federally listed species in Table 3.2.5.1-1. LCR=Lower Columbia River. UWR= Upper Willamette River.

² Oregon Department of Fish and Wildlife (ODFW) Status: E = endangered, T = threatened, U = Undetermined Status - species for which status is unclear; SV = Sensitive Vulnerable - species for which listing as threatened or endangered is not imminent and can be avoided through protective measures; SC = Sensitive Critical - species for which listing as threatened or endangered is pending or warranted if immediate conservation measures are not taken; SU = Sensitive Undetermined – sensitive species for which status is unclear.

³ USDA Forest Service Regional Forester's Sensitive Species, Region 6.

⁴ Oregon Natural Heritage Program (ONHP) Status:

1 = List 1 -- taxa threatened or endangered with extinction throughout their entire range.

2 = List 2 -- taxa threatened or endangered with extirpation from the state of Oregon.

3 = List 3 -- taxa for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

4 = List 4 -- taxa which are of conservation concern but are not currently threatened or endangered.

⁵ USFWS, in its letter dated 11 July 2005 (filed August 8, 2005), stated that Canada lynx (*Lynx Canadensis*), Willamette daisy (*Erigeron decumbens* var. *decumbens*), and *Howellia* (*Howellia aquatilis*) could occur in the Project area. However, the MHNH does not contain Canada lynx habitat (Stillwater 2005) and plant surveys conducted in 2001 and 2002 did not report any federally listed plants in the Project vicinity (Dwerlkotte and Kearny, 2003).

⁶ Oregon Department of Agriculture Status: C = Candidates – taxa for which there is sufficient information to support a proposal to list as threatened or endangered.

The Clackamas River Basin winter steelhead run provides angling opportunities throughout the winter. Annual harvest in the basin averaged 3,645 winter steelhead from 1989 through 1994 (Massey and Keeley, 1996, as reported by PGE, 1999). In the early 1990s, harvest regulations in the basin were adjusted to protect wild steelhead (PGE, 1999). Since 1998 hatchery steelhead have been removed at the North Fork fish trap and hauled back downstream, and the upper basin managed for wild fish only. In addition wild broodstock are taken at the trap to replace the use of non-native stocks.

The current stock of summer steelhead are not known to be native to the Clackamas River; however, early reports by Rudyard Kipling, sport harvesting records and ODFW's subbasin plan all indicate the possibility that summer steelhead at one time may have been present in the Clackamas River. Hatchery releases began in 1968 to provide summer angling opportunities within the Clackamas Basin. Records show that the number of naturally produced juvenile steelhead passing the Clackamas River dams doubled after hatchery summer steelhead smolt releases began (PGE, 1999). To address concerns about competition with wild winter steelhead and coho, summer steelhead releases ceased above North Fork dam after 1997, and adult summer steelhead were no longer allowed to pass above North Fork dam beginning in 1999.

In the past, adult summer steelhead passed North Fork dam from May to October, with most of the run passing in June and July (see Figure 3.2.3.1-2). In recent years, fewer summer steelhead adults have been returning to the Clackamas Basin, though smolt releases in the lower river have increased. From 1981 to 1990, about 162,500 summer steelhead smolts were released annually throughout the Clackamas Basin. About 75,500 pre-smolts were also released in the basin during three of these years. Currently, a total of about 150,000 summer steelhead smolts are released annually into lower reaches of the basin. In 1998, all summer steelhead smolts released were from the Clackamas Hatchery. It is expected that future smolt releases will be restricted to below River Mill dam to reduce impacts to native stocks above North Fork dam.

Prior to eliminating the practice of allowing adult summer steelhead to move above the North Fork dam in 1999, many adult summer steelhead were believed to spawn naturally in the upper basin. However, little was known about the location of natural production of summer steelhead in the basin. Efforts to define where they spawned and reared and when they emigrated were hindered because naturally reproducing summer steelhead resemble naturally reproducing wild and hatchery-bred winter steelhead. While changes in the management of summer steelhead render the issue moot, upper Clackamas River mainstem and most tributaries above North Fork dam contain potential spawning and rearing habitat for summer steelhead if access were allowed.

The summer steelhead fishery in the Clackamas River Basin is extremely popular. The fish have a reputation for biting well and being good fighters. They also have a long period of adult freshwater residency and maintain their bright condition. Most of the harvest traditionally occurred in the mainstem Clackamas River above North Fork dam and in the lower Clackamas River. Since 1999, their harvest has been restricted to areas below Faraday Diversion dam.

Chinook Salmon (*O. tshawytscha*)

Two races of Chinook salmon occur in the in the Clackamas River, based in part upon their time of entry to the Columbia River for spawning: spring Chinook and fall Chinook. Spring Chinook in the Clackamas River are part of the Upper Willamette River ESU, while fall Chinook are part of the Upper Columbia River summer and fall-run ESU. The latter designation results because the fall-run fish are descended from the Upper Columbia River Bright hatchery stocks that spawn in the mainstem Columbia River below Bonneville dam. The NMFS listed Chinook salmon in the Upper Willamette ESU as Threatened in March 1999 (64 FR 14308). In contrast, in March 1998 NMFS determined that listing was not warranted for the Upper Columbia River fall run ESU (63 FR 11482). Clackamas River fall Chinook are not discussed further in this section.

The Clackamas River was once considered one of the largest producers of spring Chinook in the Pacific Northwest. Historically, spring Chinook probably spawned throughout the length of the Clackamas River and in nearly all accessible large tributaries (Cramer and Associates, 2001). Today, spring Chinook typically pass North Fork dam from April through October (see Figure 3.2.3.1-2) and spawn in the Upper Clackamas River from mid-August through October. Spawning in tributary streams (e.g., Oak Grove Fork) begins after significant rainfall in September and continues until mid-November (see Figure 3.2.3.1-3).

A 1997 survey of spawning activity along nearly 67 miles of stream channel in the upper basin documented most signs of spawning within about 41 miles of the mainstem Clackamas River and one mile of Oak Grove Fork (Schroeder et al., 1998). The mainstem Clackamas River contained about 80 percent of the redds and 90 percent of the carcasses observed during the survey. Juvenile spring chinook salmon do not appear to rear in tributaries to the Clackamas River, but rather emigrate to the mainstem soon after emergence (Stillwater Sciences, 1999), with the majority of rearing occurring within North Fork Reservoir (D. Cramer pers. comm., 2004). Some juvenile spring Chinook may also rear in the Faraday and River Mill reservoirs (Stillwater Sciences, 1999).

Spring Chinook salmon are a popular target of recreational anglers on the lower Willamette and Clackamas rivers. There is currently a moratorium on angling for wild spring Chinook salmon. Since 2001, management of hatchery origin spring Chinook has interrupted migration at the North Fork ladder to return hatchery-origin adults (marked fish) downriver or elsewhere, to manage the upper basin for wild salmon.

Coho Salmon (*O. kisutch*)

Coho salmon in the Clackamas Basin are part of the Lower Columbia River ESU. In July 1995, the NMFS concluded that the ESU was not at risk of extinction, but sufficient risks were present that its status as a Candidate species was maintained (60 FR 38011). As a result of a September 2001 U.S. District Court Ruling (*Alesea Valley Alliance v. Evans*), the NMFS conducted a new status review of all 27 west coast salmon and steelhead ESUs (69 FR 33102). The proposed status of most ESUs did not change following the review, including that of Chinook and steelhead found in the Clackamas. However, NMFS proposed to change the status of the Lower Columbia River ESU from Candidate to a Threatened species.

The Clackamas River Basin supports early-run and late-run coho stocks. One component of the early-run derives from hatchery releases from Eagle Creek National Fish Hatchery. These hatchery fish return to the basin from September through December and spawn from October through early December. In addition, a self-sustaining naturalized segment of the early-run of coho returns to the basin beginning in August and spawns naturally throughout the basin in November (see Figure 3.2.3.1-2).

The Clackamas River Basin also supports a late coho run that is considered to be the last remaining viable wild coho population in the Columbia River Basin (Stillwater Sciences, 1999). This run enters the Clackamas River from November to January and spawns between January and March, mostly above North Fork dam (see Figure 3.2.3.1-2).

The three lower Project reservoirs provide important rearing habitat for juvenile coho salmon that appear to grow faster and larger than young coho that rear elsewhere in the Clackamas River (Stillwater Sciences, 1999). The availability of rearing habitat in the reservoirs may be particularly important to coho, in part because of limited rearing habitat in the upper watershed, but also the loss of off-channel rearing habitat (i.e., side channels) in the Lower Oak Grove Fork (Reach 1G) from low flows downstream of Lake Harriet dam. Production of coho smolts is in part related to the amount and quality of off-channel rearing

habitats (Argue et al., 1979; Marshall and Britton, 1980; Peterson, 1980; Reeves et al., 1989; Beecher et al., 2002).

Many wild coho destined for the Clackamas River Basin are caught in mixed stock fisheries managed for hatchery stocks. Commercial harvest rates for ocean and Columbia River fisheries of Clackamas River late-run coho exceeded 90 percent of the annual run in the early 1970s and have continued to reach as high as 80 percent in recent years. Coho also contribute to a restricted sport fishery on the Clackamas River. Fishing usually occurs on the Clackamas River from the mouth to River Mill dam. Currently there is a moratorium on fishing for wild coho salmon. The Upper Clackamas River and tributaries above North Fork dam have been closed to salmon fishing since 1998 to protect late-run coho adults after they pass the dam.

Bull Trout (*Salvelinus confluentus*)

The Clackamas River Basin is in the Willamette River Recovery Unit of the Columbia River distinct population segment for bull trout, which was listed as Threatened by the U.S. Fish and Wildlife Service in June 1998 (63 FR 31647). Bull trout were historically present in the basin, but no documented observations have occurred since the 1970s and the species is currently considered extinct in the basin (USFWS, 2002).

Bald Eagle (*Haliaeetus leucocephalus*)

The USFWS and ODFW list the bald eagle as threatened in Oregon and ONHP considers bald eagle a List 4 species. This species preys mainly on live fish, although it will prey on other small live animals such as waterfowl, reptiles, and small mammals, as well as scavenge on carrion. The bald eagle prefers mature forest habitat adjacent to large bodies of water for nesting and foraging, as these areas provide large trees with open canopies for nesting and a ready supply of fish.

Although there is some evidence that the value of the Clackamas River corridor as habitat for nesting bald eagles may be limited by the small size of the river and a closed forest canopy (Frenzel, 1993, in USFS, 2002b), the MHNF Plan designates the portion of the Clackamas River corridor between Promontory Park and the Two Rivers Campground as recovery territory for bald eagles (PGE, 1999). The Clackamas River Basin contains thirteen areas designated in the MHNF LRMP as bald eagle habitat areas.

The closest active eagle nest to the Project is at Clear Lake, approximately 3 miles northeast of Timothy Lake. Bald eagles occasionally occur at Timothy

Lake and in the surrounding area; however, no active bald eagle nests are known to exist there and no courtship activities have been documented there. In 2004, an unoccupied eagle nest was discovered near Timothy Lake; however, this nest was reported to be an alternate nest site for the Clear Lake breeding pair (Stillwater, 2005). The USDA Forest Service noted that the Timothy Lake area provides an “adequate prey base” and trees “with adequate size and structure to support nests” (PGE, 1999). Ten areas identified in the Pacific Bald Eagle Recovery Plan as A-13 bald eagle management areas exist in the vicinity of Timothy Lake (USFS, 1990) and studies indicate that the area around Timothy Lake could support a nesting pair of bald eagles (Isaacs, 1987). No bald eagle winter roost sites are known to occur in the vicinity of the Project.

Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl is a USFWS and ODFW threatened subspecies that is restricted to coniferous forests in the Pacific Northwest, from northern California through Washington. This species typically nests in cavities or mature trees and prefers moist, old-growth coniferous forests; however, it also utilizes less mature, managed forests in some locations (AMNH, 1996). The northern spotted owl prefers forests dominated by Douglas fir and Western hemlock in low-lying coastal areas and Pacific silver fir at higher elevations (USFWS, 1992). This species is a nocturnal predator and relies primarily on rodents as forage, however it will feed on other birds, insects, amphibians, and reptiles (Forsman, 2003).

Northern spotted owls inhabit a variety of forested habitats throughout their range; however, most researchers agree that young forests constitute marginal habitat for this species (Forsman, 2003). In 1992, the USFWS designated as critical habitat for this species forest that is structurally equivalent to a Douglas fir stand 80 years of age or older, and indicated that habitat loss and fragmentation are significant factors contributing to the species’ decline in the region (USFWS, 1992). In recent years other studies suggest that population declines are related to decreases in adult survivorship.

Northern spotted owls occur throughout the Project vicinity, in hemlock- and silver fir-dominated forests. Dispersal of owls in the Clackamas River Basin does not seem to be adversely affected by lack of habitat (PGE, 1999; Stillwater, 2005); however, data on adult survivorship in the Project vicinity are currently unavailable. While there is no federally-designated spotted owl critical habitat in the Project area, the Oak Grove Fork watershed contains 31 spotted owl activity centers (Stillwater, 2005). Northern spotted owls are sensitive to elevated noise levels, and noise above ambient levels from March 1 through July 15 could disrupt spotted owl nesting activities (PGE, 2006).

Known spotted owl activity centers in the vicinity of the Project are concentrated in portions of the Oak Grove Fork watershed that contain old growth and late-successional forest. Northern spotted owls are not known to inhabit the area surrounding the Oak Grove transmission line, but they are infrequently found in the area surrounding Timothy Lake (PGE, 1999).

3.2.5.1.2 State Listed Threatened and Endangered Species

Peregrine Falcon (*Falco peregrinus*)

Although the USFWS removed this species from the federal list of threatened and endangered species in August 1999, the ODFW currently lists the peregrine falcon as endangered (PGE, 1999). This species also remains on the USDA Forest Service list of sensitive species for Region 6 (USFS, 2002c). Peregrine falcons prefer to nest on cliffside ledges overlooking foraging habitat. In the Project vicinity, steep hillsides or cliffs with good visibility overlooking open areas frequented by potential prey constitute preferred habitat for this species.

One known active eyrie (peregrine falcon nest) currently exists in the Clackamas River Basin. The nest occurs within the MHNF, and the USDA Forest Service has designated a 708-acre primary nest protection zone around the eyrie, in which timber harvest, road construction, and related activities are prohibited. PGE owns a small parcel of land within the primary nest protection zone. Beyond the primary nest protection zone, the USDA Forest Service has established a secondary nest protection zone that totals approximately 1,847 ac in size. Beyond the secondary nest protection zone, a tertiary management zone containing 12,162 ac provides additional protection (USFS, 2002c). The tertiary habitat zone, which extends 2 to 4 miles from the nest site, also includes lands owned by PGE (PGE, 1999, in USFS, 2002c). The USDA Forest Service manages their lands within the protection zones to improve or maintain the overall habitat suitability of those species preyed upon by the peregrine falcon or those species within the food chain of peregrine falcon prey (USFS, 1998, in USFS, 2002c).

3.2.5.1.3 Other Rare Species

Cascade Torrent Salamander (*Rhyacotriton cascadae*)

The USDA Forest Service lists the Cascade torrent salamander as sensitive in Region 6, the ONHP designates it as a List 4 species, and the ODFW lists its status as “sensitive-undetermined.”

This species is a habitat specialist: it requires very shallow, silt-free streams, waterfalls, and seeps. It prefers steep, low-order streams below elevation

3,500 feet, although it also utilizes 3rd and 4th order streams. The most significant threat to this species is increased water temperature related to deforestation of riparian zones. It exhibits a limited capacity to re-colonize areas that have experienced localized extinctions (Bury and Corn, 1988, in EDAW, 2003a).

In the vicinity of the Project, known populations of the Cascade torrent salamander occur in Cripple Creek and Three Lynx Creek. It also occurs in several tributaries of the south fork of the Clackamas River outside the Project area.

Oregon Slender Salamander (*Batrachoseps wrighti*)

The USDA Forest Service lists the Oregon slender salamander as sensitive in Region 6 and the ONHP designates it as a List 3 species. The state of Oregon lists its status as “sensitive-undetermined.”

This species occupies moist forest areas and is more common in unmanaged forests than in managed stands (Leonard et al., 1993). It is particularly abundant in Douglas fir communities that exhibit high densities of downed wood and stumps (Corkran and Thomas, 1996) and seems to prefer large, old downed wood over young or small woody debris (Leonard et al., 1993).

Surveys documented the occurrence of the Oregon slender salamander at several locations along the Oak Grove pipeline between the Harriet Diversion dam and the Skunk Creek pipeline crossing. A record of this species also exists from one location along the pipeline immediately up from the Oak Grove powerhouse (EDAW, 2003a).

Cascades Frog (*Rana cascadae*)

The Cascades frog is a USFWS species of concern, an ODFW sensitive-vulnerable species, and ONHP designates it as a List 4 species. Cascades frogs inhabit a variety of habitats including wetland meadows, bogs, forested wetlands, ponds, and the margins of streams (Corkran and Thomas, 1996). They generally prefer cool or cold water habitats for reproduction; however, the eggs of this species are tolerant of water temperatures as high as 80°F (Nussbaum et al., 1983). Studies have identified several factors that may have contributed to the decline of this species in several locations throughout its range, including elevated ultraviolet radiation levels (contributing to elevated embryo mortality), habitat destruction, and introduced predators (Romansic, 2000).

Cascades frogs breed in only one location in the Project area, the North Arm of Timothy Lake (EDAW, 2003a). Adult Cascades frogs also occur along

the Lower Oak Grove Fork, suggesting that this species probably uses the Oak Grove Fork as a travel corridor (EDAW, 2003a).

Red-legged Frog (*Rana aurora aurora*)

The red-legged frog is a USFWS species of concern, an ODFW sensitive species, and ONHP designates it as a List 4 species. The red-legged frog prefers vegetated shallows in areas with little or no current (ODFW, 2003). Eggs are attached to submerged vegetation or other debris in water. The red-legged frog breeds from mid-January to mid-March in vegetated wetlands that do not experience wide fluctuations in water levels from January through July. Most experts implicate competition with and predation by the introduced bullfrog (*Rana catesbiana*) and habitat loss as major factors in the red-legged frogs' decline (ODFW, 2003).

Habitat exists for the red-legged frog throughout the Project area. Field surveys in 2001 and 2002 documented breeding red-legged frogs in a pond and wetland complex downstream of the emergency spillway of Frog Lake, the eastern and western ponds in Oak Grove Meadows, a drainage ditch near the Faraday Diversion dam, and wetlands adjacent to the North Arm of Timothy Lake. Of the four locations where breeding activity was observed, the greatest number of red-legged frog egg masses occurred in the pond downstream of the Frog Lake spillway (EDAW, 2003a).

Greater Sandhill Crane (*Grus canadensis*)

The USDA Forest Service lists the greater sandhill crane as sensitive in Region 6, ODFW lists it as sensitive-vulnerable, and the ONHP considers it a species of conservation concern. The greater sandhill crane's preferred habitats include marshes, shallow lakes, and meadows.

Big Meadows and Little Crater Meadows in the Oak Grove Fork Watershed support breeding pairs and several meadows outside the Project vicinity also have been utilized by breeding cranes in the past. This species may utilize some or all of these locations as breeding habitat; however, these locations seem to serve primarily as summer habitat prior to the fall migration (USFS, 2002a). Sandhill cranes are occasionally observed foraging in the North Arm of Timothy Lake.

Harlequin Duck (*Histrionicus histrionicus*)

The harlequin duck is a USDA Forest Service Region 6 sensitive species and a USFWS species of concern. It is a sensitive species according to the

ODFW, and a species threatened with extirpation from Oregon according to the ONHP (PGE, 1999).

This species prefers streams with forested riparian zones in areas undisturbed by human activity. It generally occupies low-gradient areas and calm areas in tributaries, and nests in streamside forests. Young move to the water immediately after hatching and take refuge in eddies and backwaters immediately downstream of in-stream barriers, such as rocks and woody debris. A combination of slow, calm areas surrounded by fast moving water is considered to be an important component of harlequin duck habitat (USFS, 2002b).

The harlequin duck has been documented in several locations in the Clackamas River Basin, however, it occurs in the basin in relatively low densities. Deforestation of streamside corridors and removal of large woody debris has decreased the amount of harlequin duck habitat available throughout its range. Though suitable habitat exists, duck nesting has not been observed in the Project area (i.e., the Oak Grove Fork).

Northern Goshawk (*Accipiter gentiles*)

The USFWS lists the Northern Goshawk as a species of concern. It is listed as sensitive by ODFW (ONHP, 2004) and is designated a List 4 species by ONHP. Northern goshawks prefer mature conifer forest habitats that are undisturbed by human activity. Goshawks generally hunt for prey in forest mosaics and riparian transition zones and nest in old growth forests (USFWS, 2005). A combination of open areas surrounded by mature and old growth forest is considered to be an important component of northern goshawk habitat (USFWS, 2005).

The northern goshawk has been documented in the Clackamas River Basin; however, it occurs in the basin in relatively low densities and no known nesting sites occur at the Project.

Townsend's Big-eared Bat (*Corynorhinus townsendii townsendii*)

The USFWS lists the Townsend's big-eared bat as a species of concern and ODFW lists this species as sensitive critical. It is also an ONHP list 2 species. This species has occupied the Lake Harriet area since at least 1980 (PGE, 1999). In the vicinity of the Project, it utilizes abandoned mine shafts as hibernacula. It also roosts in several cabins and an abandoned barn near the Oak Grove Meadows. This species is highly sensitive to disturbance by human activities (USFS, 2002c).

Cold Water Corydalis (*Corydalis aquae-gelidae*)

The USFWS, USDA Forest Service, ONHP, and ODA list cold water corydalis as a species of concern, a Region 6 sensitive species, a List 1 species, and a candidate species, respectively. It is also a candidate for listing under the Oregon Endangered Species Act. This species grows in or near streams with cold water. It is generally found in or alongside low gradient perennial streams with calm or slow moving water, small seasonal flow fluctuations, and coarse substrates, such as gravel, cobble, and sand (EDAW, 2003d). Because this species requires areas of calm water, it is often found immediately downstream of obstacles to current, such as boulders and large woody debris.

This species occurs at several locations along the Oak Grove Fork from approximately 1 mile below Timothy Lake to Lake Harriet. It also occurs in Stone and Peavine creeks, both of which are tributaries to the Oak Grove Fork (EDAW, 2003d).

Plant breakage from a variety of causes, including herbivory, trampling by humans and wildlife, and possibly high water flows during the growing season, constitutes the most significant threat to this species (EDAW, 2003d). High flows may contribute to stem breakage, particularly in populations that grow in unprotected portions of stream channels as opposed to those populations that are found in protected locations (e.g., behind boulders) or on shorelines adjacent to streams. Trampling by humans or wildlife, particularly at locations where trails cross streams, and herbivory by slugs and other wildlife have been documented to also cause plant damage.

Pale Blue-eyed Grass (*Sisyrinchium sarmentosum*)

The USFWS designates pale blue-eyed grass as a species of concern, the USDA Forest Service designates it as a Region 6 sensitive species, and the ODA lists it as a candidate species. This species typically inhabits locally dry areas within larger wet meadows (Center for Plant Conservation, 2002, in EDAW, 2003a).

In the vicinity of the Project, pale blue-eyed grass occurs along the shore of Timothy Lake near Meditation Point and in Little Crater Meadows (EDAW, 2003d). The most significant threat to this species in the Project vicinity is grazing by cattle, particularly at the Little Crater Meadows site. Cattle grazing permits are issued by the USDA Forest Service and are unrelated to the Project.

Inundation of suitable habitat near Timothy Lake and human disturbance related to camping and recreational angling activities also pose threats to the

Timothy Lake population. When flowers and fruits of this species are grazed or the species is otherwise stressed, it is able to reproduce asexually through rhizomes; however, this mode of reproduction does not provide a mechanism to enhance the genetic fitness of a population through gamete exchange and could result in reduced fitness over the long term (EDAW, 2003d).

Northern Bladderwort (*Utricularia ochroleuca*)

The ONHP lists the northern bladderwort as a List 2 species. The only known population of northern bladderwort in the Project area occurs in a palustrine emergent wetland adjacent to the North Arm of Timothy Lake. Water level fluctuations and human activity, particularly in high recreational use areas, are the primary threats to this species at the Project (EDAW, 2003d).

Stiff Club-moss (*Lycopodium annotinum*)

Stiff club-moss is an ONHP List 4 species. This species occurs in two locations in the Project area in or adjacent to forested wetlands along the North Arm of Timothy Lake. Both populations occur in areas shaded by western hemlock and mountain alder. Neither population appears to be immediately threatened or affected by human disturbance (EDAW, 2003d).

Tall Bugbane (*Cimicifuga elata*)

The USFWS lists tall bugbane as a species of concern. The USDA Forest Service lists this species as a Region 6 sensitive species. It is also an ONHP List 1 species and a candidate for listing by the Oregon Department of Agriculture (ODA).

This species is an herbaceous species that prefers mixed deciduous/coniferous forests (EDAW, 2003d). Field surveys in 2001 and 2002 documented tall bugbane at two locations in the Project vicinity: along the banks of Bull Run Creek and Cripple Creek. Both populations contain less than 100 individuals and neither population appeared to be threatened by imminent disturbances (EDAW, 2003d).

Nuttall's Larkspur (*Delphinium nuttallii*)

Nuttall's larkspur is an ONHP List 1 species. It is most common on basaltic cliff-sides and in prairies. This plant species occurs along Highway 224 and along the mainstem Clackamas River, upstream of the Fish Creek campground and downstream of the confluence with Moore Creek. These populations show a high degree of morphological variations and some of these individuals could be

Willamette Valley larkspur x Nuttall's larkspur hybrids. The Willamette Valley variety is also an ONHP List 1 species (EDAW, 2003d).

Methuselah's Beard Lichen (*Usnea longissima*)

The USDA Forest Service and the ONHP list Methuselah's beard lichen as a Region 6 sensitive species and a List 3 species, respectively. It is also a candidate for listing by ODFW under the Oregon Endangered Species Act. This species grows on the bark or wood of riparian hardwood and conifer trees. It is generally found in the transition zone between foothills and mountains at low elevation (USFWS, 2005). Because this species requires specific habitats and has low dispersal ability, it is sensitive to habitat changes (USFWS, 2005).

This species occurs at two locations near the Oak Grove Pipeline near Lazy Bend Campground (PGE, 2006). Lichen disturbance from a variety of causes, including vegetation management, constitutes the most significant threat to this species (USFWS, 2005; PGE, 2006).

3.2.5.2 Environmental Effects

The Proposed Action includes measures designed to benefit listed threatened or endangered and other rare species by protecting or enhancing their habitats, or mitigating other Project-related effects on these species. We list below the measures that would affect many, and in some cases all, listed threatened or endangered and other rare species at the Project:

- Flow management;
- Fish passage and fish protection improvements;
- Educational signage and interpretive materials highlighting noxious weed control, threatened and endangered and other rare species, and habitat protection;
- Implementation of a vegetation management plan that guides vegetation management practices on Project lands, including control of exotic and invasive vegetation; and
- Periodic monitoring to assess potential ongoing effects of Project-related activities on USDA Forest Service-listed sensitive (including species that may be designated sensitive in the future) or survey and manage species.

For the MHNF, there are 33 Survey and Manage Species that need to be considered; however, it is doubtful that the Proposed Action will have significant adverse affects on any of these species. If, during the license term, habitat or ground-disturbing activities would occur on NFS lands, the MHNF will coordinate

with PGE regarding the need for required surveys and protection of sites where Survey and Manage Species might be found.

3.2.5.2.1 Federally Listed Threatened and Endangered Species

PGE prepared and filed with the Commission a Biological Evaluation/Assessment (BA) of the Project-related effects on federally-listed species (available on the FERC website at www.ferc.gov) (Stillwater, 2005). Staff reviewed the BA and concur with its findings. Accordingly, we have adopted the BA as the Commission Biological Assessment. We also find that the conclusions in the BA for the Proposed Action apply to the Staff Alternative. Accordingly, we have adopted the BA as our Biological Assessment for licensing the project under our recommended Staff Alternative.

We submitted the Biological Assessment to USFWS and NOAA Fisheries on June 21, 2006 for the purposes of initiating section 7 Endangered Species Act consultation. Because the BA was prepared prior to Settlement Agreement, it does not include a comprehensive analysis of all the measures associated with the Settlement Agreement. However, the BA, when combined with this FEIS, provides a comprehensive evaluation of the effects of the Settlement Agreement measures on listed species. Section 3.2.5.2.1 presents our analysis of Project-related effects on endangered and threatened species.

As part of the section 7 consultation process, we requested concurrence with the effects determinations presented in the DEIS. USFWS concurred on September 10, 2006, and NMFS did not concur on July 19, 2006. Formal consultation with NMFS is ongoing.

The Proposed Action is likely to adversely affect but not jeopardize the federally listed threatened Upper Willamette River Chinook salmon ESU, Lower Columbia River Chinook salmon ESU, Lower Columbia River Steelhead ESU, and the Lower Columbia River coho salmon ESU. In the following sections, we summarize the effects of the Proposed Action on federally-listed species. Please refer to the BA for a detailed analysis of effects.

Federally Threatened and Endangered Fish Species and ESUs

The Proposed Action will affect four salmonid ESUs that are currently federally listed as threatened:

- Upper Willamette River Chinook salmon ESU (spring Chinook);
- Lower Columbia River Chinook salmon ESU (fall Chinook);
- Lower Columbia River steelhead ESU; and

- Lower Columbia River coho salmon ESU.

The state of Oregon classifies Lower Columbia River steelhead as a species of Special Concern, and Lower Columbia River coho as endangered. The Project also has the potential to affect bull trout, which are currently listed as federally threatened and thought to be extirpated from the Clackamas River.

PGE proposes to use an adaptive, tiered decision-making process to improve fish passage at their facilities. The tiered decision-making process would allow PGE flexibility in improving fish passage at their facilities, while providing a degree of certainty regarding the level of resource protection that is achieved. The process includes enforceable performance standards, goals, and targets, and establishes a monitoring and evaluation process to ensure that the PME's included in PGE's proposal meet these standards. The tiered decision-making process, monitoring protocols, and performance standards are discussed in greater detail in section 3.2.3.2.1

The NMFS uses a matrix of pathways and indicators as a tool for assessing a project's effects on ESA listed species (NMFS, 1996). Each of these pathways has one or more indicators (18 total) for assessing properly functioning conditions (PFCs). Appendix B describes the pathways and indicators in detail and provides an analysis of current Project operations on PFCs. The Proposed Action includes a number of changes to Project facilities and operations. A discussion of the effects of these changes on the condition of key pathways and indicators is located in Appendix B. The following sections summarize the effects of these changes on the listed ESUs and species at the Project.

Upper Willamette River Chinook Salmon ESU

Effects on Fish Passage

Implementation of the Proposed Action would have a beneficial effect on the Upper Willamette River Chinook ESU in the Clackamas River. PGE proposes to retrofit the existing North Fork fish ladder with a sorting facility that would facilitate the separation of hatchery fish and wild fish. This measure would reduce delays experienced by upstream migrating spring Chinook salmon under current conditions. PGE also proposes to implement a pulsed flow protocol to minimize delays at, and attraction to, the Faraday Powerhouse tailrace, and minimize delays to upstream migrants in the Faraday diversion reach.

The Proposed Action includes a proposal to study the effects of the Oak Grove Powerhouse tailrace on fish passage, and to address this issue through additional passage measures if warranted based on the results of the study

program. To the extent that listed salmonids would benefit from the provision of fish passage at the Oak Grove Powerhouse these measures, if implemented, would have a beneficial effect on spring Chinook.

Downstream passage of wild spring Chinook smolts would be significantly improved under the Proposed Action. Under current conditions, survival of downstream migrating spring Chinook smolts through the Project is estimated to be 75 percent. The tiered decision-making process and implementation plan that has been incorporated into the Proposed Action establishes a Project-wide goal of 97 percent survivorship of downstream migrants. Preliminary modeling suggests that system-wide survivorship is achievable for at least 95 percent of downstream migrants, which would increase Project-wide downstream migrant survivorship for spring Chinook by at least 20 percentage points. These improvements would be realized by retrofitting the downstream migrant bypass at North Fork dam to minimize delay, handling, or concentration of migrating smolts, the construction of a floating surface collector, guidance curtain, and strobe arrays that would minimize downstream passage via the turbines, and generation limits that would decrease the likelihood of entrainment of downstream migrants during peak spring Chinook smolt migration periods. Downstream passage of spring Chinook smolts would also be improved by the construction of a new downstream migrant bypass at River Mill dam, and the installation of fry criteria screens at River Mill dam to prevent outmigration via the turbines. To the extent that Project reservoirs may alter the behavior of outmigrating spring Chinook smolts, these effects would persist under the Proposed Action. The beneficial effect of improvements to downstream passage would likely be most significant for spring Chinook among the listed salmonid species at the Project, because spring Chinook currently have the lowest estimated Project-wide downstream migrant survival rate among the listed ESUs at the Project.

Under the Proposed Action, the Project would likely continue to cause minor delays in upstream passage and continue to cause minor delay, injury or mortality associated with entrainment during downstream migration, but the magnitude of these effects would be significantly reduced compared to existing conditions.

Effects on Proposed Critical Habitat

Under the Proposed Action, several measures would enhance proposed critical habitat for spring Chinook. The lower Oak Grove Fork provides spawning, incubation, emergent fry, and juvenile rearing habitat for spring Chinook. Greater minimum flow releases from Lake Harriet, in addition to modifications to the mainstem and side channels of the lower Oak Grove Fork would improve rearing habitat for juvenile spring Chinook, and increase the

amount of spring Chinook spawning habitat to within 85-100 percent of pre-Project levels (Stillwater, 2005). Additional PME measures on the Oak Grove Fork under the proposed action, including supplementing spawning gravel and LWD below Lake Harriet and reconnecting side channel habitat in the lower Oak Grove Fork, would further improve spawning and rearing habitats for spring Chinook and generally improve aquatic habitat quality in the lower Oak Grove Fork. It is impossible to quantify the magnitude of the beneficial effect that increased LWD and spawning gravel would have on spring Chinook in the lower Oak Grove Fork, but the synergistic effects of spawning gravel enhancement, which would provide additional spawning habitat, and LWD enhancement, which would promote retention of spawning gravel within the lower Oak Grove Fork, would enhance the value of this reach for the spring Chinook ESU.

Increased baseflows would also benefit spring Chinook by improving water quality and increasing the amount of instream habitat available in the lower Oak Grove Fork. During a Normal water year type, the Proposed Action flows would provide about 80 percent of maximum spawning habitat from April through September for Chinook. From October through December, the proposed flows would provide 65 percent-85 percent of maximum spawning habitat in this reach, and would provide sufficient flows for incubation of eggs. The Proposed Action would also provide substantially more Chinook spawning habitat between the Faraday Diversion dam and the Faraday Powerhouse than would be provided under the No-Action alternative.

Under the Proposed Action, flows and water temperatures in the Clackamas River upstream of North Fork Reservoir would mimic existing conditions. Spawning gravel augmentation below River Mill dam and the strategic placement of LWD salvaged from North Fork Reservoir for the purposes of habitat enhancement would also improve critical habitat for spring Chinook at the Project. North Fork Reservoir would continue to provide high quality rearing habitat for spring Chinook.

Small temporary increases in contaminants and turbidity, accompanied by localized temporary decreases in dissolved oxygen concentrations have the potential to occur in the vicinity of the Project facilities during construction activities; however, these effects would have no permanent effect on spring Chinook habitat at the Project. The Proposed Action would likely cause a small increase in water temperature in rearing habitat below River Mill dam, but the minor adverse effects of this increase on spring Chinook would be offset by fish passage improvements and habitat improvements elsewhere at the Project.

Effects on Recovery of the Upper Willamette River Chinook ESU

The Proposed Action would improve the survival and condition of adult wild spring Chinook salmon during upstream migration, increase spawning habitat and potentially increase production of juvenile spring Chinook salmon, and increase growth and survival of wild juvenile spring Chinook salmon. The net effect of the Proposed Action on spring Chinook would be to improve fish passage and improve the condition of critical habitat for spring Chinook salmon on the Clackamas River and the Oak Grove Fork. Although the Proposed Action would be an improvement over the No Action Alternative, the Proposed Action to continue to operate the Project under a new license is likely to adversely affect but not jeopardize or appreciably reduce the likelihood of either survival or recovery of this ESU.

Lower Columbia River Chinook Salmon ESU

Effects on Fish Passage

Implementation of the Proposed Action would have a beneficial effect on upstream passage of fall Chinook in the Clackamas River, and would likely have a beneficial effect on downstream passage of fall Chinook smolts. Construction of a new River Mill Fish ladder would promote passage of adult fall Chinook upstream of River Mill dam and installation of a tailrace barrier would prevent injury or mortality to upstream migrants by preventing entry into the River Mill draft tubes. To the extent that the proposed fish ladder would successfully convey adult fall Chinook upstream of River Mill dam, the fish passage PME's proposed by PGE upstream of River Mill dam at North Fork dam, the Faraday Powerhouse and Diversion Reach, and the Oak Grove Powerhouse would benefit adult fall Chinook. To the extent that adult fall Chinook would spawn upstream of River Mill dam following construction of the new River Mill fish ladder, downstream passage of fall Chinook smolts would also be improved by the installation of the new downstream migrant bypass and fry criteria screens at River Mill. Because fall Chinook do not currently pass upstream of River Mill dam, the magnitude of the potential beneficial effects on fall Chinook habitat and recovery of this ESU under the Proposed Action would depend to some extent on the effectiveness of the fish passage improvements at River Mill dam.

Effects on Proposed Critical Habitat

Gravel augmentation and improved flow conditions would enhance the condition of spawning and rearing habitat for fall Chinook below River Mill dam. Although fall Chinook do not currently occur in the Clackamas River upstream of River Mill dam, the proposed fish ladder at River Mill would be expected to promote

migration of adult fall Chinook upstream of River Mill. To the extent that fall Chinook would pass upstream of the River Mill dam via the proposed River Mill fish ladder, the improvements to spring Chinook habitat above River Mill proposed by PGE would also benefit fall Chinook, and the effects of the Proposed Action on fall Chinook habitat would be similar to the effects of the Proposed Action on spring Chinook habitat. Regardless of whether fall Chinook were to pass upstream of River Mill under the Proposed Action, the River Mill development would be operated in an inflow-matching mode to provide flow releases below River Mill Dam that equal the unregulated inflow at River Mill and thus improve spawning habitat currently used by fall Chinook below the dam.

To the extent that they would occur, potential temporary construction-related increases in contaminants and turbidity and temporary decreases in dissolved oxygen concentrations would not permanently adversely affect spring Chinook at the Project. The small increase in water temperature in rearing habitat below River Mill dam that would occur as a result of the Proposed Action would be offset by habitat improvements below River Mill and elsewhere at the Project.

Effects on Recovery of the Lower Columbia River Chinook ESU

Habitat improvements below River Mill dam would increase egg production and survival of fall Chinook in the Clackamas River. To the extent that fall Chinook salmon would access habitats above River Mill dam via the proposed River Mill fish ladder, the fish passage and habitat improvements proposed by PGE upstream of River Mill would improve survival and condition of fall Chinook salmon in the Clackamas River by improving adult survival and improving access to high quality spawning and rearing habitats. Changes to flows and habitat enhancements, coupled with downstream passage improvements would also likely increase survival and production of smolts, and further promote increases in production and survival of wild fall Chinook salmon in the Clackamas River. The net effect of the Proposed Action on fall Chinook would be to improve fish passage and improve the condition of critical habitat for fall Chinook salmon on the Clackamas River. Although the Proposed Action would be an improvement over the No Action Alternative, the Proposed Action to continue to operate the Project under a new license is likely to adversely affect but not jeopardize or appreciably reduce the likelihood of either survival or recovery of this ESU.

Lower Columbia River Steelhead ESU

Effects on Fish Passage

The Proposed Action would have a beneficial effect on the Lower Columbia River steelhead ESU, and the Proposed Action's effect on this ESU would be similar to its effect on the spring Chinook ESU. Because summer steelhead would continue to be prevented from passing above North Fork dam under the Proposed Action, fish passage measures at North Fork dam would have no effect on non-native summer steelhead, but would decrease delay of upstream migrating adult native winter-run steelhead. Construction of a new River Mill fish ladder would decrease delay of upstream migrating adults for both winter and summer steelhead. Implementing a pulsed flow protocol would minimize delays at, and attraction to, the Faraday Powerhouse tailrace, and delays to upstream migrants in the Faraday diversion reach. If additional passage measures were implemented at the Oak Grove Powerhouse, these measures would likely have a beneficial effect on passage of native winter steelhead in the Oak Grove Fork as well.

Construction of a new downstream migrant bypass at North Fork could increase the survival rate of native winter steelhead smolts, and construction of a new downstream migrant bypass at River Mill could benefit both summer and winter steelhead smolts. However, Project-wide survivorship of downstream migrant steelhead is estimated to be 95 percent under current conditions, so the magnitude of this beneficial effect would likely be small. To the extent that Project reservoirs may alter the behavior of outmigrating steelhead smolts, these effects would persist under the Proposed Action.

Effects on Proposed Critical Habitat

The Proposed Action would have a beneficial effect on spawning, incubation, emergent fry, and rearing habitat for steelhead. Gravel augmentation would increase the availability and condition of spawning habitat below Lake Harriet and River Mill dam. The Proposed Action would provide approximately 80 percent of the maximum potential steelhead spawning habitat and would increase habitat for age 2+ steelhead to within approximately 75-100 percent of pre-Project habitat levels (Stillwater, 2005), in the lower Oak Grove Fork year round. Between the Faraday Diversion dam and the Faraday Powerhouse, increased baseflows would provide substantially more 2+ steelhead rearing than exists under current conditions.

Alterations to side channels in the lower Oak Grove Fork would reconnect side channel habitat, further increasing the availability of rearing and spawning

habitat, and minimizing the risk of stranding for juvenile steelhead below Lake Harriet. Enhancement and management of LWD would also improve habitat conditions within the Project and downstream of the Project. The potential small, temporary adverse impacts associated with contaminants and turbidity that could occur, and the small increase in water temperature that would occur below River Mill dam would be offset by fish passage improvements and habitat improvements elsewhere at the Project.

Effects on Recovery of the Lower Columbia River Steelhead ESU

The Proposed Action would improve upstream and downstream passage, increase and improve critical spawning rearing habitats, and improve critical holding habitat for adult and juvenile winter steelhead throughout the Project. Habitat enhancements in the Oak Grove Fork would increase spawning habitat and increase the value of proposed critical habitat for winter steelhead. For steelhead smolts, the Proposed Action would provide minor downstream passage improvements. Changes to flows and habitat enhancements under the Proposed Action would likely increase and improve critical rearing habitats compared to existing conditions. The net effect of the Proposed Action would be to improve fish passage and improve the condition of critical habitat for winter steelhead on the Clackamas River and the Oak Grove Fork. Although the Proposed Action would be an improvement over the No Action Alternative, the Proposed Action to continue to operate the Project under a new license is likely to adversely affect but not jeopardize or appreciably reduce the likelihood of either survival or recovery of this ESU. The magnitude of the beneficial effects associated with the Proposed Action would be greater for native winter-run steelhead than for non-native, summer-run steelhead, which would mitigate current risks to the ESU from competition with non-native hatchery stocks.

Lower Columbia River Coho Salmon ESU

Effects on Fish Passage

The Proposed Action would have a beneficial effect on upstream and downstream passage of coho at the Project. Improvements to upstream and downstream fish passage would decrease delay of upstream migrating adults and increase the survival rate of downstream migrating juveniles, and would generally have the same effect on coho as they would on spring Chinook and steelhead.

Effects on Coho Salmon Habitat

The Proposed Action would have a beneficial effect on spawning, incubation, emergent fry, and 1+ rearing for coho salmon. Gravel augmentation

would increase the availability and condition of spawning habitat below Lake Harriet and River Mill dam. Enhancement and management of LWD would also improve habitat conditions within the Project and downstream of the Project. These measures would generally have the same effect on coho as they would on spring Chinook and fall steelhead. Altered flow regimes in the lower Oak Grove Fork, as proposed by PGE, would increase the amount of spawning habitat available to coho to 50-75 percent of historic habitat availability, and improve habitat conditions by lowering water temperature (Stillwater, 2005).

Side channels provide very important and productive rearing habitat for coho salmon. The side channels in the Oak Grove Fork are particularly important as rearing habitat for coho at the Project. Although flow adjustments in the lower Oak Grove Fork would increase habitat for rearing and spawning and minimize the risk of stranding for spring Chinook and fall steelhead as well, this measure would provide a particularly significant habitat enhancement for coho. Preparation and execution of the Oak Grove Fork Side Channel Enhancement Construction Plan would further increase the habitat value of the lower Oak Grove Fork for coho. The magnitude of the beneficial effect of these measures on coho would be seasonally variable, as the availability of side-channel habitat in the Oak Grove Fork would reach its seasonal maximum from approximately May 1st through August 15th each year. Under the Proposed Action decreasing baseflows after August 15th, could render some side channels unavailable to coho.

Effects on Recovery of the Lower Columbia River Coho ESU

The Proposed Action would have a beneficial effect on passage of coho throughout the Project, and increase the availability and quality of critical spawning, holding, and rearing habitat available to coho at the Project. The potential small, temporary increases in contaminants and turbidity that could occur, and the small increase in water temperature that would occur below River Mill dam would have the same adverse effects on coho as they would on the other federally-listed salmonid ESUs at the Project. The net effect of the Proposed Action would be to improve fish passage and improve the condition of critical habitat for coho on the Clackamas River. Although the Proposed Action would be an improvement over the No Action Alternative, the Proposed Action to continue to operate the Project under a new license is likely to adversely affect but not jeopardize or appreciably reduce the likelihood of either survival or recovery of this ESU.

Bull Trout

Bull trout are thought to have been extirpated from the Clackamas River basin, but their status in the Project area is uncertain. To the extent that an

undetected remnant population may exist, habitat improvements included in the Proposed Action could potentially benefit bull trout. However; due to the high probability that this species no longer occurs at the Project, the Proposed Action is expected to have no effect on bull trout.

Effects of the No-Action Alternative on Listed Salmonids

Under the No-Action Alternative, adult Upper Willamette River Chinook, Lower Columbia River steelhead, and Lower Columbia River coho migrating upstream would continue to be delayed at North Fork dam and River Mill dams, and Lower Columbia River Chinook would not pass upstream of River Mill dam. Entrainment in turbines would continue to pose a risk to downstream migrants at North Fork dam and River Mill dam, and Project-related mortality of downstream migrants would continue at rates similar to the rates experienced at the Project under existing conditions.

Habitat conditions would remain unchanged under the No-Action Alternative. The availability of spawning gravel available to Upper Willamette River Chinook, Lower Columbia River steelhead, and Lower Columbia River coho in the Oak Grove Fork, and to all the listed salmonid ESUs below River Mill dam would continue to adversely affect the condition and amount of spawning habitat available at the Project. The Project would continue to interrupt the natural downstream transport of LWD, and side channel habitat in the Oak Grove Fork would continue to be fragmented under low-flow conditions. There would be no change in the amount or condition of pool habitat or refugia available to listed salmonid ESUs at the Project, and rearing Upper Willamette River Chinook, Lower Columbia River steelhead, and Lower Columbia River coho would continue to be at risk from stranding under low-flow conditions in the lower Oak Grove Fork.

Northern Spotted Owl

Northern spotted owls occur throughout the Project area, but are concentrated in the Oak Grove Fork. The owls are found less commonly in the areas surrounding Timothy Lake. Several habitat management measures included in the Proposed Action would have the potential to benefit the Northern spotted owl. Replacing snags lost as a result of Project-related activities would supplement nesting and roosting habitat for this species, particularly if this measure resulted in increased abundance of snags in known owl activity centers in mature coniferous forests surrounding the Oak Grove Fork and around Timothy Lake. Retention of felled danger trees in spotted owl habitat would constitute an indirect benefit to Northern spotted owls because downed trees provide habitat for rodents, which are the major prey for this species.

The only activity included in the Proposed Action that could adversely affect Northern spotted owls is maintenance of Project-related ROWs and the transmission lines during the breeding season. In 2005, USFWS issued a Biological Opinion (BO) for a programmatic Biological Assessment BA that evaluated the impacts of a range of activities on Northern spotted owls and bald eagles (USFWS, 2005). This BO included an evaluation of the potential effects of PGE's ROW and transmission line maintenance activities on Northern spotted owls (USFWS, 2005). The BO determined that transmission line maintenance activities occurring outside of the 1 March–15 July critical breeding period, and occurring more than a specified distance from occupied activity centers and/or unsurveyed suitable habitat, would not affect this species. The disruption distances from the activity to the habitat varies with the type of activity; the maximum distance of 0.5 mile applies to helicopter use and the minimum distance of 65 yards applies to the use of heavy equipment (USFWS, 2005). The BO specifies that right-of-way and transmission line maintenance activities occurring within the 1 March–15 July time period, and within the specified disturbance distances of spotted owl activity centers and/or unsurveyed suitable habitat, could adversely affect this species and would require incidental take authorization from the USFWS.

The Proposed Action includes avoidance of loud noises or extensive disturbance within 65 yards of suitable Northern spotted owl habitat between 1 March and 15 July. Accordingly, PGE's maintenance activities would only affect Northern spotted owls if non-routine (i.e., emergency) maintenance activities were conducted during the restricted period. This would occur very infrequently and would require consultation with USFWS to ensure that adequate protective measures would be implemented to protect this species during the required activities. Accordingly, the Proposed Action may affect, but is not likely to adversely affect, Northern spotted owl.

Bald Eagle

Although the MHN plan designates a portion of the Clackamas River corridor as a bald eagle recovery territory, Clear Lake is the only area in the Project vicinity that supports an active bald eagle nest. Also, there are no known winter roost sites in the vicinity of the Project. Bald eagles prefer fish as prey, although eagles will prey on waterfowl, reptiles, rodents, and other small mammals. The Proposed Action includes modifying the flow regime in the Oak Grove Fork in order to increase fish production in the system. This could indirectly benefit bald eagles by augmenting the supply of fish, the bald eagle's preferred prey (Stillwater, 2005).

Although no bald eagles currently nest at Timothy Lake, several agencies have identified the forested areas surrounding the lake as suitable bald eagle nesting habitat (an inactive nest was discovered near Timothy Lake in 2004) (Stillwater, 2005). Measures that have the potential to increase human activity on Timothy Lake or in forested areas surrounding the lake, such as improvements to recreational facilities, could adversely affect potential bald eagle nesting habitat. This impact would only be realized, however, if at some future time a pair of eagles attempted to nest in an area near the increased human activity. The Proposed Action includes a provision that PGE would develop, in consultation with USFWS and USDA Forest Service, a management plan for any new bald eagle nests identified within 0.25 mile of Project facilities or within 0.5 mile in a direct line of sight of Project facilities. This management plan would ensure protection of the nest and breeding pair.

A 2005 USFWS BO that evaluated the potential effects of PGE's ROW and transmission line maintenance activities on bald eagles determined that ROW or transmission line maintenance activities occurring outside of the 1 January – 31 August bald eagle nesting period and 15 November – 15 March winter roosting period, and more than 0.25 mile or 0.5 mile sight distance of occupied bald eagle nests or roosts, would not affect bald eagles (USFWS, 2005). The Project area does not contain active bald eagle nests or winter roosts so these activity restrictions do not currently apply to the Project. However, should a nest or winter roost develop in the Project area during the term of a new license, PGE would implement these restrictions and develop a management plan, in consultation with USFWS and USDA Forest Service, for any new bald eagle nests identified within 0.25 mile of Project facilities or within 0.5 mile in a direct line of sight of Project facilities. This management plan would ensure protection of the nest and breeding pair.

Accordingly, PGE's maintenance activities would only affect bald eagles if non-routine (i.e., emergency) maintenance activities were conducted during the restricted period. This would occur very infrequently and would require consultation with USFWS to ensure that adequate protective measures would be implemented to protect this species during the required activities. Thus, the Proposed Action may affect, but is not likely to adversely affect, bald eagle.

3.2.5.2.2 *State Listed Threatened and Endangered Species*

Peregrine Falcon

One peregrine falcon eyrie occurs in the vicinity of the Project near the mainstem of the Clackamas River. Although peregrine falcons have the capacity to habituate to human activity to such a degree that they can nest successfully in

major metropolitan areas, the MHNH has designated a primary nest protection zone around the eyrie within which road construction, timber harvesting, and other habitat disturbing activities are prohibited. The Proposed Action includes measures to restrict routine Project maintenance or new construction within a mile of the eyrie during the breeding season from 15 January and 31 July. Accordingly, PGE's activities would only affect peregrine falcons if non-routine (i.e., emergency) Project maintenance activities were conducted during the restricted period. This would occur very infrequently and would require consultation with ODFW to ensure that adequate protective measures would be implemented to protect this species during the required activities.

The Project also includes land within the tertiary nest management zone. Habitat within this zone is managed to generally provide suitable habitat for falcons and the species in their food chain. The Proposed Action would have no significant impact on habitat within the tertiary management zone.

The Proposed Action includes a measure to replace snags lost as a result of Project-related activities and maintenance. Snags are an important feature of high-quality forest bird habitat, and because peregrine falcons rely heavily on other birds as forage, management of snags to enhance bird habitat would have a beneficial effect on peregrine falcon habitat in the Project vicinity.

3.2.5.2.3 *Other Rare Species*

Red-legged frog

The red-legged frog occurs in several locations within the Oak Grove development (Oak Grove Meadow, North Arm of Timothy Lake, and the pond and wetland complex downstream of the Frog Lake spillway) as well as an access road drainage ditch near the Faraday Diversion dam (EDAW, 2003a). Field surveys in 2001 and 2002 also documented red-legged frogs at Alder Flats campground and at beaver ponds on Station Creek. This species breeds in stillwater habitats in spring and utilizes riparian habitats along the Oak Grove Fork in summer. Juveniles metamorphose in their breeding ponds and by late summer are mobile and move to riparian habitats.

The Proposed Action would have no effect on red-legged frog populations at Oak Grove Meadows, downstream of the Frog Lake spillway, and the access road drainage ditch near the Faraday Diversion dam as no construction is proposed in these areas, nor any changes in flows.

The proposed drawdown of Timothy Lake in early September, as under current practice, is unlikely to have an adverse effect on red-legged frog habitat at

the North Arm of Timothy Lake. Red-legged frogs breed in the North Arm wetlands in early spring and by August and September the tadpoles have metamorphosed into juvenile frogs that are capable of moving in response to variations in water levels.

Cascades Frog

The only portions of the Project area known to support Cascades frog are the wetland areas associated with the North Arm of Timothy Lake and the Lower Oak Grove Fork. Operation of Timothy Lake as proposed under the Proposed Action would not affect Cascades frog for the same reasons given for the red-legged frog.

The Proposed Action would result in increased minimum flows from Lake Harriet to the Lower Oak Grove Fork. Cascade frogs appear to use portions of the Lower Oak Grove Fork for short periods of the year as summer or migratory habitat. The increased minimum flows should provide more wetted habitat for the Cascades frog and therefore potentially benefit this species.

Cascade Torrent Salamander

The Cascade torrent salamander is a habitat specialist that requires cool, shallow, silt-free streams or cascades. This species prefers wooded stream buffers and is intolerant of elevated water temperatures in deforested areas. Known populations in the Project area are restricted to Three Lynx Creek and Cripple Creek. The Proposed Action does not include any construction activities in these areas, nor would any of the proposed flow modifications affect these creeks.

Oregon Slender Salamander

The Oregon slender salamander occurs in the vicinity of the Oak Grove pipeline, primarily between the Harriet dam and the Skunk Creek pipeline crossing. Downed wood plays a key role in determining the suitability of habitat for this species.

The Oregon slender salamander could benefit from several measures included in the Proposed Action. Replacement of snags lost as a result of future Project-related activities could potentially benefit the Oregon slender salamander by augmenting the supply of snags that would become downed logs in the future. Retention of felled danger trees as downed wood habitat would also supplement habitat available to the Oregon slender salamander and would therefore benefit the species, especially if felled trees were placed in areas along the Oak Grove pipeline that are known to support the species. The degree to which amphibian

populations are isolated by the Oak Grove pipeline is unknown; however, amphibian surveys conducted by PGE in 2000 and 2001 documented the presence of Oregon slender salamanders and other amphibian species along both sides of the pipeline. Installation of wildlife crossings over the Oak Grove pipeline could benefit the species by improving habitat connectivity.

Greater Sandhill Crane

Greater sandhill cranes use Big Meadows and Little Crater Meadows for breeding. The Proposed Action would not result in any measures that would affect the use of these meadows by sandhill cranes.

Harlequin Duck

The harlequin duck prefers forested shorelines and requires forested riparian areas for breeding purposes. Increases in the minimum flow to the Lower Oak Grove Fork from Lake Harriet would provide more fast moving water, which is considered an important component of harlequin duck habitat (USFS, 2002b).

Northern Goshawk

The Northern goshawk nests in mature and old growth conifer forests and forages in open grasslands and riparian zones (USFWS, 2005). The Proposed Action would not result in any measures that would affect the use of the Project area by Northern goshawk.

Townsend's Big-eared Bat

Townsend's big-eared bat is found in the Lake Harriet area. It is particularly sensitive to human disturbance at roosting and breeding sites and at hibernacula (USFS, 2002c). The recreational enhancements at Lake Harriet included in the Proposed Action would not occur in the immediate vicinity of known big-eared bat sites or result in any increase in the recreational carrying capacity of Lake Harriet. Therefore, these improvements would not result in any significant increase in the levels of human disturbance and should not adversely affect the Townsend's big-eared bat.

The Townsend's big-eared bat and many other species of bats are occasionally harassed or destroyed by members of the public who consider them vectors of disease or otherwise perceive them as undesirable. Consequently, this species may also derive benefit from educational signage that addresses widely held misconceptions about bats and helps prevent indiscriminate harassment or destruction of bats or their habitat.

Cold Water Corydalis

Several clusters of cold water corydalis occur in the Upper Oak Grove Fork between the mouth of Stone Creek and Lake Harriet (EDAW, 2003d). A cold water corydalis study conducted by PGE in 2001/2002 along the Upper Oak Grove Fork found that the number of damaged plants increased during the growing season from about 3 percent of plants in June to 38 percent of plants in August (EDAW, 2003d). The damage was attributed to trampling by anglers and wildlife, falling branches, herbivory, debris flowing downstream, and high flows. The Project has had little effect on the extent of damage attributable to trampling, herbivory, or flowing debris, but could have been responsible for some damage caused by high flows.

The Proposed Action includes measures to enhance the cutthroat trout fishery in the Upper Oak Grove Fork; however, these measures are unlikely to significantly increase the number of anglers such that significant trampling would occur. This impact could be further mitigated by better education of anglers through educational signage at popular parking areas along Forest Road 57.

The USDA Forest Service raised concerns that high flows, and debris carried by these high flows, may be damaging cold water corydalis. The cold water corydalis study (EDAW, 2003d) evaluated the effects of a sustained high flow release from Timothy Lake (10 continuous days of 250+ cfs) in 2002. The study found that most reproductive adult plants were unaffected, while a few of the smaller non-reproductive adult and juveniles were bent over by the higher flows.

The Proposed Action would reduce the releases from Timothy Lake associated with the fall drawdown of the reservoir to enhance fisheries and establish a more natural hydrograph in the Upper Oak Grove Fork. Under the new license, the discharge from Timothy Lake would be no greater than 100 cfs over inflow during September, no greater than 150 cfs over inflow during October, and no greater than 300 cfs over inflow from November 1 through May 31. Although the impact of high flows (currently up to approximately 250 cfs in the fall) on cold water corydalis does not appear significant based on the results of the cold water corydalis study (EDAW, 2003d), reducing the magnitude of the flow releases from Timothy Lake and delaying the high releases (>150 cfs) to after November 1 (nearly all cold water corydalis plants completely senesce by the end of October) would ensure that flows are unlikely to adversely affect cold water corydalis (e.g., reduce the potential for stem damage).

Pale Blue-eyed Grass

Pale blue-eyed grass is known to occur in one location at the Project, near a dispersed campsite southwest of Meditation Point at Timothy Lake. It generally occurs in drier locations within open wet meadows associated with forest openings (Center for Plant Conservation, 2002). The potential threat to the population of pale blue-eyed grass is primarily trampling by dispersed campers; however, equestrians, anglers, cattle grazing, and reservoir inundation also pose potential threats (EDAW, 2003e). Cattle grazing permits are issued by the USDA Forest Service and are unrelated to the Project.

The Proposed Action would not increase the normal maximum water level at Timothy Lake, which would remain at elevation 3191.9 ft, and therefore would not inundate this population. The proposed September drawdown of Timothy Lake, as conducted under the current license, would not affect this species since it generally completes seed production by mid-August in the Pacific Northwest (Washington Natural Heritage, 2003). Under the Proposed Action, PGE would monitor this population on an on-going basis, which would provide the opportunity to assess whether Project operations or Project-induced recreation would have any adverse effects on pale blue-eyed grass.

Whether the dispersed site is heavily used or not in terms of the number of days is not an indication of the potential site-specific effects to the blue-eyed grass population from trampling. Continued monitoring of this population is appropriate, and is included as part of the Proposed Action. While grazing may be a potential threat to some blue-eyed grass populations in other areas, grazing by cattle or horses does not pose any great threat to the Timothy Lake population due to the very limited use of that area by cattle and the infrequent use of horses along the Timothy Lake Trail.

Tall Bugbane

Tall bugbane has been documented in several locations near the Oak Grove pipeline and transmission line. A recent survey (EDAW, 2003e) also found populations in undisturbed areas along Bull Creek and Cripple Creek.

The Proposed Action would have little or no effect on tall bugbane. PGE does not propose any construction activities or changes in flow regimes that would affect tall bugbane populations. To the extent that these populations are near disturbed areas (the Oak Grove pipeline, transmission line, and Forest Road 4630), there is the potential for the spread of noxious weeds into their habitats.

Northern Bladderwort

Northern bladderwort occurs in one location at the Project, in shallow pools (generally about 12-inches-deep) that are hydrologically connected to the North Arm of Timothy Lake. The identified threats to Northern bladderwort include trampling by recreationists, cattle grazing, and changes in reservoir water elevations (EDAW, 2003e). Cattle grazing is allowed via permit from the USDA Forest Service and is unrelated to the Project.

The Northern bladderwort population is located in close proximity to the North Arm developed campground and 4 dispersed campsites. North Arm Campground is small (8 campsites), but is essentially at capacity on most weekends during the high use season (July and August). There is no formal boat launch at the campground, but campers have created several paths to the water, although none of these appear to directly affect the critical pool habitat. The dispersed campsites are relatively popular and commonly used. Some of the dispersed campsites are on the water or also have created paths to the water. The Recreation Management Plan (PGE, 2006) does not specifically address the threat to Northern bladderwort from recreational use. Although the population does not appear to be significantly affected by current use, recreational use could increase or change and could adversely affect Northern bladderwort in the future.

Stiff Club-Moss

Stiff club-moss occurs at two locations near the North Arm of Timothy Lake that are heavily vegetated and appear to be unaffected by human activity or other disturbances, although one population is less than 10 ft from an informal boat launch (EDAW, 2003e). These plants are found in shaded, but dry coniferous forests.

The Proposed Action would not directly affect the stiff club-moss. The two known populations are sufficiently high in elevation that they would not be affected by water level management of Timothy Lake.

Nuttall's Larkspur

Within the Project area, Nuttalls' larkspur occurs in three locations on steep slopes along the mainstem Clackamas River between the confluence with the Oak Grove Fork and North Fork Reservoir. These three populations appear to have been slightly disturbed by highway and powerline construction and maintenance (EDAW, 2003e).

The Proposed Action would not have any direct effect on the Nuttall's larkspur. PGE does not propose any construction or changes in flow regime that would affect these three known populations. Because of its proximity to Highway 224 and the transmission line ROW, the potential for the spread of noxious or invasive species is a concern. The noxious weed control program could benefit Nuttall's larkspur to the extent that it would prevent the spread of undesirable species.

Methuselah's Beard

Methuselah's beard is a lichen species that occurs on both the north and south side of the Clackamas River near the Oak Grove pipeline and transmission line. The Vegetation Management Plan (PGE, 2006) indicates that pipeline and transmission line maintenance could potentially adversely affect this species. Under the Proposed Action, potential effects to this species would be minimized because PGE would employ spatial constraints (e.g., protective buffers) during maintenance activities in areas of the Project known to support this species.

PGE does not propose any construction activities or changes in flow regimes that would affect known populations of this species. The Proposed Action could have a limited effect on Methuselah's beard as a result of hazard tree removal. Prior to hazard tree removal in areas known to support this species, the Proposed Action provides for consultation with resource agencies to ensure avoidance or minimization of impacts to this species. To the extent that these populations occur near disturbed areas (the Oak Grove pipeline, transmission lines, and Forest Road 4630), there is the potential for the spread of noxious weeds into suitable habitat. However, implementation of the noxious weeds control program as defined in the Vegetation Management Plan (PGE, 2006) would reduce the potential for invasion of noxious weeds.

Fungi

All fungi found within the Project area exist in mycorrhizal symbiosis with the forests in which they are found. As a result, fungi are threatened by all impacts to the forest including fire and logging as well as changes in forest structure and composition. The Proposed Action would not have any effect on local fungal populations since it does not include any activities that would result in removal of forest habitat at the Project.

3.2.5.3 *Unavoidable Adverse Impacts on Threatened and Endangered Species*

The Proposed Action would not cause any significant unavoidable adverse impacts to threatened and endangered species.

3.2.6 Cultural Resources

3.2.6.1 *Affected Environment*

Cultural resources include prehistoric and historic-period archeological sites, historic structures, and traditional cultural properties (TCPs). The latter are places that may or may not have human alterations, but are important to maintaining the cultural identity of a community such as an Indian tribe. The Commission's regulations follow the National Historic Preservation Act (NHPA) of 1966, as amended, in requiring that these resources be inventoried and evaluated for their eligibility for listing in the National Register of Historic Places (National Register); that Project effects be determined; and that consultation takes place about mitigation and management measures, presented in a Historic Properties Management Plan (HPMP). For PGE, this work is accomplished in consultation with affected parties that include the USDA Forest Service, the Oregon State Historic Preservation Office (SHPO), the Confederated Tribes of the Grand Ronde Community, the Confederated Tribes of the Siletz Indians, and the Confederated Tribes of the Warm Springs Reservation. Representatives of these groups, along with PGE and their cultural resource contractors, participated in the Project's Cultural Resource Working Group, which guided and reviewed the cultural resources studies for the Project.

Cultural resources are National Register-eligible if they retain integrity and meet one of four criteria for listing, which relate to important past events or persons (criteria a and b), outstanding design or construction (criterion c), or the capability of providing information important to prehistory or history (criterion d) (36 CFR 60.4). Collectively, these resources are termed "historic properties" regardless of their nature or age.

Much of the information gathered during cultural resource studies is considered confidential. It is exempt from the Freedom of Information Act regulations to the extent that details about the nature and location of cultural resources could lead to vandalism such as unauthorized artifact collection. In addition, Indian tribes may consider information on traditional places and activities to be private and confidential. Fearing the disturbance of archeological sites, burials, and traditional resources such as native plants, tribal representatives may be uncomfortable documenting this information in detail and sharing it with the general public.

3.6.2.1.1 *Culture Historic Context*

Aboriginal Occupations in the Clackamas River Area

Traditional tribal territories within, or adjacent to, the Clackamas River Hydroelectric Project correspond to two Aboriginal groups known as the Molala and Clackamas. The Molala were primarily hunters/gatherers whose language does not appear to be related to any known Indian language. They occupied the Western Oregon Cascade Range; however, they were also seasonal occupants of the Willamette Valley where the Clackamas River provided the best fishing within their territory (AINW, 2003). The Molala traditionally occupied more upland and interior areas, and were best known as hunters and for their access to plant-resource areas in the uplands (PGE, 2005).

The Clackamas lived along the Willamette River below the Willamette Falls and up the Clackamas River to what is now Estacada and subsisted mainly on anadromous fish. They were part of the larger Chinookan-speaking groups along the Columbia River to the Pacific Ocean. The Klamath tribe from Southern Oregon began to enter the area after acquiring horses in the 1830s; however, there are no known permanent settlements in the Project area (AINW, 2003).

These tribal groups continued to use their traditional lands following the arrival of Europeans; however, the treaties of 1855 and establishment of reservations gradually relocated the Molala and Clackamas people out of the Project area. Small groups would return to their native lands at various times throughout the year to fish and gather resources, but this practice diminished to the vanishing point by World War I. Those remaining trips were associated with commercial harvesting trips as the local tribes began to seek employment from the Europeans (AINW, 2003).

PGE contacted three contemporary Indian groups that were known to have traditional connections to the area: the Confederated Tribes of Grand Ronde, the Confederated Tribes of Siletz Indians and the Confederated Tribes of the Warm Springs Reservation. Cultural resources associated with these tribes would include prehistoric archaeological sites and TCPs.

Historic Period

Prior to the establishment of the Clackamas River Hydroelectric Project, European settlements were limited to sparse homesteads along the Barlow Trail and scattered farms along the creeks that feed the Clackamas River. The earliest permanent settlement was established south of Eagle Creek in the 1840s and eventually became known as Currinsville (HRA, 2003).

The four developments that constitute the Project significantly contributed to the history and economic development of the Clackamas River Basin. The demand for electricity in Portland spurred initial efforts to develop hydropower facilities along the Clackamas River. Construction of the Cazadero Diversion dam (subsequently replaced with the Faraday Diversion dam) and Faraday Powerhouse was begun in 1902 and completed in 1907. The design of the Faraday Powerhouse was considered to be state-of-the-art for its time. The construction of the Faraday dam and Powerhouse led to the establishment of the City of Estacada in 1905 (HRA, 2003).

In 1909, construction of the River Mill Development was initiated. The River Mill dam is the oldest and apparently sole survivor of only three Ambursen-type dams built west of the Rocky Mountains. This style dam was noted for its innovative hollow flat slab and buttress construction. It is currently listed in the National Register of Historic Places.

Construction of the Oak Grove Development began in 1921. At the height of construction, the predecessor of PGE established the Three Lynx Village to provide housing, recreational facilities, and a school for its workers and their families. The development was completed in 1924 and President Calvin Coolidge officially opened the development. The Oak Grove Development was the highest head hydropower facility in the world at that time. As originally developed, the Oak Grove Powerhouse was fed by Lake Harriet. Between 1953 and 1956, Timothy Lake was constructed to provide additional seasonal storage. The dam is a compacted earth structure designed by Ebasco Services, Inc. and constructed by the Morrison-Knudson Company.

The North Fork Development began operation in 1958. It is one of the tallest arch dams in Oregon with a crest height of 207 feet. The North Fork fish ladder was constructed as part of the original development and at 1.9 miles is one of the longest operating fish ladders in the world.

3.2.6.1.2 Area of Potential Effects

For this relicensing, the NHPA requires that we assess the potential effects of the Project on cultural resources be assessed within an area referred to as the Area of Potential Effects (APE). The APE for the archeological studies includes the facilities and lands that may be affected by the relicensing of the Project. This area includes lands within the FERC license boundaries, as well as PGE's Westside Hydro Control Center, access and maintenance roads, equipment and materials storage areas, buffer zones of 30 meters above the normal maximum water elevation shorelines and areas exposed during seasonal reservoir

drawdowns, recreational sites associated with Project facilities, and ROW corridors associated with linear features such as access roads and the Oak Grove transmission line and pipeline. The total area within the APE, excluding water surfaces, is approximately 1,850 acres.

The APE for addressing TCPs for the Clackamas River Project is larger than that established for analyzing impacts on archeological or historic sites. This larger APE reflects the potential for projects to affect uses of and associations with traditional places outside the immediate Project area. For the Clackamas River Project, the ethnographic APE was defined as follows: from the mouth of Eagle Creek, about 5 river miles below River Mill dam; up the main stem of the Clackamas River to and slightly beyond the confluence of the Clackamas and Collawash rivers; and up the Oak Grove Fork of the Clackamas to the Timothy Lake area. This APE also includes the Fish Creek drainage, and the pipeline and transmission line corridor between the Oak Grove Fork and the Clackamas River at Three Lynx. Lands along these waterways, extending from the water to the ridge tops on both sides are included as well (PGE, 2005).

3.2.6.1.3 Cultural Resources Identified within the APE

Archeological Sites

Approximately 1,675 acres of the APE were surveyed for archeological sites. The remaining lands were either previously developed, too steep, or otherwise unsafe to be examined; the remaining area is unlikely to include National Register-eligible archeological sites. If any future Project-related activities are conducted outside the defined APE, they will need to receive cultural resources assessment as per requirements of the NHPA.

The extent of archeological research conducted prior to this relicensing effort generally reflects land ownership. Archeological inventories have been conducted in the Clackamas Basin above the town of Estacada on lands managed by the USFS and the BLM in the area of the Oak Grove Development. In contrast, no systematic archeological surveys have been conducted in the lower basin (River Mill, Faraday, and North Fork Developments), which is primarily privately owned, although some excavations and surveys were conducted by Woodward as part of an academic research program in the 1960s and 1970s. The results of these studies were not formally recorded (PGE, 2005).

In addition, the USFS and other private investigators have conducted numerous small and large-scale cultural resource investigations in the Clackamas Basin. These surveys consisted of small pedestrian surveys, timber sales surveys, the Wild and Scenic River designation process, and test and large-scale data

recovery excavations. While these studies do not focus on the APE for the Clackamas River Hydroelectric Project, they include portions of the APE (PGE, 2005).

The archeological investigations for the Project began in 1997 and continued into 2004 when the technical report was finalized (Oetting, 2003, 2004). The field inventory strategy included both a pedestrian surface survey of the defined APE and the excavation of subsurface probes. The inventory methods generally followed survey strategies commonly being employed on the MHN and elsewhere in the region (PGE, 2005). Twenty-seven archeological sites and 12 isolated finds have been investigated. Nineteen of the sites are prehistoric, five are historic, and three sites have both historic and prehistoric components. Detailed descriptions of the identified properties were removed from the HPMP to prevent the disclosure of privileged information (PGE, 2005).

Fourteen of the 27 archeological sites are considered to be eligible for listing in the National Register, and nine are considered to be ineligible for listing (Table 3.2.6.1-1). None of the isolated finds that were investigated were considered to be eligible. Four sites and two isolated finds were not evaluated for listing. PGE will evaluate the sites within five years of license issuance or before taking actions that may affect the sites (PGE, 2004).

3.2.6.1.4 Historic Structures and Buildings

The Determination of Eligibility (DOE) that was prepared for the Clackamas Hydroelectric Project (Kramer, 2003) evaluated Project resources within the APE that fell within the period of historical significance for this Project (years 1907 to 1958). The Project facilities were divided into eight nodes, listed in order of water flow: Timothy Lake, Lake Harriet, Oak Grove (including Frog Lake and Three Lynx Village), North Fork (including Promontory Park), Faraday Diversion dam, Westside Hydro Projects Office Complex, Faraday, and River Mill (including Timber and River Mill Parks). Each resource within each node was evaluated for listing in the NRHP as part of the relicensing studies by field archaeologists and historians (PGE, 2005). A total of ninety-four individual resources have been identified and documented within the Clackamas River Hydroelectric Project; however, due to normal maintenance and upgrades twenty-nine of these sites no longer retain sufficient integrity related to their historic functions to be eligible for listing in the NRHP (HRA, 2003). Table 3.2.6.1-2 summarizes the inventoried historical resources and indicates which ones are considered to be historic contributing features and which are not.

Table 3.2.6.1-1. Archeological sites in the Clackamas River Hydroelectric Project APE

APE Segment	Archeological Sites	Site Type	National Register Eligibility
Timothy Lake Vicinity	35CL278	Prehistoric	Eligible
Oak Grove Pipeline and Vicinity	35CL201	Prehistoric	Not eligible
	35CL277	Prehistoric	Eligible
	35CL283	Prehistoric	Eligible
	35CL285	Historic	Not eligible
	35CL286	Prehistoric and Historic	Not eligible
	35CL287	Historic	Not eligible
	35CL294	Historic	Not eligible
	35CL295	Historic	Not eligible
Oak Grove Transmission Line	35CL35	Prehistoric	Not evaluated ^a
	35CL74	Prehistoric	Eligible
	35CL75	Prehistoric	Eligible
	35CL163	Prehistoric	Not evaluated ^b
	35CL164	Prehistoric	Eligible
	35CL165	Prehistoric	Site eligible, but not entirely inside APE
	35CL224	Prehistoric	Eligible
	35CL245	Prehistoric and Historic	Not eligible
	35CL276	Prehistoric	Eligible
	35CL281	Prehistoric	Eligible
	35CL282	Prehistoric	Not eligible
	35CL284	Prehistoric	Not evaluated ^a
	North Fork	35CL261	Prehistoric
Faraday	35CL280	Prehistoric and Historic	Eligible
	35CL296	Historic	Not eligible
River Mill	35CL262	Prehistoric	Eligible
	35CL279	Prehistoric	Eligible
	35CL293	Prehistoric	Not evaluated ^c

^a Site located outside APE; portion inside not likely to contribute to significance.

^b Poor access across river hindered evaluation.

^c Not yet tested.

Table 3.2.6.1-2. Historic buildings and structures in the Clackamas River Hydroelectric Project APE

Node	Resource	National Register Eligibility
Timothy Lake	Dam	Historic Contributing
	Spillway	Historic Contributing
	Powerhouse	Non-Historic, Non-Contributing
	Intake/Outlet works	Historic Contributing
	Managers quarters	Historic Contributing
	Bunk house/lodge	Non-Historic, Non-Contributing
	Campgrounds	Non-Historic, Non-Contributing
	Lake Harriet	Diversion dam
Lake Harriet	Intake structure and headgate	Historic Contributing
	Campground	Non-Historic, Non-Contributing
Oak Grove	Pipeline section 1 (Lake Harriet to Frog Lake)	Historic Contributing
	Frog Lake (Oak Grove Forebay)	Non-Historic, Non-Contributing
	Frog Lake dam A	Historic Contributing
	Frog Lake dam B	Non-Historic, Non-Contributing
	Frog Lake spillway	Non-Historic, Non-Contributing
	Frog Lake intake and outlet works	Non-Historic, Non-Contributing
	Pipeline section 2 (Frog Lake-Oak Grove)	Historic Contributing
	Tunnel, east portal	Historic Contributing
	Surge tank	Historic Contributing
	West tunnel portal	Historic Contributing
	Johnson valve house	Historic Contributing
	Penstocks	Historic Contributing
	Powerhouse	Historic Contributing
	Machine shop	Historic Contributing
	Switching structure & substation	Historic Contributing
	Powerhouse access road storage building	Non-Historic, Non-Contributing
	Office/Maintenance building	Non-Historic, Non-Contributing
	Pipeline Road storage/maintenance yard	Historic Contributing
	Three Lynx village	Historic Contributing
	Three Lynx, "traditional cottages"	Historic Contributing
	Three Lynx, one-story cabins	Historic Contributing
	Three Lynx school	Historic Contributing
	Three Lynx school gym	Non-Historic, Non-Contributing
	Three Lynx school garage/barn	Historic Contributing
Three Lynx community pool	Historic Contributing	
Transmission line and towers	Historic Contributing	
North Fork	Promontory Park	Non-Historic, Non-Contributing
	Spillway	Historic Contributing
	Dam	Historic Contributing
	Penstocks and intake	Historic Contributing
	Powerhouse & transformer yard	Historic Contributing
Faraday Diversion Dam (Cazadero)	Fish ladder	Historic Contributing
	Faraday diversion dam	Non-Historic, Non-Contributing

Table 3.2.6.1-2. Historic buildings and structures in the Clackamas River Hydroelectric Project APE

Node	Resource	National Register Eligibility
	Electric gear building	Non-Historic, Non-Contributing
	Intake structure	Non-Historic, Non-Contributing
	Canal & tunnel	Non-Historic, Non-Contributing
Westside Hydro Office Complex	Faraday substation/switchyard	Non-Historic, Non-Contributing
	Shop buildings	Non-Historic, Non-Contributing
	Offices	Non-Historic, Non-Contributing
	Faraday bridge (Cazadero bridge)	Historic Contributing
Faraday	Faraday dam	Historic Contributing
	Intake gates/spillway	Historic Contributing
	Penstocks	Historic Contributing
	Powerhouse	Historic Contributing
	Machine shop/electrical shop	Historic Contributing
	Switching yard	Historic Contributing
	Faraday-River Mill transmission line & towers	Historic Contributing
River Mill	Timber Park	Non-Historic, Non-Contributing
	Dam	Historic Contributing
	Powerhouse	Historic Contributing
	Gate house/Unloading house	Historic Contributing
	Fish ladder	Historic Contributing
	Spillway dam	Historic Contributing
	Park structures	Non-Historic, Non-Contributing
	Substation	Historic Contributing

3.2.6.1.5 Traditional Cultural Properties

The APE for TCPs is larger than those for archeological or historic resource, due to the potential for Project activities to affect TCPs outside of the immediate Project area. The Project APE for TCPs includes the area from the mouth of Eagle Creek up the main stem of the Clackamas River to, and slightly beyond, the confluence of the Clackamas and Collawash rivers, and up the Oak Grove Fork to the Timothy Lake drainage. The APE also includes the Fish Creek drainage and the pipeline and transmission line corridor between the Oak Grove Fork and the Clackamas River at Three Lynx. The APE along these waterways extends from the water to the ridge tops on both sides.

PGE consulted three contemporary Oregon Indian groups that have traditional connections to the area: the Confederated Tribes of the Grand Ronde Community, the Confederated Tribes of Siletz Indians, and the Confederated Tribes of the Warm Springs Reservation. While all three tribes toured the Project area, only members of the Warm Springs Reservation participated in oral interviews. The remaining tribes provided information through meetings and site

visits (Hajda et al., 2003). A detailed literature review of available tribal documents was also conducted based upon sources identified during the interviews, meetings, and site visits (PGE, 2005). These interviews identified two locations within the APE as potential TCPs: Timothy Meadows and River Mill dam. Three elderly women mentioned Timothy Meadows as a camping area where wagons were often left and horses were taken to the huckleberry patches in the high country. They also mentioned that Timothy Meadows contained camas, medicinal plants, and yew wood for bows. However, Timothy Meadows has been under water since the 1950s, and since it no longer retains integrity nor appears to play a role in maintaining community identity, Timothy Meadows does not qualify for listing as a traditional cultural property.

Four elders also mentioned an area near Estacada as an area for camping, and as a place to fish for and smoke-dry, dog salmon. Often tribal people received fish from the fish hatchery workers, after they had been ‘milked’ for their eggs. This area campground is basically unchanged today, and is still remembered by several elders. However, evidence is lacking that families continued using the area after World War II, and it does not appear to be crucial in maintaining community identity. Therefore, this area near Estacada is also not eligible for listing as a traditional cultural property.

3.2.6.2 *Environmental Effects*

Adverse effects on archeological sites, historical buildings and structures, and traditional cultural properties (TCPs) could result from actions taken under a new Project license. These effects could be direct—occurring at the same time and place as the action—or indirect—occurring at a later time or a different place. For example, enlarging a campground in an area of archeological sites could include direct construction disturbance of some sites but indirect disturbance at others, if increased recreation use results in erosion at the sites or in unauthorized artifact collection.

PGE, in consultation with the SHPO, Forest Service, and the Confederated Tribes of the Grand Ronde Community, Siletz Indians, and Warm Springs Reservation, developed a historic properties management plan (HPMP) (PGE, 2005) to guide its treatment of historic properties during the new license. The HPMP includes a Manual for Built Resources as well as Detailed Procedures for Inadvertent Discovery (of artifacts, looting or vandalism, and human skeletal materials or graves). Under the Proposed Action, PGE proposes to implement HPMP measures including:

- designating a Historic Properties Coordinator with oversight responsibility for the Project’s cultural and historic resources;

- training key Project personnel in aspects of historic property management;
- reviewing operation, maintenance, and construction activities for potential effects on historic properties and needs for avoidance or mitigation of adverse effects;
- implementing procedures for inadvertent discovery of artifacts, looting or vandalism, or human graves or remains;
- preparing and implementing a monitoring program for NRHP-eligible and unevaluated archeological sites, upon acceptance of a new Project license;
- working with the USDA Forest Service and the Tribes to develop an integrated Interpretive and Education program to improve public understanding and appreciation for the Project's historic structures as well as the prehistory and history of the area; and
- consulting with key stakeholders (including the USDA Forest Service, SHPO, and the affected tribes) to refine provisions for resource monitoring, protection, and mitigation, and meeting annually with these stakeholders to discuss the past year's activities and planned future activities for resource management.

These measures will minimize the potential effects of the Project on cultural resources by guiding evaluation, management, and avoidance or mitigation of potential effects, educating the public, and determining specific actions for addressing potential effects to known or yet to be discovered archeological sites at the Project.

3.2.6.2.1 Proposed Action

Archeological Resources

Several measures included in the Proposed Action have the potential to affect archeological resources through changes in flow regimes, construction activities, or changes in use patterns. Flow management measures are not expected to affect known archeological sites. The potential for erosion along the Oak Grove Fork and the Clackamas River is minimal because the releases would flatten the hydrograph and limit high flows. Raising the level of Lake Harriet and increasing the water level fluctuation of the Faraday Diversion Pool would not affect archeological sites. It is anticipated that no archeological sites would be exposed in the Timothy Lake draw down zone, but periodic monitoring will be used to confirm that site 35CL278 does not receive impacts from unauthorized artifact collection.

Constructing a downstream migrant fish bypass pipeline from North Fork Reservoir to the existing pipeline near Faraday Diversion dam could adversely affect archeological sites, depending on route selection and pipeline design. This

action will receive archeological review to avoid or mitigate impacts. A number of ground-disturbing terrestrial resource measures could affect archeological sites. These measures could include actions to control noxious weeds, installation of signage, modification of road and stream culverts, installation of wildlife crossings for the Oak Grove pipeline and North Fork Fish Ladder, expansion or enhancement of wetland habitat, and vegetation management. These actions will be reviewed to avoid or mitigate potential impacts to archeological resources.

Any ground-disturbing measures for recreation also could potentially affect archeological sites. These measures include road maintenance, trail modifications, and upgrading campground and boat launches. These actions will be reviewed to avoid or mitigate impacts. Supporting the preparation of an interpretive and education program that includes cultural resources and discouraging vehicular access to targeted sensitive dispersed campsites at Timothy Lake should benefit archeological resources.

In addition to the proposed measures, maintenance activities also could affect archeological sites. The HPMP includes management measures to avoid impacts and monitor site conditions, with protection or data recovery, if needed. Table 3.2.6.2-1 summarizes the management measures that would be conducted in relation to site-specific activities.

Table 3.2.6.2-1. Site-Specific Activities and Associated Management Measures

Site	Activity	Management Measure
35CL75	Vegetation control; maintenance of transmission line	Avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL164	Vegetation control; maintenance of transmission line	Avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL224	Vegetation control; maintenance of transmission line	Avoid ground disturbance or consult with SHPO to protect site or conduct data recovery; coordinate protection with MHNH and ODOT
35CL261	Recreation in park area	Redirect recreation use; avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL262	Access for recreation	Avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL276	Vegetation control; maintenance of transmission line	Avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL277	Past access to flowline	Continue to block vehicle access; avoid ground disturbance or consult with SHPO to protect site or conduct data recovery

Site	Activity	Management Measure
35CL278	Reservoir erosion; recreation use	Monitor site condition annually to assess effects; as needed, consult with SHPO to protect site or conduct data recovery
35CL279	Recreation use; transmission line, pipeline, and access road use and maintenance	Review any proposed actions and divert future development; monitor site condition annually; avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL280	Vegetation control; maintenance of canal	Avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL281	Vegetation control; maintenance of transmission line	Avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL283	Flowline road access and maintenance; non-Project vehicle use	Limit vehicle access; avoid ground disturbance or consult with SHPO to protect site or conduct data recovery
35CL35	Vegetation control; maintenance of transmission line	Evaluate National Register-eligibility within 5 years of license issuance; evaluate sooner if necessitated by Project-related ground disturbance; management will depend on results of evaluation
35CL163	Vegetation control; maintenance of transmission line	Evaluate National Register-eligibility within 5 years of license issuance; evaluate sooner if necessitated by Project-related ground disturbance; management will depend on results of evaluation
35CL284	Vegetation control; maintenance of transmission line	Evaluate National Register-eligibility within 5 years of license issuance; evaluate sooner if necessitated by Project-related ground disturbance; management will depend on results of evaluation
35CL293	Access road maintenance	Evaluate National Register-eligibility within 5 years of license issuance; evaluate sooner if necessitated by Project-related ground disturbance; management will depend on results of evaluation

Historical Buildings and Structures

Several measures included in the Proposed Action would impact historic buildings or structures within the Project area. The HPMP would provide for an assessment of any change in use. Along the North Fork and Faraday Nodes, the spillway at the North Fork dam would be modified to aid fish during downstream passage. Since the spillway is National Register eligible, high quality photo documentation meeting SHPO standards would be an appropriate measure should this modification adversely affect the historic spillway.

A one-foot raise in the level of Lake Harriet would not have an adverse effect on historic buildings or structures, assuming that it is accomplished without damaging the historic integrity of the Harriet dam.

Measures for aquatic and terrestrial resources would not adversely affect historic buildings and structures.

Traditional Cultural Properties

Consultation with the three Indian tribes with traditional connections to the Project area identified no TCPs or major issues. Although no TCPs were identified for the Project, TCPs could be identified within the Project area in the future and thus could be affected by Project actions. The HPMP provides for consultation with the tribes about development actions that could impact TCPs during the licensing period. This consultation would minimize or avoid impacts to any TCPs potentially affected by the Project.

Implementation of the HPMP by PGE, in consultation with the SHPO, Forest Service, Confederated Tribes of the Grand Ronde Community, Siletz Indians, and Warm Springs Reservation would ensure that adverse effects on historic properties as a result from ongoing Project operations or other Project-related activities over the term of the new license would be avoided and satisfactorily resolved. As stated above, the HPMP includes specific measures to resolve any potential adverse effects that might occur on particular historic properties as a result of ongoing Project-related effects or results from other license requirements.

Pursuant to Section 106 of the NHPA, Commission staff will craft and execute a Programmatic Agreement (PA) with the Advisory Council on Historic Preservation (if they choose to participate) and the SHPO to implement the HPMP as a condition of any new license for this Project. Other parties involved with the PA, and who would be invited as concurring parties, would be the Forest Service, and the Confederated Tribes of the Grand Ronde Community, Siletz Indians, and Warm Springs Reservation.

3.2.7 Recreation

3.2.7.1 *Affected Environment*

The Clackamas River Project is within a large expanse of rugged and relatively undeveloped land on the west side of the Cascade Mountains, which is dominated by Mount Hood, the tallest peak in Oregon. Much of this land is part of the MHNF, which totals over one million acres. The Project is approximately 50 miles from Portland and offers a variety of recreational opportunities to the greater Portland metropolitan area.

3.2.7.1.1 *National and State Designations*

Clackamas National Wild and Scenic River

Congress designated approximately 47 miles of the Clackamas River as a Federal Wild and Scenic River in 1988. This designation includes the Clackamas River from Big Spring, in the Olallie Lake Scenic Area upstream of the Project, to Big Cliff, just upstream of North Fork Reservoir. For a river segment to be considered for Wild and Scenic status, it must be free-flowing and possess one or more outstandingly remarkable values (ORVs). Congress identified the superb fishery, scenery, and recreation opportunities as the ORVs of the designated segment of the Clackamas River. All of the federally designated section of the Clackamas River is within the MHNF and, as a result, Congress assigned the USFS authority for administering the Clackamas Wild and Scenic River.

The portion of the Clackamas Wild and Scenic River from the confluence of the Oak Grove Fork to Big Cliff (approximately 18 miles) is affected to some extent by Project operations (Figure 3.2.7.1-1). Under the Wild and Scenic Rivers Act, segments of designated rivers are classified as “wild,” “scenic,” or “recreational.” Approximately 13 miles of the Clackamas River that are affected by the Project are classified as “recreational.” The remaining five miles from the confluence with the Oak Grove Fork to the Indian Henry Campground are classified as “scenic.”

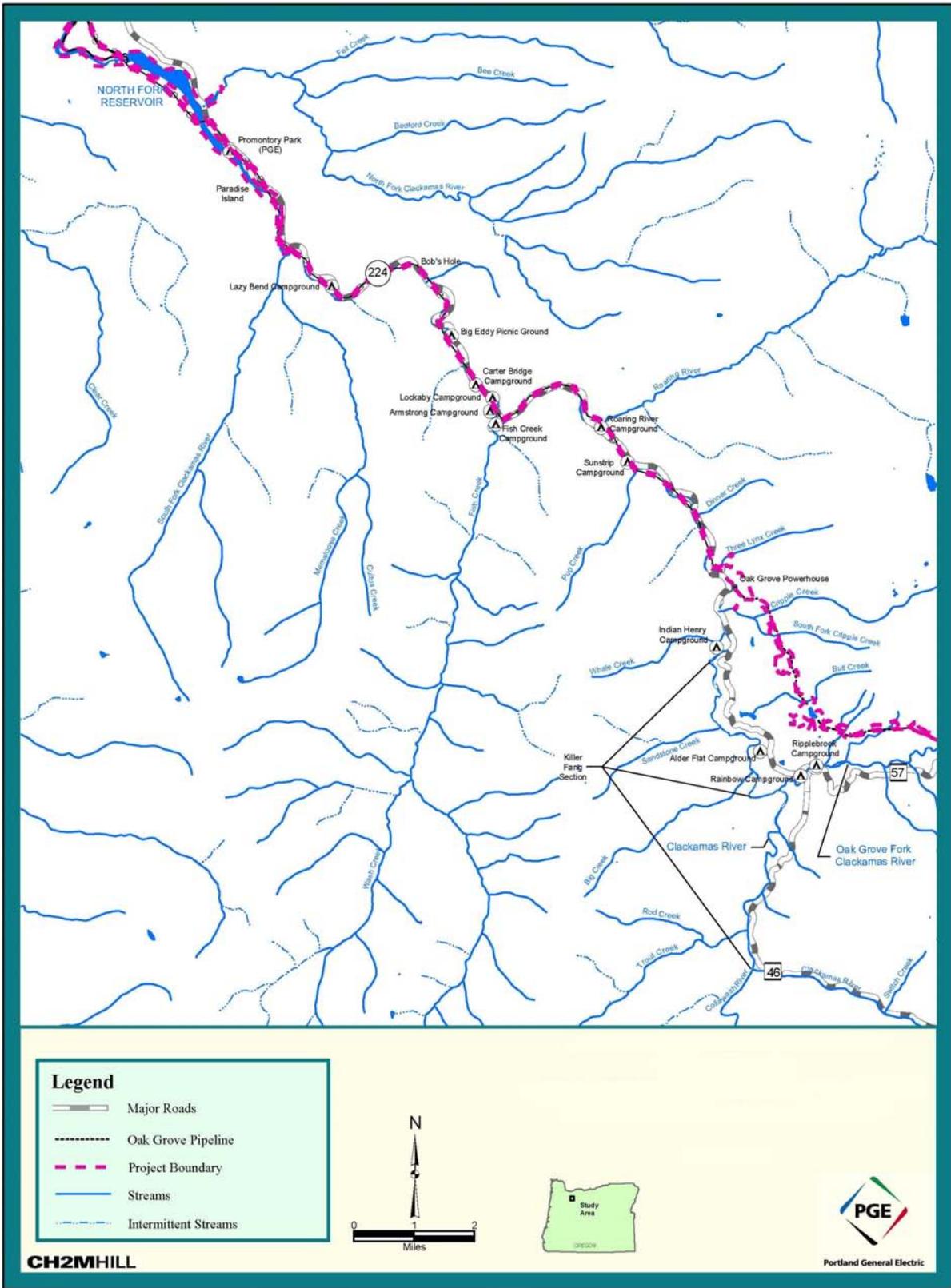


Figure 3.2.7.1-1 Location of Recreation Facilities, Mainstem Clackamas River

Other federal wild and scenic river designations in the vicinity of the Project include:

- The Roaring River, a tributary of the Clackamas River that joins the Clackamas River downstream of the Oak Grove Powerhouse, has been designated as a Federal Wild and Scenic River with a “wild” classification.
- The approximately 9.9 miles of the Upper Oak Grove Fork (from just downstream of Timothy Lake to just upstream of Lake Harriet) has been listed as eligible for federal designation as a Wild and Scenic River with a “recreational” classification. The ORV found within this segment is the cold water corydalis, which is found at several locations.
- The entire 12.6-mile-long North Fork of the Clackamas River from its headwaters to North Fork Reservoir has been listed as eligible for federal designation as a Wild and Scenic River with the upper 10 miles classified as “scenic” and the lower 2.6 miles as “recreational”. The ORV found within this segment is the late-run (wild) coho salmon.

In 1993, the USFS prepared the Clackamas National Wild and Scenic River and State Scenic Waterway Environmental Assessment and Management Plan (USFS, 1993a). All lands within 0.25 miles of the designated river sections are subject to the management policies established in the Clackamas Wild and Scenic River Plan.

Pacific Crest National Scenic Trail

The Pacific Crest Trail (PCT), a part of the National Trails System, crosses the Project area near Timothy Lake. The PCT was established in 1968 and extends for approximately 2,600 miles along the Cascade and Sierra Nevada mountain ranges from Canada to Mexico.

State Designations

In addition to its Federal designation, the mainstem of the Clackamas River from the boundary of the Olallie Lakes Scenic Area to the North Fork Reservoir was also designated as both a recreation and scenic river area pursuant to the Oregon State Scenic Waterways Act in 1988 as a result of a citizen initiative petition. The Oregon State Scenic Waterways system also includes the following reaches in the Project vicinity:

- The approximately 12 miles of the North Fork of the Clackamas River from its headwaters to North Fork Reservoir, which was designated by initiative petition in 1988.
- The approximately 4 miles of the South Fork of the Clackamas River extending upstream from its confluence with the mainstem Clackamas River, which was designated by initiative petition in 1988.
- The approximately 12 miles of the mainstem Clackamas River downstream from River Mill dam to Bakers Bridge, which was designated by the State legislature in 1975.

The Oregon Scenic Waterways Act establishes that the highest and best uses of waters within scenic waterways are recreation, fish, and wildlife uses. The Act also states that the free-flowing character of these waters shall be maintained in quantities necessary for recreation, fish, and wildlife uses (Oregon Revised Statutes 390.835).

State Highway 224, which extends along the Clackamas River, is part of the West Cascades Scenic Byway.

3.2.7.1.2 Existing Recreational Facilities and Use

Timothy Lake

The Timothy Lake recreation complex receives the highest concentration of recreational use within the MHN (USFS, 2000a). Primary recreational activities include camping, boating, fishing, hiking, wildlife observation, and winter sports. The Forest Service manages the Timothy Lake recreation complex as a “roaded natural area” on the Recreation Opportunity Spectrum (ROS). This spectrum is a tool used by the USFS to inventory, manage, and plan for a variety of recreational experiences on National Forest lands. Land classifications range from “urban” to “primitive.” Roaded natural areas are characterized by predominantly natural-appearing environments with moderate evidence of human presence. Moderate to high contacts with other users is expected, but there are opportunities for isolation from human sights and sounds.

Camping

The USFS operates five developed car campgrounds and one small walk-in campground at Timothy Lake that collectively provide 179 campsites (Table 3.2.7.1-1 and Figure 3.2.7.1-2). These campgrounds are relatively primitive with no flush toilets or showers. Most of these campgrounds are concentrated along the south shore of Timothy Lake, but the North Arm Campground is located on the

North Arm of Timothy Lake. These sites are managed through a concessionaire for the USFS and charge a fee.

Table 3.2.7.1-1. USFS Campgrounds at Timothy Lake

Campground	# of Campsites	Facilities
Pine Point	23	Water/vault toilet/boat ramp/day use area/fishing pier
Hoodview	42	Water/vault toilet/boat ramp/day use area
Gone Creek	50	Water/vault toilet/boat ramp
Oak Fork	46	Water/vault toilet/boat ramp
North Arm	8	Vault toilet/no reservations
Cove	10	Walk-in/vault toilet

The MHNH Plan (USFS, 1990) notes that, although the overall capacity of the MHNH to supply developed recreational opportunities exceeds demand, use of many specific sites, including Timothy Lake, equals or exceeds their capacity. The primary recreation use pattern for the Timothy Lake area is weekend use from the Portland metropolitan area. The USFS states that demand for campgrounds in the Timothy Lake area is at or near capacity and will likely exceed capacity in the future on weekends during the recreation season (USFS, 2003). The USFS estimates that the developed campgrounds at Timothy Lake receive over 200,000 visitors per year (USFS, 1996b). During 2000, all six developed campgrounds at Timothy Lake were close to or at capacity on weekends during July and August, but there was considerable variability on weekdays with average occupancy ranging from 24 percent (Cove) to 64 percent (Hoodview) (Hall, 2003a).

The USFS has additional developed campgrounds in the vicinity of the Project, including Clackamas Lake (46 campsites with water, including 19 available for equestrian use), Joe Graham (14 campsites with equestrian facilities and water), and Little Crater Lake (16 campsites with water) campgrounds. Recreational use is much lower at these nearby campgrounds than at Timothy Lake, with summer weekend occupancies ranging from 60 to 77 percent (Hall, 2003a).

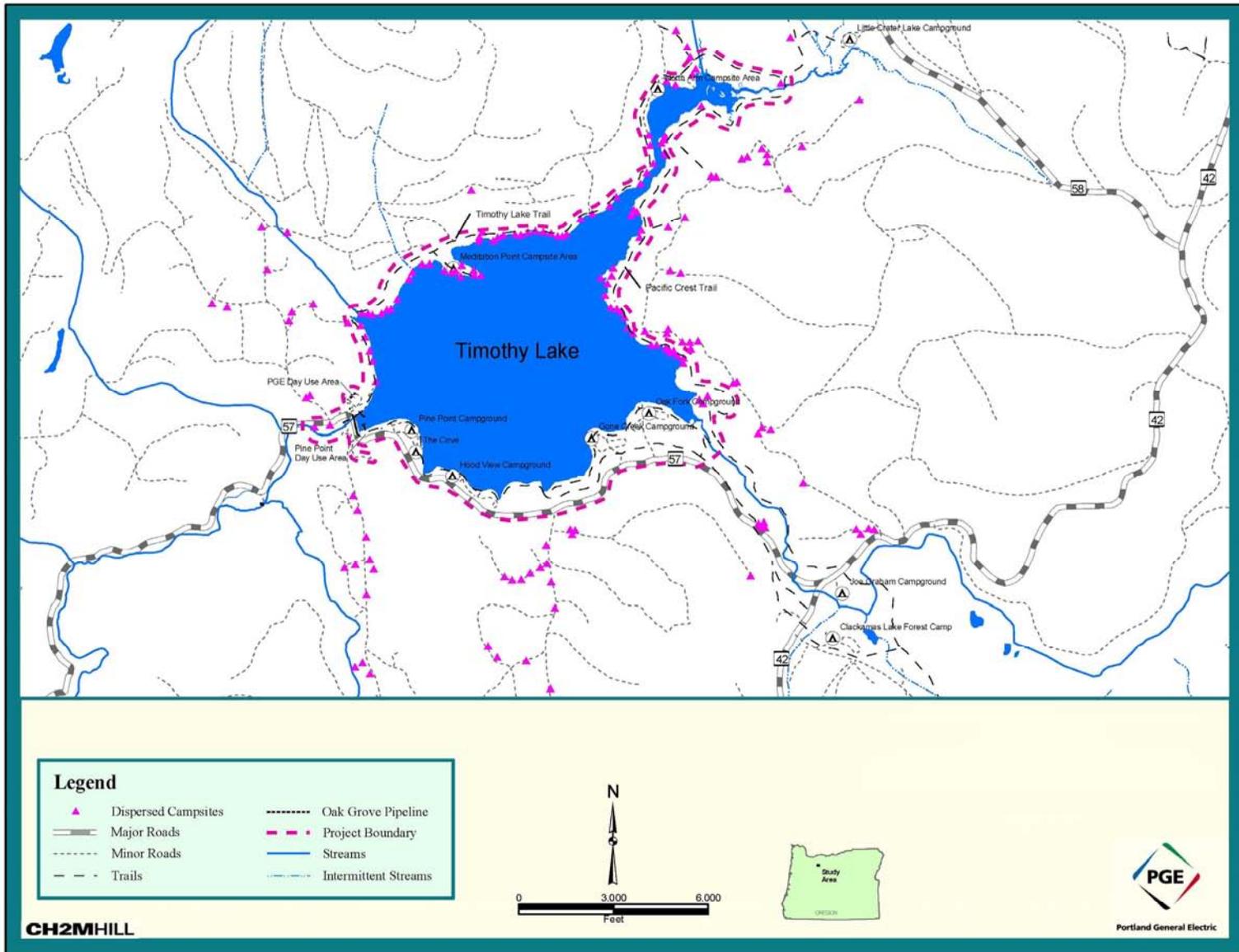


Figure 3.2.7.1-2 Location of Recreation Facilities, Timothy Lake

Dispersed camping is also popular along the shoreline of Timothy Lake and along nearby Forest Service roads and logging trails. A recent survey identified 93 dispersed shoreline sites and 88 roadside sites (Hall, 2004f). Other than a cluster of sites at Meditation Point on the northwest shore of the lake that have picnic tables and a removable vault toilet, most of the other dispersed sites have few improvements other than user-created fire rings. A recent survey found that 64 percent of the shoreline sites are never or infrequently used by campers, and only 7 percent appear to receive regular use (Hall, 2004f). However, approximately 60 percent of the shoreline sites appear to receive some level of day use and nearly 70 percent appear to be used by anglers. Only about 10 percent of the shoreline sites showed evidence of use by equestrians (Hall, 2004f).

Day Use Areas

Timothy Lake has several small, minimally developed day use areas. These include the Pine Point Day Use Area, the area around the dam, the area along the north shoreline near Timothy Lake Lodge and small day use areas in each of the four developed campgrounds (see Figure 3.2.7.1-2). Developed facilities include some picnic tables, grills, and one fishing pier, in addition to the boat ramps at the five developed campgrounds. Angling, swimming, boating, and picnicking are popular day use activities. The number of day visitors at Timothy Lake from May 1 through September 30, 2001, was estimated at nearly 5,400 (Hall, 2003a), but this estimate excludes campers at the developed campgrounds and dispersed campsites.

Recreational Opportunities

Timothy Lake is the largest lake (1,430 acres) within the MHNF and allows for both motorized and non-motorized boating. It ranks 72nd out of 234 Oregon waterbodies with 6,403 boat use days according to the Oregon State Marine Board (OSMB, 2002). The lake has a 10 mph speed limit, which limits high-speed boating-related activities, and therefore provides a unique recreation opportunity and experience. The four developed campgrounds along the south shore of Timothy Lake all have large boat ramps. The North Arm campground and the West Shore Day Use Area are also used for launching boats, although a formal boat ramp does not exist in either location.

Fishing is a popular recreational activity at Timothy Lake. Kokanee, eastern brook trout, and rainbow trout are the primary gamefish. Timothy Lake also offers some of the best crayfishing in Oregon, even supporting a small commercial fishery.

There are more than 30 miles of trails near Timothy Lake, including the 7.3-mile-long Timothy Lake Trail that extends along the south and west sides of Timothy Lake and connects with the Pacific Crest Trail, which extends 3.7 miles along the east side of Timothy Lake, to complete an 13-mile-long loop trail around Timothy Lake (see Figure 3.2.7.1-2). These trails are used for hiking, mountain biking, and equestrian use, although biking is prohibited on the Pacific Crest Trail. A recent survey of Timothy Lake visitors at developed campgrounds found the following participation rates in various recreational activities (Hall, 2001):

- | | | | |
|----------------|------------|--------------------|------------|
| • Relaxing | 87 percent | • Wildlife viewing | 47 percent |
| • Tent camping | 74 percent | • Picnicking | 46 percent |
| • Fishing | 72 percent | • Swimming | 46 percent |
| • Hiking | 65 percent | • Sunbathing | 44 percent |

The developed campgrounds all close by late October, but limited recreational use continues into the fall and winter. During the fall, hunting and sightseeing are popular. The hunters tend to use the dispersed campsites, especially the roadside sites. The roads to Timothy Lake are not plowed in the winter and once the snow begins to accumulate, vehicular access is impossible. However, snowmobiling is popular, and USFS (1996a) estimates winter use at about 1,000 people and 200 snowmobiles per weekend.

Upper Oak Grove Fork

The Upper Oak Grove Fork extends for 9.9 miles from Timothy Lake to Lake Harriet. It receives substantially less use than Timothy Lake (PGE, 1999), as it is mostly inaccessible to either foot or vehicular traffic. Due to its difficult terrain and the high volume of large woody debris in the river, fishing and limited dispersed camping are the only common recreational activities. The Forest Service classifies this reach as a semi-primitive non-motorized area on the ROS, which is characterized by a natural setting with little or no evidence of primitive roads or structures.

Lake Harriet and Frog Lake

Lake Harriet is a popular fishing destination, despite its relatively small surface area (approximately 20 acres). It is stocked several times a year by ODFW. A boat ramp allows motorized boating, although the lake is most commonly used for car top boating (e.g., canoes, kayaks, tubes, and inflatable boats). “Car fishing” (fishing from, or immediately adjacent to, the anglers vehicle) is popular along Forest Road 4630, which is attributable to the steep

topography, limited shoreline access, and user preference to be near their vehicle for security and convenience.

Although there is very little useable upland area (about 3 acres) adjacent to the lake because of its location in a narrow canyon, there is a small campground located at the head of the lake (Figure 3.2.7.1-3). The campground includes 10 campsites, drinking water, and a toilet. There is also a day-use area adjacent to the campground that includes a barrier free fishing pier, parking area, and another toilet. These improvements were implemented as a cooperative effort of PGE, EWEB, and the USFS in conjunction with the licensing of the Stone Creek Hydroelectric Project (No. 5264) by the Commission. The USFS contracts with a concessionaire to operate the campground and the day use area. The concessionaire charges a fee for the use of these areas.

The Forest Service manages Lake Harriet as a roaded natural area on the ROS.

There are three dispersed campsites upstream of Lake Harriet and a dispersed campsite along Forest Road 4630 downstream of the lake. In general, all of these dispersed sites are relatively large and appear to receive substantial use during the summer (Hall, 2004f). Other than the approximately eight parking spaces in the day use area, the only other day use parking available is along Forest Road 4630, which is a single lane gravel road.

Recreational use at Lake Harriet has increased significantly in recent years, which is most likely attributable to ODFW restrictions on fishing along the Clackamas River upstream of North Fork dam. From March 15 to October 15, 2001, which encompasses most of the recreation season, recreational use at Lake Harriet was estimated between approximately 7,100 and 10,200 visitor days (Hall, 2002b). This is consistent with PGE's estimate of 6,000 day users and 2,000 overnight visitors in 2002 (PGE, 2003). The campground is usually full on weekends in the summer, although weekday occupancy is only about 50 percent, even in the summer. The few dispersed campsites are very popular. Most visitors are recreating along the shoreline adjacent to the road.

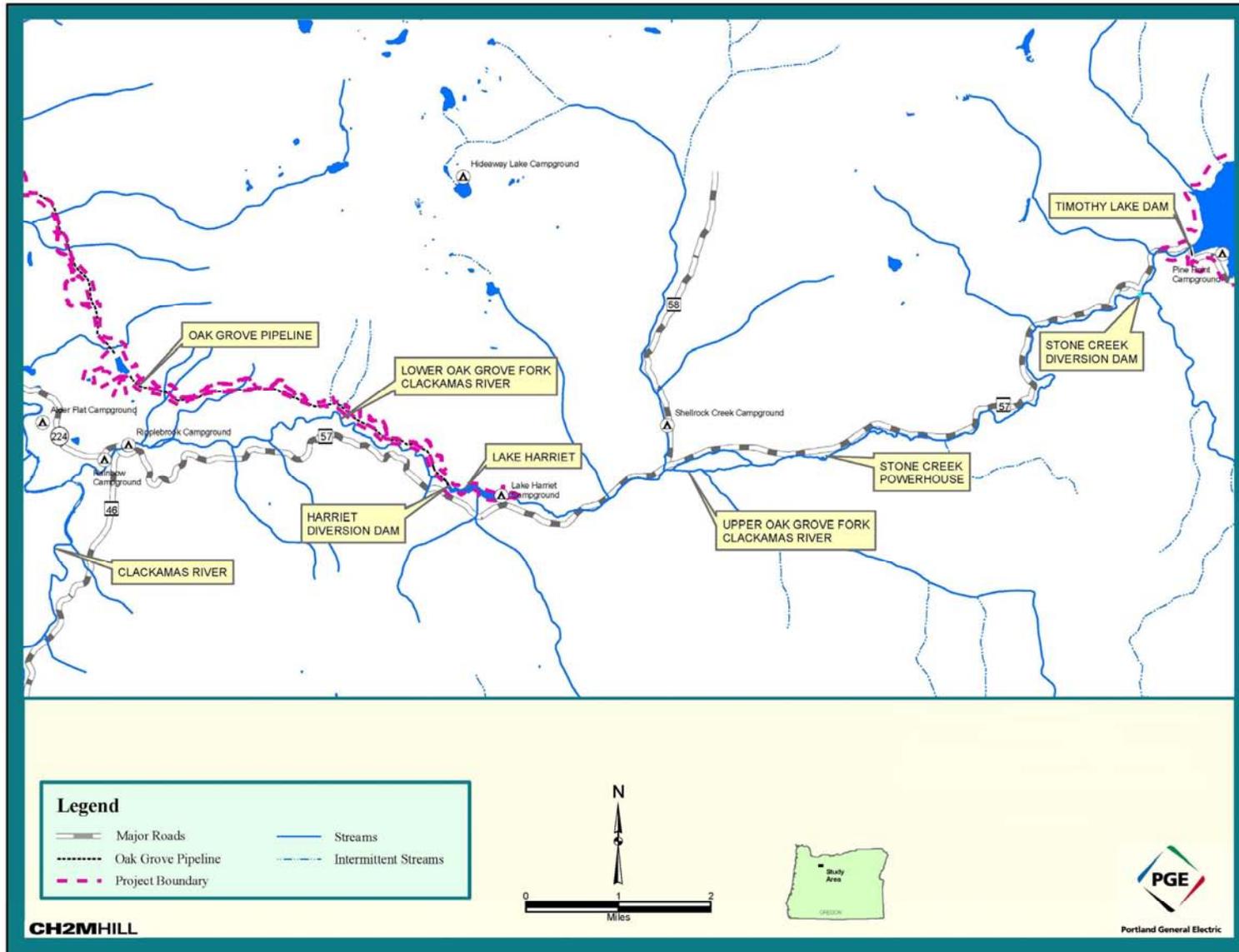


Figure 3.2.7.1-3 Location of Recreation Facilities, Oak Grove Fork

Lower Oak Grove Fork

The Lower Oak Grove Fork extends for approximately 5.4 miles from Lake Harriet to its confluence with the Clackamas River (see Figure 3.2.7.1-3). Most of the year water is diverted from the Lower Oak Grove Fork to the Oak Grove Powerhouse. PGE currently has no minimum flow requirement for the Lower Oak Grove Fork and the stream usually only receives leakage from the Harriet dam. It is only when Lake Harriet receives flows in excess of approximately 600 cfs that water is spilled into the Lower Oak Grove Fork. These flows occur approximately an average of 39 days a year (based on data from 1983 to 1992, Wamser, 2000).

Little recreational use occurs in this reach because of difficult access. There is little anecdotal information about kayakers paddling this reach, and none of the regional whitewater guidebooks review this reach. The upper portion of the Lower Oak Grove Fork is a high-gradient reach that includes at least two Class V rapids, the Crack-in-the-Ground waterfalls and the 25-foot-high Barrier Falls. The lower portion of the reach downstream of Barrier Falls has a gentler gradient and is classified as Class III.

In terms of other recreational uses, little if any angling occurs because of the water diversion. Trail development is limited in this area because of the steep terrain. Other nearby sites outside the Project area attract most of the trail use (such as along the Clackamas River). There are two small USFS campgrounds located along the Oak Grove Fork near its confluence with the Clackamas River – Rainbow and Ripplebrook campgrounds.

Clackamas River

The Clackamas River between the confluence of the Lower Oak Grove Fork and North Fork Reservoir is a popular whitewater boating, fishing, and camping area (Figure 3.2.7.1-4). Little of this segment is within the Clackamas Project boundary, but the Oak Grove Development does affect river flows in this reach to some extent. This entire segment is within the MHNH and within the federally designated Clackamas Wild and Scenic River.

The USFS classifies this reach as “roaded natural” on the ROS. In the roaded natural river zone, moderate to high contact with other users is expected.

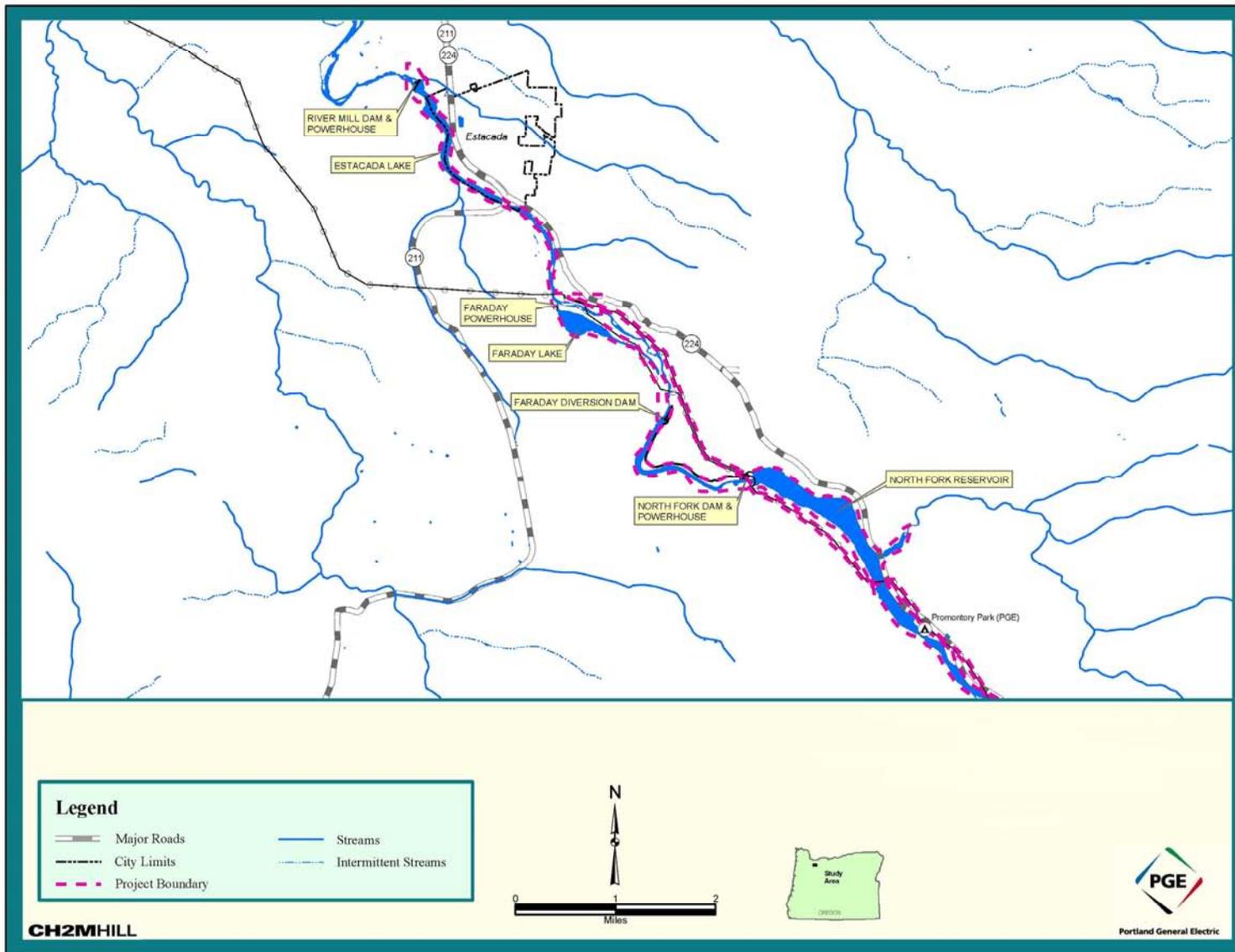


Figure 3.2.7.1-4 Location of Recreation Facilities, lower Oak Grove Fork

Whitewater Boating

The Clackamas River offers some of the best accessible whitewater boating opportunities in the Northwest. The popularity of the river for paddling, play boating, and whitewater events (e.g., the annual Bob's Hole Rodeo and the Whitewater Festival) has increased markedly over recent years. The portion of the Clackamas River in the vicinity of the Project that is used for whitewater boating is typically divided into two segments: the Killer Fang and the Three Lynx segments.

The 8.5-mile-long Killer Fang segment extends from the confluence of the Collawash River to Indian Henry and offers challenging expert-level whitewater boating. It is a Class III to V segment, typically involving a portage at the Killer Fang rapid (Class V+). The lower 5.4 miles of this segment, from the confluence of the Oak Grove Fork to the Oak Grove Powerhouse, which includes the Killer Fang rapid, are within the Oak Grove Development bypass reach. Flows less than 600 cfs in the Oak Grove Fork are diverted at Lake Harriet to the Oak Grove Powerhouse and bypass the Lower Oak Grove Fork and the lower 5.4 miles of the Killer Fang segment. Recreational use of this segment is relatively low and limited mostly to kayaks. Commercial rafting outfitters in the area have indicated an interest in running this segment, but currently do not offer any regularly scheduled trips.

The approximately 13-mile-long Three Lynx segment extends from Indian Henry to North Fork Reservoir. This is a very popular whitewater segment supporting both private and commercial boating. As a result of its popularity, it has been the subject of several recreation and visitor studies over the years including Shelby et al. (1989), Rolloff et al. (1995), and Hall (2004e), as well as unpublished recreational use surveys by the USFS. It is a Class III to IV segment with a series of challenging rapids and includes Bob's Hole, a popular playboating destination. The most popular put-in locations are at Indian Henry (also known as Three Lynx) and Fish Creek, and the most popular take-outs are Bob's Hole for kayakers and Memaloose for rafters. These locations have minimal improvements, generally only a graveled launch area, some parking, and seasonally-installed portable restrooms.

As recommended in the Clackamas Wild and Scenic River Plan (USFS, 1993a), the USFS has estimated a maximum of 140 boaters per day guideline on the river in order to maintain a desired recreational experience. Hall, using data from Rolloff et al. (1994), estimated over 2,700 private boaters during the 1994 primary use season (February 1 to May 31), with an average of 60 boats on weekends/holidays and 9 on weekdays. The maximum number of boaters

observed on any given day was 136, which approached the recommended limit of 140 boaters per day.

Commercial outfitters have been actively promoting the Clackamas River for rafting trips for the past ten years. Ten commercial outfitters have obtained special use permits to run the river. The number of commercial customers has grown from 150 in 1999, to 1,200 in 2000, to 3,092 in 2003 (Woodcock, 2001; Woodcock, 2004). Commercial use in 2003 peaked in the summer with approximately 1,028 customers in July. This increase in summer commercial use is extending the primary use season at the Clackamas River until river flows are too low for rafting (typically in August). Private boating traditionally ended by June when river flows dropped below preferred levels.

Fishing

Fishing is very popular in this reach, primarily as a catch and release trout fishery. ODFW prohibits salmon and steelhead fishing upstream of North Fork dam. Fishing primarily occurs along the shore because of the swift river current. There are no recreational facilities provided specifically for anglers.

Camping

There are eight USFS campgrounds in this reach, all of which provide access to the river for shore angling (see Figure 3.2.7.1-4). All of the campgrounds provide drinking water, several have barrier-free campsites, and several offer access to hiking trails. The Fish Creek and Indian Henry campgrounds are located at either end of the popular Clackamas River Trail. This trail closely follows the river for eight miles and is primarily used by hikers (Hall, 1999); the trail is now closed to mountain biking. The campgrounds receive most of their use between April and November, with peak use occurring in August. Although dispersed camping is a popular activity, the USFS prohibits riverside dispersed camping between Three Lynx and the forest boundary near North Fork Reservoir. The USFS also maintains two day-use areas in this reach (Big Eddy Day Use Area and Carter Bridge Picnic Area) that are used for fishing, picnicking, swimming, and sunbathing.

North Fork Reservoir

The North Fork Development offers a variety of recreational opportunities (see Figure 3.2.7.1-4). The 350-acre reservoir provides good angling and flatwater boating opportunities. There is no speed limit on the lower half of the reservoir, which allows for waterskiing. However, the area upstream of the Promontory Park marina, as well as the North Fork Arm culvert area, have speed limits of 10

miles per hour (mph) for boater safety. Use of North Fork Reservoir ranks 76th out of 234 Oregon waterbodies with 5,572 boat use days according to the OSMB (2002).

PGE owns and operates Promontory Park on the North Fork Reservoir. Promontory Park includes a 52-site campground with restrooms, showers, and a concession-run store. The park also includes a day use area with a double boat ramp, boat dock, fishing platform, and Small Fry Lake, which is a small pond open to children under age 15 for fishing. Promontory Park is well used and the campground is usually full on weekends in July and August. Weekday occupancy was approximately 26 percent during 2003 (Dentel, 2004). There is also an informal, but popular, boat launch at the PGE maintenance area on North Fork Reservoir. PGE prohibits overnight parking at Promontory Park and the maintenance area boat ramp to discourage dispersed camping along the reservoir shoreline.

There are few opportunities for dispersed camping at the North Fork Development because of topographic constraints on the south side of the reservoir and the proximity of Highway 224 to the reservoir along the north shore. A limited amount of dispersed camping occurs along the North Fork of the Clackamas River just upstream of North Fork Reservoir and at a few small sites on the south shore of the reservoir. The most popular dispersed camping area is just upstream of North Fork Reservoir at Paradise Island, within the MHNF. Several large unimproved dispersed campsites are available at Paradise Island within a short distance of the Promontory Park boat ramp.

A 2002 survey estimated total annual recreational use of the North Fork Development as between 15,000 and 34,000 recreation days (Hall, 2004b). This is considerably less than PGE's (2003) estimate of over 80,000 recreation days at the North Fork Development in 2002.

Faraday Development

The Faraday Development offers land-based day-use recreational opportunities; PGE does not allow boating or overnight use at this development (see Figure 3.2.7.1-4). The primary recreational activity is bank fishing at Faraday Lake, the 50-acre forebay for the Faraday Powerhouse, which is stocked year round by ODFW. Recent improvements include a barrier free toilet. A 2002 survey estimated total use from April 15 to October 31, 2002 as just over 8,000 visits (Hall, 2004c). This survey focused on Faraday Lake and did not include other nearby recreational use (e.g., walkers/bikers on trail along north shore). This estimate is consistent with PGE's estimate of approximately 10,000 visitors for the entire year, with about 200 users per day on peak weekends (PGE, 2003).

Faraday Diversion Reach

The Faraday Diversion Reach is the approximately 1.8-mile-long bypass reach between the Faraday Diversion dam and the Faraday Powerhouse (see Figure 3.2.7.1-4). Under current operations, most flow is diverted around this reach by the Faraday Diversion dam, except for operating and attraction flows for the Faraday-North Fork Fish Ladder that total about 100 cfs. It is only when river flows exceed approximately 5,200 cfs that water is spilled over the Faraday Diversion dam and into the Faraday Diversion reach. Based on data from 1984 to 1998, flows above 5,200 cfs occur on average approximately 34 days a year (ranges from a low of 14 days to a high of 88 days a year). Spills at the Faraday Diversion dam average about 3,000 cfs, but have reached as high as 31,000 cfs (CRC, 2003).

Although this reach is not open to vehicular access, it is currently used for walk-in fishing and viewing wildlife. There is also anecdotal information indicating that it is paddled at least sporadically during spill events. One guidebook (Keller, 1998) rates this reach as Class II-III at relatively low flows, but interviews with paddlers after a recent flow test suggest that the reach is Class III-IV at flows in the range of 600 to 1,200 cfs, and probably has Class V rapids at very high flows (CRC, 2003).

River Mill Development

The River Mill Development includes Estacada Lake, which is a relatively small (150 acres) and narrow reservoir, as well as the adjoining River Mill Park and a portion of Timber Park (see Figure 3.2.7.1-4). These areas provide day use opportunities for picnicking, fishing, and boating. Recreational facilities include a boat launch, parking, and restrooms. Timber Park is located mostly outside of the Project boundary, but is owned by PGE. Recreational facilities at Timber Park include picnic pavilions, ballfields, and a disc golf course. PGE estimated recreational use at the River Mill development to be approximately 42,000 visitors in 2002 (PGE, 2003). This estimate, however, includes attendance at various concerts and festivals at the adjoining Timber Park (RWG, January 28, 2004 Meeting Summary). A 2002 survey estimated total recreational use from April 15 to October 31 for the boat launch and parking areas at only about 1,100 visits (Hall, 2004d).

Lower Clackamas River

Below River Mill dam, the Lower Clackamas River flows for approximately 22 miles before joining the Willamette River. Only a small area

immediately below River Mill dam is within the Project boundary. The gradient of the river in this segment is gentle (Class I/II) and it is commonly used for more family-oriented float trips (e.g., canoes, rafts, tubes) and powerboat use. Other recreational activities include fishing, camping, swimming, and wildlife observation.

There are several State and Clackamas County parks downstream of River Mill dam, including Milo McIver State Park, Bonnie Lure State Park, Barton County Park, and Carver County Park.

This river segment is heavily used for recreation. According to the OSMB (2002), the Lower Clackamas River ranks 27 out of 234 Oregon waterbodies in terms of use by registered boats (10,863 boat use days).

3.2.7.1.3 *Recreational Trends*

The Clackamas Project lies within Planning Region 2 of the Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP). This region includes eight counties that comprise much of the Portland Metropolitan Area. The SCORP (2003) documents the following major changes in outdoor recreation participation from 1987 to 2002 in Regions 2 and 3 (the two regions were combined for statistical reasons):

<i>Major Increases</i>	<i>Major Decreases</i>
Nature/wildlife observation	Swimming in an outdoor pool
Sightseeing/Driving for pleasure	Swimming at a beach
Outdoor photography	Horseback riding
Fishing from a boat	Car camping with a tent
Big game hunting	
Downhill skiing	
RV/Trailer Camping	
Day Hiking	

The SCORP also identifies the following statewide outdoor recreation goals:

- Need for major rehabilitation of existing recreational facilities
- Need for recreational trails/trail connectivity
- Need for land acquisition for recreation
- Need for water-based recreational resources and facilities

3.2.7.2 *Environmental Effects*

3.2.7.2.1 *Proposed Action*

PGE developed a Recreation Resources Management Plan (RRMP), which was included as part of the Settlement Agreement (PGE, 2006). The objectives of the RRMP include:

- Defining PGE’s long-term roles and responsibilities for providing, enhancing, and managing recreation resources and opportunities on lands in the Project area by providing specific recreation measures and protocols for operations, maintenance, management, coordination, interpretation, and education over the term of a new license.
- Recognizing a shared responsibility in the management of recreation resources available to the public in the Project area.
- Noting the roles of recreation providers in the Project area and their role in the implementation of the RRMP.
- Acknowledging PGE’s responsibility to provide reasonable and safe access to, and use of, those recreation facilities.

PGE proposes to establish a Clackamas River Recreation Work Group (CRRWG) to coordinate implementation of the RRMP throughout the life of a new license and to facilitate consultation between PGE and those recreation stakeholders that are party to the Settlement Agreement. The CRRWG would meet at least once annually to coordinate implementation of the measures defined in the RRMP and to review long-term management objectives. As a subset of the CRRWG, a Boaters Logistics User Body (BLUB) would also be created to coordinate implementation of measures associated with whitewater boating.

The measures included in the Proposed Action to protect, mitigate, and/or enhance recreational opportunities at the Clackamas River Project are described below in terms of Project-wide measures and facility-specific measures.

Project-wide Measures

PGE proposes two Project-wide measures: development of an interpretation and education strategy and funding additional law enforcement officers.

Develop Interpretation and Education Strategy

PGE proposes to prepare and implement an integrated interpretation and education (I&E) strategy to address themes related to natural and cultural resources, visitor environmental practices, the value of mitigation measures, area

history pre- and post-European contact, as well as hydroelectric power and the history of PGE in the area. The strategy would include interpretive programs at Timothy Lake and Promontory Park campgrounds. The purposes of the I&E strategy would be to provide information, to use interpretation to enhance the visitor experience, to encourage participation in resource protection measures, and to promote cooperative, safe behaviors to benefit all Project area resources and visitors. PGE would develop and implement the strategy in consultation with the CRRWG.

There are a limited number of educational and interpretive displays within the Project, primarily near Timothy Lake dam and North Fork dam. A visitor survey at Timothy Lake (Hall, 2001) found that approximately 35 percent of respondents supported the development of additional interpretive and educational sites and programs, while only about 10 percent opposed it (the remaining 55 percent of respondents were neutral).

The development of the I&E program would enhance the recreational experience for both campers and day users at the Project through improved interpretive displays and education programs that promote safety, resource protection, and natural and cultural resource education.

Contribute to Law Enforcement Officers

PGE proposes to contribute \$25,000 annually toward law enforcement support for Project facilities on U.S. Forest System lands. Currently the USFS funds two law enforcement officers (LEO) for the MHNH through the Clackamas County Sheriff's Department Cooperative Deputy Program to assist with law enforcement and address civil problems that are not within the jurisdiction of the Forest Service. PGE also proposes to enter into a contract with the Oregon State Marine Board to provide \$30,000 annually to fund a Clackamas County Marine Deputy Sheriff position to patrol Timothy Lake, Lake Harriet, North Fork Reservoir, and Estacada Lake. PGE would also provide a boat slip at North Fork Reservoir for a County marine patrol boat.

Visitors at Timothy Lake have raised concerns about several law enforcement-related issues. About 10 percent of visitors state that people shooting guns and using alcohol are big or moderate problems, and about 3 percent said that they have big or moderate concerns about their personal safety and security while at Timothy Lake (Hall, 2001). The Forest Service indicates that the two contracted deputies cover all of MHNH within Clackamas County and do not have sufficient time to deal effectively with all of the law enforcement problems. Approximately 45 percent of visitors indicated that they perceived the law enforcement presence at Timothy Lake was too low (after removal of "don't

know” responses) (Hall, 2001). It should be noted that this response measures the visitor’s perception of coverage, not the actual response rate of law enforcement personnel. Although visitors at Lake Harriet were not specifically asked about law enforcement-related issues, safety and security reasons were cited as the primary reasons that being near their vehicles was important, especially among campers (Hall, 2002a).

During the NEPA Scoping process and for several years before that, several local residents raised concerns about excessive boat speeds on Estacada Lake and have proposed establishing a speed limit for the lake. However, during the survey of recreational users at Estacada lake (Hall, 2003c), boat speeds were not considered a problem (less than five percent of respondents indicated that this was a major problem). Boat speed limits can only be established and regulated by the Oregon State Marine Board (OSMB). PGE proposes to provide \$30,000 annually funding to the OSMB for a Clackamas County Marine Deputy Sheriff to patrol the Project reservoirs, including Estacada Lake. This law enforcement presence would help address excessive boat speed issues.

The increased law enforcement presence could provide better coverage and response to safety and security issues throughout the Project area.

Timothy Lake

Summer Water Levels

PGE proposes to maintain water elevations in Timothy Lake between 3,189.0 and 3,191.5 ft from Memorial Day through Labor Day (herein referred to as the summer season), with the goal of achieving elevation 3,190.0 by July 1 and maintaining at least elevation 3,190.0 until August 1.

Until the mid-1990s, PGE normally maintained Timothy Lake at the “full pond” elevation of 3,190.0 ft. Many of the recreational facilities (e.g., boat ramps, piers, campsite locations) at Timothy Lake were designed based on this elevation. Since the mid-1990s, PGE has typically maintained Timothy Lake at the “surcharge” elevation of 3,191.9 ft, which allowed for additional water storage. Raising the lake elevation to the surcharge level inundated many of the sand and gravel beaches along the shoreline that were popular day use areas. The loss of these day use areas forces visitors further inland, which in some cases has encroached into developed campsites.

We reviewed the width of exposed shoreline data from Table 3.2.7.2-1 and photographs of Timothy Lake at various water elevations. It appears that once water levels fall below elevation 3,190.0, the width of the exposed shoreline,

presence of mudflats, and exposed stumps adversely affect aesthetics, boating safety, and the recreational experience. From a recreational perspective, water levels above elevation 3,190.0 are desired during the summer recreation season.

Table 3.2.7.2-1. Amount of exposed shoreline at key recreation areas as measured from the surcharge water level (el. 3191.9 ft).

Location	Width of Exposed Shoreline at Various Lake Elevations			
	El. 3191.9	El. 3190.0	El. 3189.4	El. 3188.0
West Shore Day Use Area	0 feet	27 feet	33 feet	47 feet
Pine Point Boat Ramp	0 feet	22 feet	39 feet	51 feet
Hood View Boat Ramp	0 feet	21 feet	27 feet	43 feet
Gone Creek Boat Ramp	0 feet	33 feet	39 feet	52 feet
Oak Fork Boat Ramp	0 feet	30 feet	44 feet	93 feet
North Arm Campground	0 feet	68 feet	99 feet	170 feet

The major recreation concern with the Proposed Action is providing and managing recreational facilities and opportunities for a water level that could fluctuate as much as 2.5 ft during the summer season. In order to address this issue, PGE proposes to design and implement a plan for shoreline enhancements at or adjacent to the campgrounds and day use areas abutting Timothy Lake. These enhancements are intended to improve lake access for fishing, swimming, picnicking, sunbathing, and relaxing. These enhancements would be designed to accommodate high season use and assure functionality and safety under the proposed Project operating regime. These improvements specifically include:

- Repair and upgrade the six existing boat launches at Timothy Lake;
- Provide vegetated areas with picnic tables and/or benches to accommodate use by other campground visitors;
- Repair or upgrade the two docks at Hoodview and Oak Fork campgrounds and to insure at least one barrier free dock is provided at either of these two locations or at another Timothy Lake campground;
- Improve or replace the fishing pier near Pine Point and modify its access route to meet barrier free standards;
- Provide finger piers, floating platforms, and furniture in accordance with the shoreline plan; and
- Stabilize shoreline erosion at Meditation Point in consultation with the USFS.

These measures would address documented facility maintenance and repair requirements (EDAW and Frayer, 2003) and ensure recreational facilities are useable and operational over the range of water elevations proposed.

Existing Developed Campgrounds Improvements

As part of the Settlement Agreement, PGE proposes to develop a site plan for each of the four south shore campgrounds, in consultation with the USFS, to guide their reconfiguration and improvements. These site plans would strive to increase the number of double sites and pull-through sites for RVs. PGE proposes to make the following specific improvements to the developed campgrounds at Timothy Lake:

- Upgrade the existing water supply infrastructure at the Pine Point, Hoodview, Gone Creek, and Oak Fork campgrounds to assure functionality and compliance with applicable health and safety standards. At least one water supply source in each campground would meet barrier free design and accessibility criteria.
- Upgrade or replace facilities such as toilets/restrooms, picnic tables, fire rings, cooking grills, gray water sumps, campsites, interior campground roads, and parking spurs (including lengthening some to accommodate RVs) at the developed campgrounds. A minimum of three campsites at Pine Point, Hoodview, Gone Creek, and Oak Fork campgrounds would be made barrier free, including access routes to the campsites.
- Enhance screening between campsites by planting vegetation consistent with the Vegetation Management Plan.
- Upgrade the benches and fire ring at the Gone Creek amphitheater.
- Develop a new amphitheater (similar to the Gone Creek amphitheater) to serve Hoodview and Pine Point campgrounds.

PGE also proposes to develop a site plan for the North Arm campground and make the following improvements:

- Maintain the existing number of campsites (8), but establish a new host site;
- Add gravel to the parking spurs and to the road leading and adjacent to the campground;
- Repair or provide natural markers or barriers for site delineation;
- Repair or replace signage, fire rings, and picnic tables as needed;
- Make one campsite and its elements and access routes of barrier free design;
- Install a water pump of barrier free design; and
- Provide vegetative screening in key locations in accordance with the Vegetation Management Plan to enhance separation of campsites.

PGE also proposes to develop a site plan for the Cove walk-in campground. This site plan would maintain the existing number of campsites (assuming adequate and safe parking can be provided), but would incorporate the following improvements:

- Better delineate sites and trails and replace worn elements; and
- Grade, level, and gravel the roadside parking areas to optimize the available parking.

In consultation with the USFS, PGE proposes to assume operations and maintenance responsibilities for the seven developed campgrounds abutting Timothy Lake (i.e., Pine Point, Hoodview, Gone Creek, Oak Fork, Cove, North Arm, and Meditation Point); the Pine Point and West Shore day use areas; and the Lake Harriet Campground and day use area; and any new campgrounds or group sites constructed during the term of any license issued. PGE proposes to include all of these sites within the Project boundary. PGE would retain the user fee revenues from these facilities, but would pay a \$7,000 annual administrative fee to the USFS for its participation in the review of the annual operating plan and any site and construction plans. PGE and the USFS would coordinate closely regarding the operations and maintenance of these facilities. PGE would use the existing Timothy Lake Lodge as a base for its management of the Timothy Lake campgrounds.

The recreation facilities inventory (EDAW and Frayer, 2003) determined that several facilities at these campgrounds were in need of maintenance and repair. The Gone Creek, Hoodview, and Pine Point campgrounds are served by a common well and storage tank. The existing water lines are in poor condition and are not laid deep enough to withstand even light freezing temperatures of short duration, resulting in frequent leaks and repairs. The Oak Fork Campground has its own wells with three hand pumps, but some of the pumps are not operational or have very high iron concentrations. PGE will upgrade the water system to meet State standards in addition to adding valves so that parts of the system can be turned off when there are leaks. These proposed improvements would ensure the availability of potable water for recreational users.

The Forest Service states that the existing campgrounds need to be redesigned to address inadequate screening between campsites, trails through campsites, and inadequate separation of special users (e.g., RVs, groups). The recreation facility inventory (EDAW and Frayer, 2003) found sparse vegetation and inadequate screening between many campsites (especially at Pine Point Campground) and no internal trail system, which was contributing to vegetation damage. Over 20 percent of the visitors to Timothy Lake identified noise from

RV generators as a big or moderate problem and many cited problems with large groups (Hall, 2001). The redesign of the developed campgrounds to provide more screening between campsites and improved separation of users would improve the recreational experience at Timothy Lake.

There is only one amphitheater at Timothy Lake, which is located within the Gone Creek Campground. It is linked by a trail to the Oak Fork Campground. It is relatively small containing a fire ring and twelve log benches. The amphitheater is used for interpretive programs on Saturday nights. The USFS considers the amphitheater to be in disrepair (USFS, 2003). The Gone Creek and Oak Fork campgrounds are the two largest developed campgrounds at Timothy Lake and the proposed improvements to the fire ring and log benches would support the proposed improvements to the I&E programs at the Project.

The Hood View and Pine Point campgrounds, which are two of the primary developed campgrounds at Timothy Lake, currently lack any facilities to support I&E programs. Provision of the proposed amphitheater would support the proposed improvements to the I&E programs at the Project.

Although a fee campground, the North Arm Campground does not have a resident campground host because it does not have water, is remote, and is a small campground. A host from another campground visits the site to collect the camping fee. Perhaps because it does not have a resident host, the North Arm Campground attracts a distinct group of campers who prefer a more isolated, undeveloped, and less regulated campground setting (Hall, 2001). The North Arm campground tends to have a disproportionately large percentage of complaints or incidents involving inconsiderate behavior, loud noises, and people shooting guns. The Proposed Action includes a measure to establish a resident campground host at North Arm campground. This would likely reduce the amount of inconsiderate behavior, help control group size (enforce site capacity), and help protect sensitive environmental resources in the area.

New Proposed Developed Campgrounds

PGE proposes to construct:

- A new 50 site campground between the existing Hoodview and Gone Creek campgrounds between 10 and 15 years after issuance of a license. The campground would accommodate both tents and RVs and would include a shower facility.
- Two new small (accommodate 12 to 25 people each) group sites in a location to be determined in consultation with the USFS between 5 and 10 years after issuance of a license. The sites would be able to accommodate both tents and

RVs and would include parking, picnic tables, a common fire ring, grills, toilet facilities, and a water spigot.

PGE also proposes to consult with the USFS in year 30 following license issuance (if the term of the new license is more than 35 years) regarding the need for two additional similarly-sized group sites. If it is decided to proceed, PGE would build the new group site in accordance with the timing and location agreed to with the USFS.

The four primary developed campgrounds are close to or at capacity on weekends from July through Labor Day, but there is considerable variability on weekdays with average capacity ranging from 40 percent (Oak Fork Campground) to 64 percent (Hoodview Campground). Existing vacancies at all of the Timothy Lake campgrounds during the shoulder seasons (May, June, September, and October) and even on weeknights (Sunday through Thursday) during the high use season could suggest that demand is not yet strong enough to immediately justify an additional campground.

It is expected that over the next 10 to 15 years there will be the need for an additional campground given demographic and recreational trends in Oregon. There appears to be ample lake surface capacity on Timothy Lake to accommodate additional boaters without causing crowding problems. The proposed location of the campground between the existing Hoodview and Gone Creek campgrounds poses few environmental concerns (see section 3.2.4). Therefore, the proposed campground would help meet the growing demand for campsites along Timothy Lake with no significant environmental issues.

There currently is not a shower facility at Timothy Lake. The Timothy Lake Visitors Survey (Hall, 2001) found that about 55 percent of visitors supported the provision of showers at Timothy Lake. The support for showers increased to about 65 percent for campers staying at least 3 nights, which represents over 50 percent of the campers at Timothy Lake. The provision of shower facilities at the proposed campground would help satisfy visitor expectations.

The average group size at Timothy Lake is quite large, ranging from 5.1 at North Arm to 8.4 at Pine Point campgrounds. Nearly 25 percent of the groups camping at Timothy Lake were in groups of 10 or larger and over 30 percent were in groups that were occupying more than one campsite. This indicates a large amount of organized group and extended family use (Hall, 2001) and suggests a demand for multiple or group campsites. There are currently only 15 multiple campsites at Timothy Lake (all at Pine Point Campground) and no group sites. Under the current campground reservation system it is possible, but difficult, to

reserve multiple adjoining sites. Nearly 45 percent of visitors support the creation of more group campsites, but 25 percent of visitors oppose more sites. This is attributable to the fact that many respondents to the Timothy Lake Visitor Use Survey complained about large groups in adjacent campsites (Hall, 2001). It is probable that small family groups looking for a quiet camping experience will find large boisterous groups incompatible. While there is a need for additional multiple and group campsites, they should be separated from other campsites to minimize conflicts. The proposed group sites would help meet this recreational need.

As these recreation sites would be Project facilities, PGE would be solely responsible for their operation and maintenance.

Timothy Lake Trail Improvements

PGE proposes to modify the Timothy Lake Trail, including reconstruction and/or relocation of some segments, redefining segments within the developed campgrounds and day use areas, stabilizing areas that are currently eroding, prioritizing targeted sections for improved accessibility, and improving trail signage. PGE also proposes to construct four smaller loop trails (either off the main Timothy Lake Trail or off developed campground loops) and to convert the old road from the Timothy Lake campgrounds to the Clackamas Guard Station for hiking and mountain biking.

The approximately 11-mile-long Timothy Lake Trail that encircles Timothy Lake and is within the existing Project boundary actually consists of the Timothy Lake Trail and a segment of the Pacific Crest Trail. The trail is heavily used for hiking, horseback riding, and mountain biking (although bikes are not allowed on the Pacific Crest Trail segment). Use of these trails, especially by mountain bikers, is increasing at Timothy Lake.

A recreational facilities inventory (EDAW and Frayer, 2003) concluded that the Timothy Lake Trail is in relatively good condition, but noted erosion in some areas and heavy use along the south shore of the reservoir near the developed campgrounds. Further, the Timothy Lake Trail extends through several of the developed campgrounds on the south shore of the lake creating potential conflicts between trail users and campers.

The Proposed Action would enhance recreational use by hikers and mountain bikers. The construction of the shorter loop trails and the creation of the hiker/biker trail to the Clackamas Guard Station would provide alternative biking and hiking opportunities, especially for smaller children who are unable to negotiate the approximately 11 miles around the lake.

Dispersed Campsites

PGE proposes to develop, in consultation with the USFS, a detailed Dispersed Sites Management Plan (DSMP) as an addendum to the RRMP. The DSMP would define management actions (e.g., close dispersed campsite and discourage use, leave open and encourage use, or do nothing). Dispersed campsites that would be candidates for closure and restoration include sites near sensitive habitats (e.g., some sites near North Arm) and large sites that receive little or no use. Recreational use of some popular dispersed campsites can be encouraged through management actions and site improvements. Most dispersed campsites would likely fall into the category of “do nothing,” which would allow current use to continue. PGE would include the dispersed sites within the Project boundary.

Approximately 181 dispersed campsites have been identified at Timothy Lake (Hall, 2004f). Many of these sites were rarely or never observed used. The most sites occupied on any single day during a 5-month-long survey (Hall, 2003a) were 11 roadside and 15 shoreline campsites – about 15 percent of the available sites. Many of these dispersed campsites may have been created because of the lack of a campground reservation system until mid-1990s (e.g., visitors came to Timothy Lake only to find that the developed campgrounds were full and therefore used, or created, a dispersed campsite). The reservation system now in place helps avoid this situation.

A few of the dispersed sites in the North Arm are near sensitive habitats that support sensitive plant species. With the increased popularity of more four-wheel drive vehicles, vehicular access to shoreline sites that heretofore were only accessible by foot is becoming more common. This vehicular access is destroying vegetative cover and resulting in erosion in some sensitive areas such as the campsite near Dinger Creek.

The proposed DSMP would help encourage and direct dispersed campers to designated sites that are popular, have low environmental effects, and can be easily managed through the use of signage and educational materials at trailheads and other locations, while also closing other dispersed sites that are seldom used or are near sensitive habitats.

Timothy Lake Lodge

PGE has a structure (referred to as the Timothy Lake Lodge) that is located on the west side of Timothy Lake and is used for some Project operations purposes as well as for other corporate and public interest activities. PGE proposes to use

the Lodge as a base for managing the Timothy Lake campgrounds and day use areas and as a communications center for law enforcement activities.

Now that PGE proposes to assume responsibility for managing the Timothy Lake campgrounds and day use areas, the provision of an administrative and communication center near Timothy Lake would be beneficial. Since the structure already exists, it would not result in any adverse environmental effects.

Upper Oak Grove Fork

PGE does not propose any recreation-related PM&E measures for the Upper Oak Grove Fork. The proposed increase in the minimum flow from Timothy Lake (from 10 cfs to 30 - 60 cfs) and development of a more natural year-round hydrograph would enhance fisheries in this reach, especially the trout fishery (see section 3.3.3.2), and could indirectly benefit anglers.

Lake Harriet

PGE proposes to develop a detailed site plan including all of the PM&E measures described below in consultation with the USFS.

Raise Elevation of Lake Harriet and Modify Fishing Dock

PGE proposes to raise the elevation of Lake Harriet by one foot. This increase in the pool elevation would not affect any existing recreational facilities, which are all above this elevation, except for the accessible fishing dock. The increase in the pool elevation would benefit angling by increasing the depth of water in the relatively shallow upper end of the reservoir adjacent to the day use area. PGE proposes to modify the fishing dock at Lake Harriet to accommodate the one-foot pool rise and better address barrier free design standards.

Relocate Boat Launch and Reconfigure Day Use Area

PGE proposes to relocate the Lake Harriet boat launch to an improved location. Lake Harriet is a popular fishing destination where over 90 percent of visitors fish during their stay. Most of these anglers fish from the shoreline, but approximately 5 percent use motorboats and about 8 percent of day users and 21 percent of campers use other non-motorized watercraft (Hall, 2002b). Therefore, despite its relatively small size (approximately 22 acres), there is a demand for boating at Lake Harriet. The existing boat launch is located along the steep bank of the north shore of Lake Harriet and is only accessible from Forest Road 4630, which is a single lane gravel road. The launch is oriented such that any boaters that come from Forest Road 57 (approximately 75 percent of all visitors access

Lake Harriet from Forest Road 57 according to Hall, 2002) must drive past the launch to the end of the lake on Forest Road 4630, turn around, return along Forest Road 4630, and then back down the steep ramp, all with a trailer on a narrow single lane road. Relocation of the boat launch to the day use area near the upper end of the lake would alleviate the difficulty. This location would provide a gentler grade for the boat ramp, a much improved turn-around area, the potential for a convenient trailer parking area, and would reduce congestion on Forest Road 4630.

PGE would reconfigure the day use area to accommodate the boat ramp as well as both vehicular and boat trailer parking. Up to two campsites within the Lake Harriet campground would be eliminated if necessary to satisfy parking requirements.

Lake Harriet Campground Improvements

PGE proposes to replace the outdated restroom at the Lake Harriet Campground with a barrier free restroom. The recreational facilities inventory (EDAW and Frayer, 2003) concluded that most of the facilities at the Lake Harriet campground and day use area are in good condition; however, the restroom in the campground has two vault toilets that are functionally obsolete. Replacing the restroom would improve conditions at the campground.

Improve Shoreline Access

PGE proposes to construct an approximately 400-linear foot-long and 4-foot-wide walkway, with three expanded sections for better angling access, along the shoreline of Lake Harriet. PGE also proposes to place large rocks at appropriate sites around the lake to provide areas for sitting and angling. The design of the walkway and placement of large rocks at appropriate areas would minimize disturbance of existing trees and other vegetation along the shoreline of Lake Harriet. PGE would also provide two accessible parking spaces (one in the day use area and the other may be converted from the existing roadside boat ramp) and access routes to the shoreline walkway.

Approximately 20 percent of responders indicated that crowding along the shoreline was a big or moderate problem; this increased to about 25 to 30 percent during peak use periods (weekends and holidays). Despite the crowding shoreline access was not considered a major problem by most visitors, nearly 45 percent support improving shoreline access and almost 40 percent support the installation of fishing platforms (Hall, 2002a). The proposed shoreline walkway would provide improved, barrier free, and safe access to Lake Harriet.

According to the Recreation Resources Management Plan, the USFS would make a suitable rock source (quarry) available within approximately a one-way haul distance of five miles to meet the rock requirements for PGE proposed enhancements at Lake Harriet.

FS Road 4630 Improvements and Dust Abatement

PGE proposes to improve Forest Road 4630 adjacent to Lake Harriet to more efficiently and safely accommodate parking while allowing emergency vehicle clearance. The proposed improvements would extend for approximately 400 linear feet, may or may not be continuous, and would include structural improvements and road widening. PGE would provide two access points from the roadway to the shoreline walkway, and would include the road in the Project boundary.

Currently, most visitors to Lake Harriet park along Forest Road 4630 both for closer access to fishing areas and, at times, to avoid the parking fee imposed in the small day use area. During the Lake Harriet use survey (Hall, 2002b), as many as 40 vehicles were observed parked along an approximately 2,000-ft-long segment of Forest Road 4630. This road is very narrow and unless vehicles are carefully parked they can often encroach into the roadway. The Forest Service has raised concerns that these vehicles could potentially obstruct emergency access to Lake Harriet. Hall (2002b) found that on 87 percent of the days surveyed, there was at least one vehicle encroaching into the 12-ft-wide travelway at some time during the day, while on 46 percent of the days surveyed, at least one vehicle was obstructing the 8-ft-wide required clearance for emergency vehicles. The occurrence of vehicles obstructing the required clearance increases with the number of cars and the problem occurs along most of the length of Forest Road 4630 adjacent to Lake Harriet (Hall, 2002b). The improvements to Forest Road 4630 would provide better access for emergency vehicles to the area, and improve parking conditions for those accessing Lake Harriet..

PGE also proposes to perform annual dust abatement treatments approved by the USFS along a 1,500-linear-foot section of Forest Road 4630 adjacent to the Lake Harriet campground. Currently, campers, anglers, and other day users using the Lake Harriet campground and day use area are subjected to high levels of dust from vehicles using Forest Road 4630. Dust abatement in this area would significantly enhance recreational use that occurs near Forest Road 4630.

Lake Harriet dam Safety and Security Improvements

PGE proposes to take steps (e.g., discourage parking from Harriet dam east of point just west of proposed shoreline enhancements) to discourage pedestrian

angler access adjacent to the Lake Harriet dam. PGE has expressed safety and security concerns about recreation use (primarily anglers) near the dam, which is not visible from most of the reservoir and other designated recreational areas. Anglers have fished from the dam because shoreline access is otherwise severely limited by steep topography. With the provision of impaired shoreline access described above, the need to use the dam for angling has been greatly diminished.

Lower Oak Grove Fork

PGE does not proposed any recreation-related PM&E measures for the Lower Oak Grove Fork. This reach is very difficult to access because of topographic constraints and large amounts of woody debris in the channel. Under PGE's current license, there is no requirement for a minimum flow release into the Lower Oak Grove Fork. PGE proposes to provide a 70- to 100-cfs minimum flow. The establishment of these minimum flows from Lake Harriet would enhance fisheries in this reach (see section 3.3.3.2), especially the trout fishery, and could indirectly benefit anglers. However, because of topographic constraints, we expect most fishing would occur in the lower reaches of the Lower Oak Grove Fork near its confluence with the Clackamas River.

The Lower Oak Grove Fork flows through the USFS's Rainbow Campground. The stream currently only has a small accretion flow, except when spillage occurs at Lake Harriet, and offers limited recreational opportunities to campers. The increase in minimum flows from 0 to between 70 and 100 cfs would improve fishing and wading opportunities as well as the aesthetic and auditory values of the Lower Oak Grove Fork for campers. These flows would not be sufficient to support whitewater boating in this reach.

Some whitewater advocates suggest providing higher flows to the Lower Oak Grove Fork. Whitewater boaters who participated in a flow evaluation on the Lower Oak Grove Fork in October 2001 all agreed that flows of at least 300 cfs would be needed to safely run this reach (ERM, 2002).

The Lower Oak Grove Fork offers a challenging (Class V – VI) whitewater experience. Therefore, providing flows of at least 300 cfs would only provide paddling opportunities for a limited number of expert level kayakers (this reach is not suitable for canoes or rafts). There are several other issues associated with providing whitewater flows in this reach:

- Paddlers would need to portage around at least one and probably two rapids.
- There is a significant amount of large downed wood in this reach that creates dangerous obstructions for paddlers. This wood provides valuable fishery habitat and some of it has been placed and secured in the stream by the Forest

Service to enhance fishery habitat, so it cannot be displaced or removed. This wood would remain a boating safety hazard.

- This reach is very difficult to access, especially for emergency response personnel.
- Flows of at least 300 cfs would conflict with the optimal flows for the various life stages of several federally and state listed endangered fish species (see section 3.3.3.2).

Clackamas River

Optimize Flows for the Bob's Hole Rodeo

PGE proposes to continue to work with the organizers of the Bob's Hole Rodeo to optimize flows in the Clackamas River for this annual boating event. PGE would optimize generation timing slightly during daylight hours for up to three days when flows are available to benefit the rodeo.

Bob's Hole is the premier playboating spot for kayakers in the Portland metropolitan area and has been rated as one of the best playspots in the United States by Paddler Magazine (January 1998). The Bob's Hole Rodeo has been held since 1982, usually in May, and is a main event on the national playboating circuit. It has steadily increased in popularity and attracted as many as 100 paddlers and 300 spectators in recent years. Bob's Hole used to have a wide range of optimal flows (1,700 to 4,500 cfs), but a flood in 1996 has resulted in a much narrower range of optimal flows (1,900 to 2,300 cfs) (CRC, 2000). Flow in the Clackamas River in May for the rodeo can often be more and occasionally less than the optimum flow levels for Bob's Hole. In 2002, PGE agreed to try modifying the release from the Oak Grove Powerhouse to move flows toward the optimal range for the Bob's Hole Rodeo. This proved to be highly successful. PGE proposes to continue to modify its hydropower operations to optimize flows in the Clackamas River for the Bob's Hole Rodeo when possible.

Provide funding for Coral Whitewater Events

PGE proposes to provide \$4,000 annually to support local whitewater events on the Clackamas River in the Project area based on requests submitted by BLUB. PGE would also support local whitewater events by providing access to Promontory Park and other in-kind support.

PGE has not identified the specific measures that would be funded or provided supporting information for such funded measures; therefore, we are unable to analyze the benefits of the funding. Promontory Park would be a Project recreation facility open to the public.

Provide Flow Information for Whitewater Boaters

PGE proposes to provide current Clackamas River and Oak Grove Fork flow information for whitewater boaters on an internet site.

Currently, boaters can access current Clackamas River flow information from the Three Lynx gage station at the USGS website. The difficulty in interpreting these flow data, however, is that the gauge is just downstream of the Oak Grove Powerhouse and the peaking operation of the Oak Grove development can significantly affect flows in the river. Unless the boater knew whether the current flows on the USGS website reflect peaking operations at the Oak Grove Powerhouse and PGE's operations schedule, actual river flow could differ by as much as 700 cfs. PGE proposes to abandon the gage above Lake Harriet (Gage 14209000), fund the installation and ongoing maintenance of a USGS gage at Ripplebrook campground, and fund the conversion of the Three Lynx gage (Gage 14209500) to a satellite system.

Improve OGPB Safety Signage

PGE proposes to improve the safety signage at the Indian Henry boat launch site and at the Oak Grove Powerhouse, warning of the potential boating hazard from the emergency release valve at the powerhouse. No injuries have ever been reported. However, in the event of an accidental powerhouse trip, usually as a result of lightning strikes, water that normally flows through the turbines at the Oak Grove Powerhouse is diverted by the wicket gates and is discharged through a release valve under approximately 360 pounds per square inch (psi) of pressure across the river. This discharge occurs quickly (i.e., within about 3 seconds of the trip) and results in a water cannon-like release (Emergency Release Valve Demonstration Video, PGE, RWG meeting summary, June 18, 2003).

Indian Henry, just upstream of the Oak Grove Powerhouse, is a popular put-in location for both commercial whitewater rafting outfitters and private whitewater boaters running the 13-mile-long Indian Henry segment of the Clackamas River. Some safety signage exists at Indian Henry. Whitewater boaters are exposed to the potential threat of a sudden release, although it occurs relatively infrequently (about three times per year) and no injuries have ever been reported. Recognizing the potential danger to boaters near the release valve when a trip occurs, PGE installed anchor chains that hang vertically over the release valve and function as energy dissipaters in 1990. Although these chains are estimated to have reduced the severity of the release by about 50 percent, concern remains that a boater could be injured during a release.

PGE proposes to improve the signage at the Indian Henry put-in and at the Oak Grove Powerhouse notifying boaters of the safety hazard and warning them to stay away from the face of the powerhouse. This proposal would improve safety conditions at the Project.

Provide New and/or Improved Whitewater Boating Facilities

PGE proposes to improve shoreline access, staging, parking and toilet facilities at three river access sites and one additional seasonal toilet to benefit private as well as commercial boaters. Possible sites include Indian Henry, Whitewater Bridge, Milepost (MP) 35, MP37, MP 41, and Bob's Hole. All of these locations are located along the popular Three Lynx segment of the Clackamas River. Maintenance of these facilities would be coordinated among PGE, USFS, and BLUB.

A survey of private boaters (mostly kayakers) along the Clackamas River (Hall, 2003b) revealed that about 55 percent considered the number of sanitation facilities fair or poor and nearly 65 percent rated the condition of existing sanitation facilities as fair or poor.

During the Bob's Hole rodeo and during heavy use weekends, parking has been a problem at Bob's Hole. There is no designated parking at Bob's Hole, and most paddlers park on the wide far shoulder of Highway 224, requiring them to cross the highway carrying their kayak. Traffic volumes on Highway 224, however, are not high and event volunteers help manage and direct traffic to assure pedestrian and boater safety between the rights-of-way. Nevertheless, improved parking or at a minimum appropriate signage warning motorists of congestion or "paddler-crossings ahead" would improve safety conditions at this popular boating location.

The number of commercial boaters has increased significantly over the past few years and the outfitters have asked for improvements at the put-in at Indian Henry (nearly all of the commercial outfitters put-in at Indian Henry unless water levels are low) and improved restrooms for their customers. The outfitters indicated a need for more maneuvering room rather than additional parking.

Whitewater boating use along the Clackamas River is increasing and is projected to continue to grow in popularity. Improved sanitation facilities and parking/circulation at the primary put-in and take-out locations would be beneficial and would be consistent with the USFS *Clackamas National Wild and Scenic River and State Scenic Waterway – Environmental Assessment and Management Plan* (1993).

Clackamas Wild and Scenic River Act Consistency

In a letter dated August 17, 2006, the USFS provided a Preliminary Section 7(a) determination under the Wild and Scenic Rivers Act for the Project. The USFS determined that the “effects from the Proposed Action do not invade the river, do not have direct and adverse effects to the river, and do not rise to the level of unreasonable diminishment of river values.” Overall, the USFS concluded that the Proposed Action will protect and enhance the recognized values of the Clackamas Wild and Scenic River (USFS, 2006a).

North Fork Development

Promontory Park Improvements

PGE proposes to continue to operate and maintain the Promontory Park recreation area. In addition, PGE proposes to provide electrical hookups to six campsites, convert two campsites to meet barrier free design standards, add a restroom, lower the launch vault toilet, and create a common area for interpretive programs at Promontory Park Campground. PGE would also add a restroom at the day use area and remodel the day use area shelter. PGE also proposes to pave the parking lot, provide a fish-cleaning station, and improve the trail at Small Fry Lake.

The recreational facility inventory (EDAW and Frayer, 2003) concluded that most of the facilities at the Promontory Park Campground and Day Use Area are in good condition. Some electrical hookups, provision of additional accessible campsites, and the creation of an area for interpretive programs would enhance the recreational experience at the campground. Paving the gravel parking lot would improve one of the few facilities at the Day Use Area identified in the facilities inventory as only being in satisfactory condition. A fish cleaning station would be a useful amenity at the popular Small Fry Lake.

Day Use Along North Fork Reservoir

PGE proposes to enter into a coordinated management agreement with BLM to manage boat-in day use on the south side of North Fork Reservoir. This agreement would address safety, security, and potential resource damage.

Currently, limited day use, and occasional dispersed camping, occurs at a few locations on the south side of North Fork Reservoir. This use results in litter and sanitation problems. Coordination with BLM would help address these

concerns; however, as a Project facility, PGE would ultimately be responsible for managing the area.

Paradise Island Dispersed Camping

PGE proposes to install fire rings, picnic tables, and a sanitation system; and provide trash removal and disposal, servicing of the sanitation station, and minor maintenance of the dispersed campsites at Paradise Island. PGE would include the dispersed sites within the Project boundary.

Dispersed camping commonly occurs at Paradise Island within the MHNF, just upstream from North Fork Reservoir. Paradise Island provides the closest and most convenient location for boat-in camping for visitors coming to the MHNF from the Portland metropolitan area. A recreation survey found that over 35 percent of the visitors expressed an interest in boat-in dispersed camping at North Fork Reservoir (Hall, 2003a). There are very few such opportunities, however, because of limited Project area and severe topographic constraints. Therefore, Paradise Island provides an attractive, accessible, riverfront dispersed camping location in close proximity to North Fork Reservoir.

The Forest Service has indicated that it recognizes the desire for accommodating dispersed camping at Paradise Island, but that it needs to be better managed. The Proposed Action would address both the recreational and management needs at Paradise Island.

Springwater Corridor Trail Extension

After the OPRD provides information on where their proposed Springwater Corridor Trail Extension would intersect PGE Project land, PGE would conduct a feasibility/viability assessment of siting the trail across Project lands. PGE would initiate this assessment within one year of license issuance, provided that OPRD has proposed a trail alignment.

PGE's proposed feasibility studies would presumably be used to decide whether to grant use of Project lands for non-Project purposes per a standard land use article which is included in all licenses. Such an assessment is administrative in nature and not related to actual Project recreation enhancements; therefore, there is no direct, Project-related recreation benefit associated with the proposal.

Faraday Development

Faraday Lake Day Use Area Improvements

PGE proposes to continue to operate and maintain the Faraday Day Use Area. PGE also proposes to provide/improve accessible tables, parking, and fishing facilities at the Faraday Lake Day Use Area. These accessibility improvements would compliment other recently provided accessible facilities (e.g., bathrooms). PGE would monitor any proposed structural changes for conflicts with angling. The recreational facility inventory (EDAW and Frayer, 2003) concluded that the facilities at the Faraday Lake Day Use Area were in good condition. Improving the accessibility of Faraday Lake to anglers by altering the railing on the dam would enable the disabled to participate in the primary recreational activity at Faraday Lake – fishing.

Playboating Feature

PGE proposes to determine the feasibility of creating a whitewater playboating feature at either the Faraday Diversion reach or near McIver State Park, downstream of River Mill dam. If both sites are determined to be infeasible, other sites would be evaluated. If such a feature is determined to be feasible, taking into consideration access, security, and resource effects), PGE would provide up to \$50,000 to create the feature and provide \$5,000 annually to maintain the feature.

PGE conducted a controlled flow study in June 2002 in conjunction with American Whitewater. Ten experienced and relatively expert boaters participated in the study using hard shell kayaks and an inflatable kayak. They paddled the reaches under four different flows ranging from 665 to 1,220 cfs. The flow test (CRC, 2003) identified the optimal range for technical/playboating trips as 800 to 1,100 cfs, the optimal range for standard whitewater trips as 1,200 to 2,500 cfs, and estimated the optimal range for “big water” trips as 3,250 to 10,000 cfs. Although no rafters participated in the study, the boaters estimated that the optimal range for rafting trips as 2,000 to 4,000 cfs. Therefore, significant releases would be needed to create optimal conditions for all four types of trips.

Two of the original reasons for suggesting whitewater releases into the Faraday diversion reach were to provide an alternative to the Three Lynx segment when flows were too low (i.e., late summer and early fall) and to provide another rafting option for the commercial outfitters. Based on the results of the flow test, releasing the optimum flows for kayakers (at least 800 cfs) during the late summer or early fall would divert nearly all of the river flow from the Faraday Powerhouse. Releasing the optimum flows for rafts (at least 2,000 cfs) would also

represent a large percentage of total river flow during the primary commercial boating season (May to August). The reach would not be appropriate for novice boaters at these flow levels, so these releases would be targeted towards experienced and capable kayakers.

When asked to compare the whitewater boating opportunity in the Faraday diversion reach to other reaches in the region, seven out of ten participants indicated the reach was worse than average compared to other reaches along the Clackamas River or other Portland-area rivers. The participants suggested that channel modifications might create some higher quality playboating rapids. Without such modifications, however, most boaters did not think the Faraday diversion reach would attract much use if whitewater releases were provided. Only one of the boaters stated that they would definitely run this reach again and only at the highest flow level (1,220 cfs). The boaters stated that the short length of the reach, difficult access, and the lack of play features were the primary reasons for their disinterest in the Faraday diversion reach (CRC, 2003).

Creation of playboating opportunities, either in the Faraday Diversion reach or downstream of River Mill dam, would help diversify whitewater boating opportunities along the Clackamas River.

River Mill Development

Estacada Lake

In 2003, the Commission issued an Order Amending License (FERC, 2003) that approved the construction of a new fish ladder and downstream fish bypass outfall at the River Mill development to enhance the upstream and downstream passage of salmonids in compliance with the Endangered Species Act. In conjunction with this new construction, the existing boat launch at River Mill Park will need to be relocated. Its current location is very close to the upstream outlet of the fish ladder and the resource agencies are concerned that recreational use and the possible release of gasoline or other boat fuels could interfere with effectiveness of the fish ladder.

Upon construction of the new fish ladder, PGE proposes to close the boat ramp to the public for motorized boating access. Barriers would be installed to retain the ramp for PGE operational and maintenance needs and for public non-motorized rooftop boat access. PGE proposes to provide one additional slide-type canoe/kayak launch and/or improved angler access in a location to be determined in consultation with the City of Estacada.

In order to replace the loss of motorized boat access, PGE proposes to construct a single lane boat launch with a boarding float, restroom, trash receptacles, signage and parking on land owned by PGE on the south shore of Estacada Lake. PGE would include the launch and associated facilities within the Project boundary. Access to the new boat launch would be through McIver State Park via a gravel access road. Oregon Parks and Recreation Department would manage the boat launch facility as part of the McIver State Park day use area fee program. Access on the south shore of Estacada Lake is less convenient, especially for residents of the City of Estacada, however, the presence of steep slopes preclude the feasibility of retaining the boat launch on the north side of the Estacada Lake. PGE has offered to conduct a feasibility study for constructing a pedestrian bridge between the City of Estacada and McIver State Park, which could function as part of the proposed Springwater Trail Corridor if the City of Estacada Lake and the Oregon Parks and Recreation Department support the concept.

PGE proposes to evaluate the need for angler access along the south shore of the Clackamas River downstream of River Mill dam as part of the Milo McIver State Park Master Plan process, and based on the results, provide access improvements. If access is determined in the Master Plan not to be desirable, PGE proposes to fund a mutually agreed-upon method for discouraging angler access. This area is outside the Project boundary. Also, PGE has not identified the specific study that would be funded or provided supporting information for the need for such a study; therefore, we are unable to analyze the benefits of this measure.

River Mill Park

PGE does not propose any improvements to River Mill Park and would continue to prohibit public vehicular access, while allowing pedestrian and angler access. The recreational facilities inventory (EDAW and Frayer, 2003) concluded that most of the facilities at River Mill Park are in poor condition and recommended that the park be closed or totally renovated. The City of Estacada has indicated that it would prefer that any new recreational improvements focus on Timber Park rather than River Mill Park because Timber Park is more convenient to both residents of the city and visitors and offers a wider range of recreational opportunities (RWG, January 23, 2002). No specific recreational improvements to River Mill Park have been proposed by the agencies or stakeholders.

Timber Park

PGE proposes to continue to operate and maintain Timber Park. The management goals for the park are to maintain disc golf opportunities, enhance angler access, and accommodate appropriate community events.

3.2.7.3 *Unavoidable Adverse Impacts on Recreation*

None.

3.2.8 Land Use

3.2.8.1 *Affected Environment*

3.2.8.1.1 *Regional Perspective*

Approximately 71 percent of the land in the Clackamas River Basin is in public ownership. Most of the upper watershed is in the MHNF, while most of the lower watershed is privately owned. Approximately 73 percent of the watershed is classified as mature or regrowth forest, while only approximately 3 percent is urban and about 3 percent is in agricultural use (Metro, 1997). There is a limited amount of industrial land use in the watershed, primarily related to hydropower operations, agriculture and other resource-related operations, and most of it is concentrated in the lower watershed downstream of River Mill dam. The City of Estacada is the only incorporated town in the Project area.

3.2.8.1.2 *Existing Project Land Use and Land Ownership*

The Clackamas Project boundary includes approximately 3,600 acres (approximately 2,500 acres associated with the Oak Grove Development and 1,100 acres with the North Fork, Faraday, and River Mill developments). At the Oak Grove Development, the USFS owns 93 percent of the land, PGE owns 6 percent, BLM owns 1 percent, and a very small area (about 2 acres) is in private ownership. At the three lower developments, most of the Project land is owned by PGE (70 percent), with about 18 percent in private ownership, 8 percent by BLM, and 4 percent by the USFS.

The Oak Grove Development is located entirely within the MHNF, except for a short portion of its transmission line, and land use is primarily forest, recreation, and Project-related facilities. The three lower developments are located just west of the MHNF in a semi-rural area near the City of Estacada. Land use in this area includes forest, recreation, some residential uses, and hydropower facilities.

3.2.8.1.3 Planned Land Use

Planned future land uses in the Project area are described within the MHNF Land and Resource Management Plan (MHNF Plan) (USFS, 1990), the Clackamas County Comprehensive Plan (Clackamas County, 2003), and the City of Estacada Comprehensive Plan (ECC, 2003). These plans are described below.

MHNF Management Plan

Most of the land within the Oak Fork Development is within the MHNF. The MHNF Plan (USFS, 1990) describes forest management goals, desired future conditions, and forestry management objectives. It was amended by the Northwest Forest Plan Record of Decision (USFS, 1994). The MHNF Plan standards and guidelines were retained where they were more restrictive or provided greater benefits to late-successional forest-related species than the Northwest Forest Plan (EDAW, 2002b).

The MHNF Plan also identifies specific Management Areas (MA). The MA's in the "A" category have primarily a resource emphasis other than timber production, while MA's in the "B" category have a primary resource emphasis other than timber production, but regulated timber production is allowed. Category "C" has timber production as the primary emphasis. The following MA's occur within the Project boundary:

- A7 – Special Old-Growth (see discussion in section 3.3.4)
- A10 – Developed Recreation Sites – these MA's are typically small and discrete inclusions within larger MA's and include the five developed campgrounds on the south side of Timothy Lake (see discussion in section 3.3.7)
- A13 – Bald Eagle Habitat (see discussion in section 3.3.4)
- B1 – Designated Wild, Scenic, and Recreational River (see discussion in section 3.3.7)
- B2 – Scenic Viewshed (see discussion in section 3.3.8)
- B8 – Earthflow (see discussion in section 3.3.1)

Clackamas County Comprehensive Plans

The Clackamas County Comprehensive Plan establishes goals and policies that direct future land use on non-federal land within the county. The Clackamas County Zoning and Development Ordinance (Clackamas County, 2003) helps to implement the goals and policies of the Comprehensive Plan.

The Comprehensive Plan envisions the Project area remaining rural and encourages conservation of forest lands and protection of the state's forest economy. Consistent with this goal, all non-federal lands within or adjacent to the Project, with the exception of lands within the City of Estacada, are zoned Timber District.

City of Estacada Comprehensive Plan

A portion of the land around Estacada Lake lies within the City of Estacada. The City of Estacada has adopted a Comprehensive Plan and established a zoning ordinance to guide future land uses within the City. The Project lands within the City are currently zoned for low density residential use, open space, light industrial (near the River Mill Powerhouse), and general commercial and governmental use.

Clackamas National Wild and Scenic River and State Scenic Waterway Environmental Assessment and Management Plan

The *Clackamas National Wild and Scenic River and State Scenic Waterway Environmental Assessment and Management Plan* (Clackamas WSR Plan) is intended to guide management for the designated river to protect and enhance its resource values and to allow public use for the enjoyment of those values. Several MAs defined by the MHNF Plan overlap with the Clackamas Wild and Scenic River designation. If inconsistencies occur between the prescriptions outline in each management plan, the standards and guidelines that are most restrictive apply (EDAW, 2004a).

3.2.8.1.4 Access and Travel Management

PGE uses State and Forest Service roads to operate and maintain the Project. Project-related recreation users also travel on State and Forest Service roads. The vast majority of recreation users come from the Portland metropolitan area. They access the Project either via State Highway 26 to Forest Road 42 through Government Camp, or via State Highway 224 to Forest Road 57 through Estacada. PGE also owns and maintains some roads in the Project area.

There are over 3,600 miles of road within the MHNF. The USFS has four categories of roads as indicated in the MHNF Access and Travel Management (ATM) Plan (USFS, 1999):

- Category 1 – Arterial Roads – major through roads with average daily traffic from May to November in excess of 200 vehicles per day (vpd)

- Category 2 – Secondary Main Line Roads – provide access to high use recreation areas
- Category 3 – Keep Open Roads – needed for forest land administration, commercial use, or to access dispersed recreation areas
- Category 4 – Decision Roads – policy decisions are needed as to whether to keep these roads open, decommission them (i.e., close them but leave them in place), or physically remove the road.

The USFS and PGE have an existing Memorandum of Understanding (MOU) for maintaining Pipeline Road (FS Road 4630/200) near Lake Harriet.

3.2.8.2 *Environmental Effects*

We discuss below the effects of the Proposed Action in terms of land ownership, existing land use, and adopted future land use plans. These relevant future land use plans include the MHNH Plan, the Clackamas County Comprehensive Plan, and the City of Estacada Comprehensive Plan.

3.2.8.2.1 *Proposed Action*

Effects on Land Ownership

The Proposed Action would not have any effects on land ownership. There are no elements to the Proposed Action that would require the acquisition or sale of Project lands by PGE.

Effects On Existing Land Use

The Proposed Action would involve constructing some new facilities (e.g., North Fork downstream fishway, various recreation facilities). These facilities would involve the conversion of some forest land to other uses, but on a very limited, site specific basis. These facility construction activities would not have the potential for stimulating broader land use changes in the area. Therefore, the Proposed Action would not have any significant effect on existing land use.

Consistency with Planned Land Use

The Proposed Action would be consistent with the MHNH Plan, as amended by the Northwest Forest Plan, and the planning objectives of the applicable Management Areas, with the possible exception of the Visual Quality Objective of the Timothy Lake Scenic Viewshed (see section 3.3.9.2).

The Clackamas County Comprehensive Plan envisions the Project area remaining rural and encourages conservation of forest lands and protection of the state's forest economy. The Proposed Action would be consistent with these goals.

The City of Estacada Comprehensive Plan proposes open space, low density residential, light industrial, general commercial, and governmental land uses around Estacada Lake. The Proposed Action would be consistent with these goals.

Section 7(a) of the Wild and Scenic Rivers Act provides specific standards for review of existing hydropower facilities for developments below or above a designated river. For developments below or above a designated river, the direction states:

Developments below or above a designated river may occur as long as the project "will not invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area on the date of designation..." This standard applies to projects outside the river corridor but on the same river or tributary as is the case with the Clackamas River.

The Proposed Action is consistent with this Act and its planning objectives. The USFS concurred in a letter dated August 16, 2006 that the Proposed Action will not cause "an unreasonable diminution of the scenic, recreation, fish, or wildlife values listed as outlined in Section 7(a) of the Wild and Scenic Rivers Act. The Proposed Action, as designed, will have a positive benefit for Recreation, Wildlife and Fishery values and will have no adverse effect to Scenic values" (USFS, 2006a).

Contribute to USFS Road Maintenance Fund

PGE proposes to implement a "Project-related Road Maintenance Plan" to provide for shared maintenance, repair, and rehabilitation of Forest Service roads in the vicinity of the Oak Grove development, including establishment of the Project Roads Account. The purpose of the Project Roads Account is to ensure that adequate funding is available to PGE and the Forest Service to undertake road improvements, reconstruction projects, and emergency repairs due to natural disasters to Project-related roads without having to delay actions until they can be entered into either the PGE or the USDA-FS budget allocation process. This would reduce the impacts to natural resources by shortening the time required to accomplish needed tasks on these roads. Project-related roads include the roads utilized by PGE for Project operations and maintenance and by Project-related

recreation users. The specific roads involved would be: (1) Road 4200 from the Warm Springs Reservation Boundary to Road 5700; (2) Road 5700 from Road 4200 to Road 5820; (3) Road 5700 from Road 5820 to Road 4630; and (4) all of Road 4600200 and 4630. All of these road segments would be brought into the Project boundary. PGE would assume all annual and periodic maintenance responsibility necessary to maintain the road segments.

PGE would also make available \$102,400 annually to a Project Roads Account. The account would be available to PGE and the Forest Service for road improvements, reconstruction projects, natural disaster repairs, and road closures on the road segments. PGE would also make available two \$1,000,000 payments dedicated toward an upgrade of the Road 5700 segment.

Forest Service Roads 4600200 and spurs, 4630 and spurs, 5700, and 4200 are used primarily for Project operations and maintenance. Forest Service Roads 4200 and 4700 and Road 4630 are used primarily for Project-related recreation, with Roads 4200 and 5700 providing access to the Timothy Lake area and Road 4630 providing access to Frog Lake and Lake Harriet.

We conclude that the roads are Project-related, because they are: (1) located in and adjacent to the Project; (2) essential for access to the Project; and (3) predominantly used by those accessing the Project for various purposes, including operations, maintenance, and recreation.

As Project facilities, PGE would be responsible for maintenance and any needed upgrades of the access roads to ensure that the roads would continue to effectively and safely allow access to the Project. However, PGE would not be the sole party responsible for all of the needed upgrades to the aggregate segment of Road 5700. The USFS retains the ultimate responsibility for determining when the upgrade is needed, what specifications the upgrade must meet, and to provide funding beyond what PGE is obligated to provide.

3.2.8.3 *Unavoidable Adverse Impacts on Land Use*

None.

3.2.9 *Aesthetic Resources*

3.2.9.1 *Affected Environment*

The Clackamas Project is located in a highly scenic area on the west slope of the Cascade Mountains. Primary landscape features include dense conifer forests dominated by mature Douglas-fir and western red cedar, riparian flats with

wetlands and with groves of cottonwood and red alder, beaches of river-rounded cobbles, occasional views of Mount Hood, and water cascading through narrow canyons. In general, the Project area is in a natural to a natural-dominated condition, but a combination of highway construction, timber harvesting, recreational development, and transmission lines have impacted the natural appearance.

3.2.9.1.1 Oak Grove Development

The Oak Grove Development lies entirely within the MHNH. The MHNH Plan was developed in 1990 using the USFS's Visual Management System (VMS), which includes standards and guidelines in the form of Visual Quality Objectives (USFS, 1974). The Visual Quality Objectives (VQOs) represent management goals for future desired conditions and reflect various degrees of acceptable alteration of the natural landscape based upon the importance of aesthetics. The VMS identifies five VQOs: preservation, retention, partial retention, modification, and maximum modification. Most of the USFS lands in the vicinity of the Project were assigned VQOs of retention, partial retention, and modification. These VQOs are defined below (USFS, 1974):

- Retention – allows for management activities which are not visually evident
- Partial Retention – allows for management activities that remain visually subordinate to the characteristic landscape
- Modification – allows for management activities that may visually dominate the original landscape. However, activities that alter vegetation and land form must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type.

The MHNH Plan identifies several Management Areas (MA) within the MHNH (see section 3.3.8), including a Scenic Viewshed MA. Most of the Oak Grove Development is within one of the designated MA. All of the MA have been assigned VQOs, as indicated in Table 3.2.9.1-1. Different VQOs may apply depending on whether the modification is viewed from the foreground (from 0 to 0.25 - 0.5 miles from the observer), middleground (from 0.25 – 0.5 miles to 3 – 5 miles from the observer), or background (greater than 3 – 5 miles from the observer). The aesthetic characteristics of each of the major Project facilities are described below.

Table 3.2.9.1-1. Mt. Hood National Forest Visual Quality Objectives

Management Area	Visual Quality Objective		
	Foreground	Middleground	Background
A7 – Special Old Growth	Retention	Retention	Retention
A10 –Developed Recreation Sites	Partial Retention	Partial Retention	Partial Retention
A13 – Bald Eagle Habitat			
B1 – Designated W&S River	Partial Retention ¹	Partial Retention ¹	Partial Retention ¹
B2 – Scenic Viewshed (SV)			
- Timothy Lake SV	Retention	Partial Retention	Partial Retention
- Upper Oak Grove Fork SV	Retention	Partial Retention	Partial Retention
- Lower Oak Grove Fork SV	Retention	Partial Retention	Partial Retention
- Lower Clackamas River SV	Retention	Partial Retention	Partial Retention
B8 - Earthflow	Modification	Modification	Modification

¹ Modification VQO may be allowed for structural facilities.

Source: USFS, 1990

Timothy Lake is located in a broad open valley, which was referred to as Timothy Meadows prior to Project construction, surrounded by forested ridges. Forest cover extends to practically the normal maximum water level (i.e., surcharge level), and creates a natural appearing condition. In fact, except for the area near the dam, the overall appearance of the lake is natural. There are four primary developed campgrounds along the south shore of Timothy Lake, but they are well concealed within the forest and are relatively unobtrusive from either the water or from Forest Service Road 57.

An aesthetic resource evaluation study (EDAW, 2004) identified ten Key Observation Points (KOP) at Timothy Lake, including views of Timothy Lake dam, the lake itself, and various recreational areas. Several areas (especially Hoodview campground) offer outstanding views of Mount Hood. The Timothy Lake/Pacific Crest Trail encircles the lake and provides many opportunities to view and access the lake. Timber cuts on the forested ridges surrounding the lake are evidence of landscape modifications. The geometric shape of these cuts contrasts sharply with the otherwise natural landscape. PGE draws down Timothy Lake after September 1st each year. Because of the gentle slopes of this valley, a few vertical feet of drawdown exposes a wide swath of shoreline. The MHNF Plan assigns the Timothy Lake area a VQO of retention (foreground perspective).

The 10 miles of the Upper Oak Grove Fork from Timothy Lake dam to Lake Harriet flow through a relatively narrow river valley with small intermittent rock outcrops. Mature conifers dominate the steep terrain. The gravel road that hugs the steep ridge side offers many scenic views of the landscape, but few views of the stream. PGE’s operation of Timothy Lake modifies the natural flow regime in this reach, but a minimum flow of 30 cfs, or inflow whichever is less, is provided. The Stone Creek Project (FERC No. 5264) is located in this reach and

diverts water from the stream for several miles. The MHNH Plan assigns the Upper Oak Grove Fork a VQO of retention (foreground perspective).

Lake Harriet is located in a narrow, well-defined forested canyon. It is a relatively small lake, but because of its winding shape, only portions of the lake can be seen from any one location. The south side of the lake is forested, has very steep topography, and is difficult to access. Forest Road 4630 closely follows a portion of the north side of the lake. People regularly park cars along the road, and both are clearly visible from the lake because of the lack of riparian vegetation on this shore. The dam is relatively unobtrusive, not readily visible, difficult to access from Forest Road 4630, and appears to have weathered well into the narrow rocky cleft of the canyon. The MHNH Plan assigns the Lake Harriet area a VQO of modification. The aesthetic resource evaluation study (EDAW, 2004) identified three KOPs at Lake Harriet, including views of Lake Harriet and the dam.

Water is diverted from the lower Oak Grove Fork at Lake Harriet into a nine-foot diameter steel-riveted pipeline that extends approximately 6.4 miles. Wood poles carrying a 13-kV powerline follow the relatively narrow cleared right-of-way of the pipeline. The pipeline and powerline pass through dense forest, but are visible at a few locations along Forest Road 4630. The pipeline is a weathered dark brown color and in most locations is set partially below grade, and is often bordered by shrubby and herbaceous vegetation, which collectively reduce its visibility. The MHNH Plan assigns the Oak Grove pipeline a VQO of modification. The aesthetic resource evaluation study (EDAW, 2004) identified seven KOPs where the pipeline is visible.

The lower Oak Grove Fork below Lake Harriet flows through a steep, rugged forested area before reaching the Clackamas River. PGE manages the Oak Grove Development to minimize flow releases to the lower Oak Grove Fork. Therefore, flows in the lower Oak Grove Fork are greatly reduced relative to natural conditions. There are few opportunities to view this stream segment, but it is visible from the USFS Ripplebrook and Rainbow campgrounds and from the Highway 224 crossing. The MHNH Plan assigns the lower Oak Grove Fork a VQO of retention (foreground perspective). The aesthetic resource evaluation study (EDAW, 2004) identified three KOPs of the lower Oak Grove Fork.

Frog Lake is the small forebay located above the Oak Grove Powerhouse. It is immediately adjacent to and readily visible from Forest Road 4630. The lake is geometrically shaped with steep rock riprap sides. It has an intake and an outlet structure and a gangplank-type walkway. The area surrounding the lake has been cleared of natural vegetation and planted with grass. For these reasons, the lake contrasts sharply with the surrounding natural environment. The MHNH Plan

assigns Frog Lake a VQO of modification. The aesthetic resource evaluation study (EDAW, 2004) identified one KOP at Frog Lake.

The Oak Grove Powerhouse complex includes the surge tank, penstock, and the powerhouse itself. The 24-foot-high reinforced concrete surge tank is briefly visible from Forest Road 4630. The penstock can be briefly seen from Highway 224 above the powerhouse. The powerhouse was built in 1924 and, despite being a relatively plain industrial-style building, reflects the architectural style of its time and offers visual interest. It is only briefly visible through some forest vegetation on a curve along Highway 224. The powerhouse is clearly visible from the Clackamas River by whitewater boaters. The MHNH Plan assigns the powerhouse complex a VQO of partial retention. The aesthetic resource evaluation study (EDAW, 2004) identified two KOPs at the Oak Grove Powerhouse and the surge tank.

The Clackamas River in this reach is federally designated as a Wild and Scenic River in 1988, many years after Project development. The section upstream of the powerhouse is classified as “scenic”, while the section from the Oak Grove Powerhouse to just above North Fork Reservoir is classified as “recreational.” The landscape along the Clackamas River consists of a highly incised canyon with forested slopes punctuated by varied and scenic rock outcrops. The river exhibits a range of characters, from open peaceful waters, to areas with riffles, to whitewater. Although the natural environment dominates the landscape, human influences are evident, including both the 115-kV transmission lines and steel-lattice towers, which connect the Oak Grove Powerhouse with the switchyard at the Faraday Development, and Highway 224, a designated State Scenic Byway. Because the canyon is relatively narrow, the river, highway, and transmission lines are all concentrated in the canyon bottom and side benches. The transmission line crosses the highway and the Clackamas River several times, and varies in its visibility from unseen to highly prominent. In most cases, only the towers are readily seen. As part of a recent realignment of Highway 224 at the intersection with Forest Road 54, a portion of the transmission line was relocated and a single steel pole tower was placed on a ridgetop in a direct line of sight to both north and south bound travelers. Overall, the compelling visual interest of the natural landscape within the canyon is a stronger visual element than the transmission line. The MHNH assigns the transmission line a VQO of partial retention.

3.2.9.1.2 *North Fork, Faraday, and River Mill Developments*

The three lower developments all lie outside of the MHNF.

The North Fork Development is set in a relatively wide, deep, forested canyon. It is closely paralleled on its north side by Highway 224 for its entire length and the dam is clearly visible from the highway. The south shore of North Fork reservoir, however, is only accessible by boat. The powerhouse is integral to the dam, and therefore does not have any additional aesthetic effects. While much of the land around the reservoir appears natural, timber harvest and highway cuts have clearly modified the visible landscape. The aesthetic resource evaluation study (EDAW, 2004) identified seven Key Observation Points (KOP) at the North Fork Development, including views of the dam, reservoir, recreation areas, and the transmission line.

The Faraday Development is set in a narrow forested canyon. The Faraday Diversion dam is only accessible from a closed road from Highway 224 that is used primarily by hikers and bicyclists, or via a trail from Faraday Lake. It is not visible from Highway 224, so relatively few people see this facility. Faraday Lake is set relatively high above the river and constructed with an embankment against a forested hillside. The penstocks, powerhouse, and a substation are located at the toe of the embankment and are not particularly visible from the recreation areas above or from Highway 224. The Faraday bypass reach flows through a winding scenic gorge and is visible from the bridge (limited to pedestrians and service vehicles) across the Clackamas River that links the parking area with the recreation areas at Faraday Lake. The aesthetic resource evaluation study (EDAW, 2004) identified 6 KOPs at the Faraday Development, including views of the dam, penstocks, powerhouse, transmission lines, substation, bypass reach, and fish ladder.

The River Mill Development is set in a relatively narrow and forested river channel, with Milo McIver State Park to the southwest and River Mill and Timber Parks to the north. The dam, which was constructed in 1911 and is currently listed on the National Register of Historic Places, is built into a large rock outcrop into the river and has significant architectural character. The powerhouse is integral to the dam. Estacada Lake is relatively small and narrow with steep forested banks. These forested banks effectively screen the reservoir from view except near its upper reaches where the Highway 211 bridge crosses the reservoir. The reservoir abuts the City of Estacada and there are a few private homes along the reservoir, but they are set back from the shoreline and barely visible from the water. The aesthetic resource evaluation study (EDAW, 2004) identified three KOPs at the River Mill Development, including views of River Mill dam and Estacada Lake.

3.2.9.2 *Environmental Effects*

PGE commissioned an aesthetic study (EDAW, 2004) that included a technical evaluation of all Project features and also involved a Visual Preference Survey by visitors to the Project area. The technical evaluation scored sites on a Scenic Integrity Rating Scale from Very Low to Very High. The Visual Preference Survey used a scale of –2.0 (very negative) to +2.0 (very positive). Table 3.2.9.2-1 summarizes the results of this study.

The Scenic Integrity Ratings and the Visual Preference Ratings were combined to determine whether the Project facilities conflict with the MHNF Plan Visual Quality Objectives (for those facilities within the MHNF) or with the surrounding landscape (for those facilities outside the MHNF). This assessment identified seven Project facilities that pose some degree of visual conflict – three of these occur within the MHNF:

- North Arm of Timothy Lake during lake drawdown
- Timothy Lake dam and outlet works
- Oak Grove Transmission line in some areas
- North Fork informal boat launch
- Faraday Diversion dam and fish ladder
- Faraday Powerhouse, penstocks, and substation
- River Mill dam when viewed from downstream

The North Arm of Timothy Lake was assigned a high Scenic Integrity rating for the summer, but a low rating for when the lake is drawn down (image taken in December at water surface elevation 3,179.8 ft). The MHNF Plan designates the area around Timothy Lake with a VQO of Retention. The low Scenic Integrity rating during drawdown conflicts with VQO of retention. Drawdown of Timothy Lake, however, currently does not occur until after Labor Day. Since this condition only occurs when visitation is low, it does not create a significant visual conflict (EDAW, 2004).

Table 3.2.9.2-1. Aesthetic Evaluation of Project Features

Project Feature	Scenic Integrity Rating	Public Visual Preference Rating (-2.0 to 2.0)	MHNF Plan VQO	Compatibility with MHNF VQO	Comments
Timothy Lake – North Arm	High-summer Low-winter	Not Rated	Retention	Summer – Yes Winter - No	Attractive, secluded lake inlet area in the summer surrounded by forest and wetland vegetation, but largely mudflat and stumps when the reservoir is drawn down.
Timothy Lake	Very High -summer High- winter	0.95 - 1.68	Retention	Yes	Highly desirable mountain lake setting in summer, with numerous exposed stumps in winter.
Timothy Lake dam and outlet works	Moderate	0.07	Retention	No	Although the dam is rather unobtrusive, the outlet structure intrudes into the otherwise relatively natural setting.
Oak Grove Fork bypass reach	High	1.61	Retention	Yes	Although part of the bypass reach, the stream appears to receive enough accretion flows to remain scenic.
Lake Harriet	Very High	1.83	Modification	Yes	This is a highly scenic setting.
Frog Lake	Low	0.44	Modification	Yes	The lake is geometric in shape and tends to be dominated by the intake/outlet structures, but is not readily visible.
Oak Grove Pipeline	Moderate- Low	0.91	Modification	Yes	Often seen from very close where it competes for dominance. It has some visual interest due to its size (9-ft-diameter) and construction (riveted metal segments).
Oak Grove Surge Tank and Penstocks	Moderate	NA	Partial retention	Yes	While clearly modified, the focus of attention is along Highway 224 and not toward the tank, and the view is of short duration.
Oak Grove Powerhouse	High	0.24	Partial retention	Yes	Feature is inconspicuous, only briefly visible through trees, and offers some historical interest.
Oak Grove Transmission Line	Low to High	Variable	Partial retention	No in some areas	The transmissions lines are intermittently visible and usually set against a forested background. Rated negatively when towers near road dominate view.

Project Feature	Scenic Integrity Rating	Public Visual Preference Rating (-2.0 to 2.0)	MHNF Plan VQO	Compatibility with MHNF VQO	Comments
North Fork Marina	High	0.28	NA	Yes	The marina is not a natural element, but is an expected image in a valued landscape and is well designed and maintained. Public rated it as slightly negative.
North Fork boat launch/parking area	Low	0.23	NA	No	Rated low in technical evaluation, but public rated facility as slightly positive.
North Fork Reservoir	Very High	1.45	NA	Yes	A desirable landscape feature in a generally intact landscape setting.
North Fork dam	Moderate	NA	NA	Yes	The dam is large and indirect view, but it has simple, clean lines and is set in a narrow forested river canyon with a strong degree of visual interest.
Faraday Diversion dam and fish ladder	Low	-0.88	NA	NoO	There is strong visual interest in the canyon and forested slopes, but the dam and fish ladder intrude and tend to dominate.
Faraday bypass reach	High	1.67	NA	Yes	The scene appears little altered.
Faraday Lake	Moderate	0.22	NA	Yes	Primarily natural setting.
Faraday powerhouse, substation and penstocks	Very Low	-0.94	NA	No	The focus of attention is strongly directed to the limited area of view that contains the collection of facilities. The colors and patterns are not unified.
Estacada Lake	High	NA	NA	Yes	Scenic setting of a narrow winding lake in a conifer forest setting.
River Mill dam - upstream view	Moderate	NA	NA	Yes	Has visual interest, low profile, fits well into the enclosing forest.
River Mill dam -downstream view	Low-Very Low	-0.15	NA	No	Visible from River Mill Park and McIver State Park. Appears discordant, institutional, and somewhat neglected.

The Timothy Lake dam and outlet works are located in a Retention VQO within the MHNF, which means that the modifications would be visible, but should not be readily evident to the casual viewer. The dam and outlet works are readily apparent from Forest Road 57, the Pine Point and West Shore Day Use Areas, and a few campgrounds, and therefore exceed the management prescription based on the Scenic Integrity rating process (EDAW, 2004). It should be noted that the dam received a moderate Scenic Integrity rating and a neutral Visual Preference rating, so most visitors do not consider the dam objectionable; it simply does not meet a Retention VQO. There is no opportunity to mitigate this visual effect.

The Oak Grove transmission line received mixed ratings depending on the location of the viewer. In the vicinity of North Fork dam, the wood H-frame transmission towers are only intermittently visible, are usually set against a forested background, do not dominate the view and actually received a high Scenic Integrity rating. At other locations (e.g., near Promontory Park, along the Clackamas River Trail, and various locations along Highway 224), however, multiple large steel transmission towers are visible with focused direct views that compete for dominance with the natural setting. In these locations, the transmission lines would exceed the Partial Retention VQO for this area, which provides for modifications that are readily evident, but subordinate to the surrounding landscape (EDAW, 2004). A survey of visitors found that about 66 percent of visitors noticed the transmission lines, of whom 28 percent had a moderately negative reaction and only 4 percent had a strongly negative reaction. Therefore only about 21 (i.e., 32 percent of 66 percent) percent of visitors reacted adversely to the transmission lines. The Oak Grove transmission line has been determined to be a historic contributing feature to the National Register eligibility of the Clackamas River Hydroelectric Project (HRA, 2003). It is unclear to what extent this historic designation will require retention of the transmission line's characteristic appearance, and thus limit opportunities to mitigate the aesthetic effects of the transmission line. One of the most obvious visual impacts is the style modification of the transmission tower where Highway 224 was recently realigned near the intersection with Forest Road 54. Vegetative screening underneath transmission towers would help mitigate the aesthetic effects in a few locations.

The North Fork maintenance area and informal boat launch were assigned a low Scenic Integrity rating, but were rated in the neutral range in the Visual Preference survey. The informal boat launch is not used nearly as much as the main marina at Promontory Park, and is not a prominent feature on the North Fork reservoir. Therefore it does not create a significant visual conflict.

The Faraday Diversion dam and fish ladder received a low Scenic Integrity rating. These are large structures with contrasting forms, lines, colors, and textures that strongly compete for dominance. These facilities are located in an otherwise attractive forested

canyon setting, but are only visible from limited locations and for a short distance. This reach receives relatively few visitors. Therefore, the Faraday Diversion dam and fish ladder do not create a significant visual conflict.

The Faraday Powerhouse, penstocks, and substation, as viewed from the far end of Faraday Lake dam and from the access road to the Faraday Powerhouse, received a very low Scenic Integrity rating and one of the lowest Visual Preference ratings. The more common view of the Faraday Powerhouse complex, however, is from the footbridge from the parking lot to Faraday Lake, which received a moderate Scenic Integrity rating. This higher rating is because the view is broken by vegetation and the attractive natural features keep the complex from dominating the view (EDAW, 2004). The complex is only briefly seen from Highway 224. There are very few boaters in this reach, so few visitors view the complex from the Clackamas River. Since few visitors view the complex from the less attractive perspective, this does not create a significant visual conflict. It should also be noted that these facilities have been determined eligible for the National Register of Historic Places, which could limit options for improving its appearance.

River Mill dam received a Scenic Integrity rating of low to very low, but was rated in the neutral range in the Visual Preference survey by the public. The dam is not highly visible to the public, although it is visible from some portions of the McIver State Park and the relatively lightly used River Mill Park. For these reasons, the River Mill dam does not create a significant visual conflict. River Mill dam is on the National Register of Historic Places.

3.3.9.2.1 Proposed Action

The Proposed Action could potentially affect aesthetics in the Project Area by proposed facility construction, changes in flow regimes, wildlife enhancements, and changes in Project operations. Each of these potential effects is discussed below.

As part of the Settlement Agreement (PGE, 2006), PGE proposes an Aesthetic Resource Protection Strategy with the intent to:

- Protect and/or enhance aesthetic/visual resources associated with the Project on USFS lands; and
- Ensure that human activities associated with the Project do not unnecessarily detract from the USFS land's natural scenic qualities.

In general, PGE intends to make appropriate use of color, materials, design features, and plant materials to improve or protect the visual resources of the Project area. PGE would consider all treatments that are compatible with FERC requirements, human health and safety considerations, and Project operation objectives.

Facility Construction

PGE proposes to construct several new structures, including road and recreation improvements at Lake Harriet, a downstream migrant fish bypass pipeline extending from North Fork Reservoir to below River Mill dam, a juvenile counting station near River Mill dam, and various recreational facilities.

PGE proposes to relocate the boat ramp, construct a shoreline walkway, and improve approximately 400 feet of Forest Road 4630 adjacent to Lake Harriet. These improvements are primarily intended to improve recreational access and address traffic safety concerns, but have the potential to affect aesthetics as well. Although Lake Harriet is located in a spectacular forested canyon, Forest Road 4630 currently detracts from the area's visual quality. The road becomes dusty in the summer, and cars park somewhat haphazardly along the section directly adjacent to the Lake. Providing order to the parking and reducing the dust problem would improve the visual character of the lake. The shoreline walkway will only be four feet wide (except for three bump-out sections) and the final design and materials would be compatible with the landscape setting as determined by PGE in consultation with the USFS. These improvements would not adversely affect aesthetics.

The downstream fish pipeline from North Fork Reservoir to below River Mill dam extends along a segment of the Clackamas River that is difficult to access and is seldom used by visitors other than a few anglers. Heavy forests and steep slopes screen this reach from view from Highway 224. An upstream fishway already exists along a portion of the proposed downstream pipeline from Faraday Diversion dam to North Fork dam. For these reasons, this pipeline should not result in a significant visual conflict.

The juvenile fish counting station near River Mill dam would be a small facility in an area that already has visual conflicts. As discussed above, few visitors other than some anglers view River Mill dam and associated structures, such as this new fish counting station, from downstream. Further, the River Mill dam would dominate the view, with the counting station being only a small contributing factor. The counting station should not worsen the view of the River Mill dam complex.

The many recreational improvements proposed by PGE would all be located in areas with existing recreational facilities. The design of these new improvements would be consistent and compatible with the existing facilities and would not result in any adverse aesthetic effects.

Changes in Flow Regimes

PGE proposes to increase minimum flows in the Upper Oak Grove Fork (from 10 to between 30 and 60 cfs) and to provide minimum flows in the Lower Oak Grove Fork (from 0 to between 70 and 100 cfs). Increasing the minimum flow in these reaches would enhance their visual and auditory features. Research indicates that most people rate the aesthetics of rivers and streams at the same high level, except when flows do not cover the bottom of the channel (Whittaker and Shelby, 2002; Brown and Daniel, 1991). Providing or increasing minimum flows along the Oak Grove Fork would enhance their aesthetic quality.

Wildlife Enhancements

PGE proposes to develop and implement a Wildlife Connectivity and Disturbance Management Plan (see section 3.3.4.2) that would include installing several earthen/low profile crossings along the Oak Grove pipeline and eight-foot-high wildlife exclusion fencing and two wildlife bridges along the lower portion of the North Fork Fish Ladder. These measures would occur in areas that receive relatively little recreational use, appear relatively natural, and would be screened by woods and steep slopes from view from Highway 224. For these reasons, these wildlife enhancements should not result in any adverse aesthetic effects.

Changes in Project Operations

PGE proposes several changes in Project operations that have the potential to affect aesthetic resources. These changes include raising the water elevation at Lake Harriet by one foot and reducing the minimum water level in the Faraday Diversion Pool during extreme droughts from elevation 521 feet to 516 feet.

Raising the water level at Lake Harriet by 1 foot would have little noticeable effect. Lake Harriet is located in a very steep forested canyon. Given these steep slopes, increasing the lake elevation by one foot would not increase the surface area of Lake Harriet appreciably. It should not result in any significant aesthetic effects and should meet the MHN Plan VQO of Retention in this area.

Water levels in the Faraday Diversion pool already fluctuate by up to 5 feet daily. PGE proposes to increase this to 10 feet during extreme droughts. As with Lake Harriet, the Faraday Diversion pool is in a steeply sloped canyon where water level fluctuations expose very little shoreline. As described above, the Faraday Diversion dam received a low Scenic Integrity rating, but this was not considered significant because of the low level of visitation in this area (there are no formal recreation facilities and no boating allowed in this reservoir). The increase in water level fluctuations would not improve the aesthetics of the facility, but neither would it significantly worsen them. Given the low

visitation rate, this increase in water level fluctuations during extreme droughts would not significantly worsen any visual conflicts.

3.2.9.3 *Unavoidable Adverse Impacts on Aesthetics*

None.