

2.0 PROPOSED ACTIONS AND ALTERNATIVES

This section describes the Proposed Action and alternatives considered in this FEIS. Section 2.1 describes the No Action Alternative under which the Clackamas Project would continue to operate with no change to its current license conditions. This alternative provides the current conditions against which all other alternatives are compared. Section 2.2 describes the Proposed Action of issuing a new license that adopts the terms and conditions presented in the Settlement Agreement. Section 2.3 describes the Staff Alternative, under which the Project would operate as per the Proposed Action with staff recommended modifications. Section 2.4 discusses other alternatives that were considered but eliminated from detailed evaluation in this FEIS.

2.1 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Clackamas Project would continue to operate under the terms and conditions of the existing license and no new environmental measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with the Proposed Action.

2.1.1 Existing Project Facilities and Operations

The Clackamas River Hydroelectric Project is located within the Clackamas River Watershed, which lies southeast of, and includes part of, the Portland metropolitan area (Figure 1.0-1). The watershed drains into the Willamette River just southeast of Portland and is part of the Lower Willamette River Basin. The Clackamas River drains more than 940 square miles and most of its headwaters are located within the Mt. Hood National Forest (MHNH).

PGE's development and use of the Clackamas River to supply electricity for a growing Oregon began at the turn of the twentieth century. At that time, PGE placed into operation four hydroelectric developments (Oak Grove, North Fork, Faraday, and River Mill developments) with a total installed generating capacity of 173 MW.

The Project currently operates under the following FERC licenses and amendments:

- The current North Fork Project license, No. 2195, issued by Federal Power Commission (now FERC) in 1957 (effective on September 1, 1956) and expiring August 31, 2006. This license was amended in 1965 to include the Faraday and River Mill Developments.

- The current Oak Grove Project license, FERC No. 135, issued in 1980 and expiring August 31, 2006 to coincide with the expiration of the North Fork Project license.
- FERC amended License Nos. 2195 and 135 in June 2003, which combined the Oak Grove and North Fork Projects and designated the combined projects as Clackamas River Project No. 2195. Other amendments to the Project license approved under this Order include:
 - Modifications of operations and replacement of the turbine runner for Unit 6 at the Faraday Development, yielding a new turbine and hydraulic capacity of 41,500 horsepower (hp) and 3,334 cubic feet per second (cfs).
 - Modified operation of North Fork Unit 2 to increase turbine efficiency and average annual energy generation of the modern runner installed in Unit No. 2 in 2001 (increasing maximum turbine output from 34,500 hp to 41,500 hp, and increasing hydraulic capacity from 2,680 cfs to 3,334 cfs).
 - Replacement of the existing River Mill fish ladder with a new fish ladder designed to meet the criteria identified by the fisheries agencies and lower existing downstream migrant outfall to improve entrance conditions to tailrace.
 - Implementation of various conservation measures as proposed in PGE's Application for Non-Capacity Amendment of Licenses, Project Nos. 135 and 2195, and as described in NOAA Fisheries Biological Opinion on Interim Operation of the North Fork (FERC No. 2195) and Oak Grove (FERC No. 135) Projects through 2006, dated March 4, 2003.
 - Addition of license articles addressing total dissolved gas monitoring, proposed fishway improvements, and reservation of authority pursuant to section 18 of the FPA.

The State of Oregon also licenses components of the Project pursuant to Oregon's Hydroelectric Act, which requires a State license for new projects or additions to existing projects built after February 26, 1932 that require additional water rights. Four State licenses exist for the Project that expire on August 31, 2006:

- State License No. 186 to store, divert, and use 60,000 acre-feet (ac-ft) of water (in a 12-month period with a 300-cfs draft limitation) for construction of Timothy Lake was issued with a priority date of March 18, 1953;
- State License No. 203 for 2,650 cfs for the addition of Faraday Unit No. 6 was issued with a priority date of September 13, 1956;
- State License No. 202 for 5,400 cfs for construction of North Fork dam and Powerhouse was issued with a priority date of September 25, 1956; and
- State License 220 for 950 cfs for River Mill Unit No. 5 was issued with a priority date of March 4, 1960.

In addition to the State-licensed water rights listed above, PGE filed for water rights for the remaining Project developments in December 1992 pursuant to Oregon's water rights adjudication process (ORS 539.240). Specifically, PGE made three, pre-1909 Surface Water Registration (SWR) filings:

- SWR-386 for 4,641 cfs for the River Mill Development;
- SWR-387 for 602.5 cfs for the Oak Grove Development; and
- SWR-388 for 2,370 cfs for the Faraday Development (units 1-5).

Concurrent with the FERC relicensing process, the State is conducting its hydroelectric reauthorization process, which involves review of the water rights and registrations listed above. PGE submitted draft applications for reauthorization of its water rights with the OWRD and for section 401 Water Quality Certification with the ODEQ in 2003. This final application also serves as the final application to OWRD for reauthorization of water rights. PGE filed its final application to ODEQ for section 401 Water Quality Certification on June 30, 2005.

The Project has been operating for over 50 years under existing licenses and during this time, Commission staff have conducted operational inspections focusing on maintaining the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, and compliance with the terms of the license, and proper maintenance. In addition, the Project has been inspected and evaluated every 5 years by an independent consultant and a consultant's safety report has been submitted for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the Project during the new license term to assure continued

adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.1.1 Oak Grove Development

Timothy Lake

Timothy Lake is in the headwaters of the Oak Grove Fork of the Clackamas River drainage, and is located approximately 17 miles south of Mt. Hood at an elevation of approximately 3,200 feet mean sea level (ft). Timothy Lake dam was completed in January 1956, creating a 1,430-acre (ac) seasonal storage reservoir at the location of the former Timothy Meadows. With a gross storage capacity of 69,000 acre-feet (ac-ft), the reservoir increases the flow available for energy generation on the Clackamas River during low river flow periods. PGE uses approximately 27,300 ac-ft of this storage. Releases from the lake also supplement water supply needs farther down in the Clackamas River Basin.

During the summer period (June to Labor Day), PGE usually maintains Timothy Lake at no less than full pool (fluctuates between 3,189.0 and 3,191.9) for recreational use and to conserve water for the fall drawdown season; however, PGE is authorized to drawdown the lake to 3,189.0 under its current license. PGE is authorized to, and in recent years has exercised its right to, raise the water level in Timothy Lake to what is referred to as the “surcharge” elevation of 3,191.9 ft. PGE adjusts the release valve at Timothy Lake on an approximately weekly basis during the summer. As a result, water levels in Timothy Lake may fluctuate slightly as a result of changes in inflow to the lake. PGE does not typically make adjustments to the release rates (or indirectly lake levels) for power generation purposes during the summer.

Typically after Labor Day each year, PGE drafts the storage at a rate not exceeding 300 cfs plus inflow to Timothy Lake. Generally, PGE limits storage drafts to times when there is a high probability of refill, as determined from the monthly snow surveys and long-range precipitation forecasts. PGE normally lowers water levels approximately 10 to 15 feet by early November and generally maintains this lower water level until spring. The magnitude of drawdown depends on the amount of snowpack, anticipated spring rainfall, and the need to minimize spill at Lake Harriet dam. Water levels, however, rise and fall several feet during the November to spring drawdown period in accordance with precipitation patterns and flow requirements for generation at the Oak Grove Powerhouse. Spring inflow to Timothy Lake, principally from snowmelt, normally fills the reservoir by late May or early June for the next recreation season.

PGE operates Timothy Lake within a certain set of constraints:

- Maintain a continuous year-round minimum flow release of 10 cfs from Timothy Lake into the Upper Oak Grove Fork;
- Maintain a year-round maximum flow release limitation of 300 cfs plus inflow;
- Maintain a maximum change in river stage in the Upper Oak Grove Fork, below Timothy Lake dam, of 0.33 ft per hour; and
- Although PGE is authorized to draw down the lake to elevation 3,189.0 under its current license, PGE attempts to maintain Timothy Lake's water surface elevation no lower than elevation 3,190.0 ft from Memorial Day to Labor Day, with the 10-cfs minimum flow taking priority over lake levels.

PGE manages the Oak Grove Development to minimize spill at Lake Harriet downstream by controlling releases from Timothy Lake.

Lake Harriet Diversion Dam

The Lake Harriet Diversion dam is approximately 10 miles downstream of Timothy Lake on the Oak Grove Fork. Lake Harriet has a gross and usable storage capacity of approximately 300 ac-ft and 250 ac-ft, respectively. PGE diverts flows up to approximately 600 cfs from Lake Harriet to Frog Lake for generation at the Oak Grove Powerhouse. PGE maintains Lake Harriet at full pool at all times (i.e., water levels do not fluctuate except for occasional maintenance) to maintain water pressure in the supply pipeline to Frog Lake. The dam crest acts as an overflow spillway; Lake Harriet inflows in excess of approximately 600 cfs spill downstream over the reinforced rockfill dam face to the Lower Oak Grove Fork.

Frog Lake

Frog Lake is the forebay for the Oak Grove Powerhouse. This 9.25-ac impoundment is roughly 4.1 miles from Lake Harriet, and 1-mile upslope from the Clackamas River on a bench in the hillside near Three Lynx. Frog Lake has gross and usable storage capacities of 252 ac-ft and 170 ac-ft, respectively. Frog Lake may fluctuate up to 18 feet for peaking power needs at the Oak Grove Powerhouse. In some instances, PGE may cycle operations at the Oak Grove Powerhouse, fluctuating Frog Lake twice in one day depending on natural flow conditions, and the demand for power.

Oak Grove Powerhouse

Water flows approximately 2.3 miles from Frog Lake through a 9-ft-diameter pipeline to the Oak Grove surge tank, then through the two 1,220-ft-long steel penstocks leading to the Oak Grove Powerhouse. The Oak Grove Powerhouse contains two Francis-type turbine-generators with a gross head of 870 to 880 ft. The Oak Grove Powerhouse has a hydraulic capacity of approximately 740 cfs. The combined generating capability of both units is 44 MW. The flow discharges into the mainstem Clackamas River approximately 5 miles downstream of the Oak Grove Fork confluence.

2.1.1.2 North Fork Development

The 350-ac normal maximum water surface area (NMWSA) North Fork Reservoir is the first of three hydroelectric developments on the Clackamas River mainstem. The powerhouse is integral to the concrete-arch dam and includes two Francis-type turbines with a total hydraulic capacity of 6,000 cfs, and a combined generating capacity of 58 MW. The North Fork Reservoir has a gross storage capacity of 18,630 ac-ft, a useable storage capacity of 7,700 ac-ft, and only draws down the reservoir by 2 ft. In the past several years, PGE has operated North Fork in a peaking mode by utilizing 1 to 2 ft of storage. When operated in a peaking mode the project is cycled typically once a day. A 1.9-mile-long fishway extends from the forebay area along the north bank of the North Fork Reservoir to immediately downstream of the Faraday Diversion dam. PGE maintains a flow of 43 cfs in the fishway.

2.1.1.3 Faraday Development

The Faraday Development consists of the Faraday Diversion dam, a tunnel/canal, Faraday Lake, and the Faraday Powerhouse. The Faraday Diversion dam is a concrete-gravity structure located about 1.6 miles downstream from North Fork Reservoir. The 55-ac NMWSA Faraday Diversion Dam reservoir has a gross storage capacity of 1,200 ac-ft. PGE uses about 300 ac-ft of this capacity and draws the reservoir down by 5 ft. A gated intake diverts part of the river flow through a 0.5-mile-long, 23-ft-diameter tunnel and a 0.67-mile-long canal into the 50-ac NMWSA Faraday Lake, the forebay for the Faraday Powerhouse. Faraday Lake has a gross storage capacity of 550 ac-ft, reduced to 430 ac-ft due to silt deposition. PGE utilizes 235 ac-ft of this capacity and 5.2-ft of draw down. A 1956 MOA between PGE and the Oregon Fish and Game Commissions (now ODFW) set instream flows in the bypass reach between Faraday Diversion dam and the Faraday Powerhouse at a minimum of 50 to 90 cfs. The MOA also includes specific requirements for operating flow (43 cfs) and attraction flow (80

cfs during spill) for the Faraday-North Fork Fish Ladder. PGE generally maintains minimum flows of about 120 cfs in the bypass reach.

The water level behind the diversion dam may fluctuate up to five feet. Because the hydraulic capacity of the Faraday Development (5,120 cfs, 5,020 by water right) is less than the North Fork Development (6,000 cfs capacity, water right 5,400 cfs), storage is used to smooth the inflow.

The Faraday Powerhouse contains five horizontal Francis-type turbines and a sixth, semi-outdoor, vertical Francis-type turbine, similar to the North Fork turbines, with a total hydraulic capacity of approximately 5,020 cfs and combined generating capacity of 44 MW. PGE operates Faraday Powerhouse in generation control, which means that the MW load is typically set for the entire day and does not vary considerably. To ensure generation control, the Faraday Diversion dam storage is used to meter out the North Fork inflow. Discharges below the Faraday Powerhouse do not fluctuate as much as a peaking facility.

2.1.1.4 River Mill Development

Discharges from the Faraday Powerhouse combine with flow from the Faraday Diversion dam bypass reach and proceed down the Clackamas River to the River Mill Development. The River Mill Development consists of Estacada Lake, the River Mill dam, and River Mill Powerhouse. Estacada Lake is a 150-ac NMWSA reservoir formed by River Mill dam. The spillway dam and powerhouse section of the development are of the Ambursen buttress-type construction, with a maximum dam height of 85 feet. The reservoir has approximately 2,300 ac-ft of gross storage capacity. PGE uses 200 ac-ft of this capacity with a 2-ft drawdown. The River Mill Development is operated to minimize flow fluctuations downstream. The River Mill Powerhouse, which is integrated with the dam, has five Francis-type turbines with a total hydraulic capacity of 4,840 cfs, and a combined generating capacity of 25 MW.

PGE controls flows from the North Fork, Faraday and River Mill developments to ensure that river stages below River Mill dam do not exceed the natural flood peak stage. Minimum releases from River Mill dam are 1,000 cfs from November 1 through April 30, 1,400 cfs from May 1 through July 15, and 600 cfs from July 16 through September 30, and 800 cfs from October 1 to October 31. Natural flows are released whenever they are less than the stipulated minimum release flows. These releases are designed to adequately supply the pumps at the Clackamas River Fish Hatchery, located about 0.5 mile below the development, and to meet the requirements of public water supply systems downstream from the hatchery. The River Mill fish ladder also passes 40 cfs throughout the year.

Under the existing license and pursuant to ESA consultation with NOAA Fisheries and others, PGE is constructing a new upstream fish passage facility, conducting spillway improvements, and developing related operations at River Mill dam. These modifications have been made under a FERC-approved modification to the existing license (FERC Order Amending License 103 FERC ¶62,161, June 18, 2003) and are considered existing conditions in this EIS.

2.2 PROPOSED ACTION – SETTLEMENT AGREEMENT

The Settlement Agreement, filed with the Commission on June 30, 2005, is the Proposed Action evaluated in this FEIS. The Settlement Agreement describes the measures that PGE proposes to undertake during the term of the FERC license for the Clackamas Project. We summarize the primary components of the Proposed Action – Settlement Agreement in Table 2.2-1 and compare them with existing operations.

Table 2.2-1 Summary of Current Operations and Proposed Action – Settlement Agreement

REACH	CURRENT OPERATIONS/FACILITIES	PROPOSED ACTION – SETTLEMENT AGREEMENT
Timothy Lake	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) 8-10 cfs turbine at toe of dam, generation used as backup for station service and Timothy Lake Lodge 2) Timothy Lake is maintained at full pond, including surcharge (3,191.9 ft) between Jun 1 and Aug 31 (inconsistent with description in text above) 3) Drawdown occurs from Sep 1 through Apr 1; typical drawdown is 15-20 ft, but depends on snowpack; drawdown is managed to limit spill at Harriet <p>Fish Passage:</p> <p>No fish passage facilities or screening</p>	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) From Memorial Day through Labor Day, Timothy Lake elevation to be maintained between 3,189.0 and 3,191.5 ft. Refill goal of 3,190.0 or higher by July 1 and maximum summer drawdown of 1.5 ft (from highest lake level achieved after Memorial Day). No drawdown below 3,190.0 ft before August 1 (or delayed to August 15 if amphibian monitoring shows effects on amphibians) 2) From the day after Labor Day through the day before Memorial Day, Timothy Lake elevation to be maintained at: 3,191.9 ft maximum, 3,170.0 ft normal minimum, 3,125.0 ft extreme minimum. Drawdown after Labor Day is limited by maximum flow release below Timothy dam <p>Fish Passage:</p> <ol style="list-style-type: none"> 1) Replace the top bar rack section with a solid panel increasing the depth of solid panel protection to 29 feet below water surface at 3,190.0 ft and monitor the performance of the racks and panels for two years after installation 2) Replace Dinger Creek culvert to provide passage for cutthroat trout <p>Fish Habitat</p> <ol style="list-style-type: none"> 1) Install approximately 3 aggregates of 10-15 logs each in Dinger Creek 2) Install weirs to disrupt spawning kokanee and brook trout 3) Establish and implement a blue-green algae monitoring program <p>Terrestrial Resources:</p> <ol style="list-style-type: none"> 1) Monitor amphibians at the North Arm of Timothy Lake and within the drawdown zone. 2) Contribute \$500 annually to the USDA-FS to help fund maintenance and monitoring of bird nest boxes <p>Recreation:</p> <ol style="list-style-type: none"> 1) Upgrade water supplies at Timothy Lake recreation sites 2) Repair or upgrade the two docks at Hood View and Oak Fork Campgrounds 3) Implement the shoreline enhancements plan at or adjacent to Timothy Lake recreation areas 4) Replace or upgrade elements at the existing four south shore Timothy Lake campgrounds determined to be in need of repair or replacement. Install a minimum of three universal access sites at each of the developed campgrounds abutting Timothy Lake 5) Improve/replace fishing pier near Pine Point and modify access 6) Improve North Arm campground 7) Repair/upgrade six existing boat launches on Timothy Lake 8) Within five years of license issuance: <ul style="list-style-type: none"> • Improve Cove walk-in campground and stabilize shoreline erosion at Meditation Point 9) Between years 5 and 10 following license issuance construct two new group sites 10) Between years 10 and 15 following license issuance construct new 50-site campground 11) Develop amphitheater to serve Hoodview and Pine Point campgrounds 12) In year 30 of new license, consult with USFS to determine whether and where to build two more similar sites 13) Plant or seed campgrounds to improve site separation 14) Provide new or relocate existing trails near Timothy Lake 15) Assume maintenance and operations responsibilities at the developed campgrounds abutting Timothy Lake

REACH	CURRENT OPERATIONS/FACILITIES	PROPOSED ACTION – SETTLEMENT AGREEMENT
Timothy Lake Dam to Stone Creek Diversion (Reach 1B)	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) Minimum discharge from Timothy Lake is 10 cfs (license condition, takes priority over lake levels) 2) Maximum discharge from Timothy Lake is 300 cfs, plus inflow (license condition) 3) Maximum ramping rate of 0.33 ft/hr stage change at gage below Timothy Lake 	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) Memorial Day through Labor Day - <ul style="list-style-type: none"> • Minimum 60 cfs or inflow, whichever is less • Maximum inflow +70 cfs 2) Day after Labor Day through September 30 – <ul style="list-style-type: none"> • Minimum 60 cfs or inflow, whichever is less • Maximum inflow +100 cfs 3) October 1 through October 31 – <ul style="list-style-type: none"> • Minimum 60 cfs or inflow, whichever is less • Maximum inflow +150 cfs 4) November 1 – November 30 <ul style="list-style-type: none"> • Minimum 60 cfs or inflow, whichever is less • Maximum inflow +300 cfs • Limit of 3 large scale flow events between November 1 and February 28/29 5) December 1 through February 28/29 <ul style="list-style-type: none"> • Minimum 30 cfs or inflow, whichever is less • Maximum inflow +300 cfs 6) March 1 through day before Memorial Day <ul style="list-style-type: none"> • Minimum 40 cfs or inflow, whichever is less • Maximum inflow +100 cfs 7) Changes in stream stage at USGS gage not to exceed 0.2 ft/hr year round (except on days when inflow to Timothy Lake exceeds 600 cfs). 8) Minimize frequency and duration of downramping and upramping rates above 0.2 ft/hr. 9) Provide satellite telemeter for USGS gage. <p>Fish Habitat:</p> <ol style="list-style-type: none"> 1) Install 225 1.5’-4’ dia. boulders between the dam and Hammer Springs, spaced ~10 ft apart; incorporate large wood to extent possible 2) Enhance habitat in Oak Grove Fork mainstem and side channels <p>Fish Passage:</p> <p>Replace Anvil Creek culvert to provide passage for cutthroat trout</p> <p>Terrestrial Resources:</p> <ol style="list-style-type: none"> 1) Implement a cold water corydalis monitoring program.

REACH	CURRENT OPERATIONS/FACILITIES	PROPOSED ACTION – SETTLEMENT AGREEMENT
Stone Creek Powerhouse to Lake Harriet (Reaches 1C-1E)	<p>Flow Regime/Reservoir Levels/Operations: Regulated by EWEB. Flows as influenced by license conditions listed for <i>Timothy to Stone Creek Diversion</i></p>	<p>Flow Regime/Reservoir Levels/Operations: Flows as influenced by conditions listed for <i>Timothy to Stone Creek Diversion</i></p> <p>Terrestrial Resources: 1) Implement a cold water corydalis monitoring program.</p>
Lake Harriet	<p>Flow Regime/Reservoir Levels/Operations: 1) No generation 2) Diverts flows up to 600 cfs to Frog Lake 3) Lake level maintained at full pool</p> <p>Fish Passage: No fish passage or screening (trash rack at intake only)</p>	<p>Flow Regime/Reservoir Levels/Operations: 1) Maintain water level of Lake Harriet at 2,039.0 ft, with minimum water level 2,020.0 ft</p> <p>Fish Passage: 1) Provide agreed upon minimum baseflows using water withdrawn through the Harriet Lake intake and tunnel to a new pipeline ending at the rivers edge 2) Monitor the minimum flow facility to determine if non-native fish are escaping through the minimum flow releases. If so, modify north bar rack to exclude non-native fish 3) Replace existing bar rack at the Frog Lake flowline intake with a new rack with 0.75-in. open spacing, approach velocity of about 1 ft/s. If monitoring demonstrates a need, install cleaners.</p> <p>Recreation: 1) Move the boat launch to an improved location at Lake Harriet 2) Replace the outdated campground restroom at the Lake Harriet Campground 3) Adjust fishing dock at Lake Harriet to improve accessibility and accommodate the one-foot higher pool 4) Perform annual dust abatement treatments on FS Road 4630 adjacent to the Lake Harriet campground 5) Improve shoreline access for anglers 6) Place large rocks at appropriate sites 7) Provide additional parking spaces and shoreline access routes to shoreline walkway 8) Improve Forest Road 4630 adjacent to Lake Harriet 9) Take steps to discourage pedestrian angler access to Lake Harriet dam 10) Implement phased program to discourage parking from Harriet dam east to a point west of shoreline enhancements</p>

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Frog Lake	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) Water level fluctuation to 14 feet for peaking at Oak Grove Powerhouse 2) Lake may be cycled twice in one day depending on flow conditions and power demand 3) Flashboards (1 ft) on emergency spillway as a safety measure to store water in case Oak Grove Powerhouse trips off-line 4) Trashrack at Frog Lake outflow 	<p>Flow Regime/Reservoir Levels/Operations: Maintain lake elevation year round as follows: 1988.0 ft maximum, 1970.0 ft normal minimum, and 1958.0 ft extreme minimum</p> <p>Fish Passage Replace the existing bar rack at the Frog Lake flowline intake with a rack with 0.75 inch open spacing and approach velocity of approximately 1 ft/sec</p> <p>Terrestrial Resources Implement a wildlife habitat improvement program for Frog Lake within 5 years of license issuance</p>
Lake Harriet to Clackamas (Reaches 1F and 1G)	<p>Flow Regime/Reservoir Levels/Operations: Flows in excess of Frog Lake flowline capacity (i.e., 600 cfs) are spilled at Harriet dam and enter the lower Oak Grove Fork—no minimum flow requirement</p>	<p>Flow Regime/Reservoir Levels/Operations: Release base flows throughout the year, combined with higher flow releases during winter floods and spring runoff events:</p> <ol style="list-style-type: none"> 1) Base flow releases vary depending on classification as dry, normal, or wet year: <ul style="list-style-type: none"> • April 1 – September 30 release 80 (dry), 90 (normal), or 100 (wet) cfs • October 1 – October 15 release 100 cfs (all) • October 16 – December 15 release 80 cfs (all) • December 16 – March 31 release 70 cfs (all) 2) Between January 1-March 31, pass all flow >1,300 for ~10 hours, then resume 600-cfs diversion, for first 4 events of year separated by ≥5 days apart 3) Release flows that simulate snowmelt runoff beginning anytime between April 20 and May 15, followed by ramping down to base at 10 cfs/day: <ul style="list-style-type: none"> • Wet years: 150 cfs for 54 days • Normal Years: 250 cfs for 3 days, ramping down to 150 cfs at 20 cfs/day • Dry years: 200 cfs for 3 days, ramping down to 150 cfs at 20 cfs/day 4) Fall pulse flows will be considered if members of Fish Committee provide information that shows the need for such flows <p>Fish Passage:</p> <ol style="list-style-type: none"> 1) Provide agreed upon minimum baseflows 2) Monitor minimum flow facility to determine if non-native fish are escaping to the river below the dam through minimum flow releases. If so, modify the north bar rack to exclude non-native fish. <p>Fish Habitat:</p> <ol style="list-style-type: none"> 1) Transport all woody debris captured in Lake Harriet around dam and place it in the Oak Grove Fork below the dam 2) Create 40,000 ft² of 1+ coho side channel habitat during summer base flow conditions through a combination of base flow increases and on-site projects 3) Install large wood structures at 6 sites in mainstem Clackamas River 4) Augment 2,200-3,000 tons/yr of spawning gravel in first three years; 50-80 tons/yr thereafter <p>Terrestrial Resources: Install 6 earthen ramps and 20 low-profile overhead crossings along the Oak Grove Pipeline</p>

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		<p>Recreation</p> <ol style="list-style-type: none"> 1) Reconfigure the Harriet Lake day use area 2) Relocate boat launch area to an area adjacent to the current day use area 3) Replace the existing restroom at Lake Harriet 4) Perform annual dust abatement treatments on FS Road 4630 adjacent to the Lake Harriet campground 5) Improve shoreline angling access 6) Improve FS Road 4630 adjacent to Lake Harriet 7) Discourage pedestrian angler access adjacent to the Lake Harriet dam
Mouth of Oak Grove Fork to Oak Grove Powerhouse (Reach 2A)	<p>Flow Regime/Reservoir Levels/Operations: Flows as influenced by lower Oak Grove Fork Flow regime, i.e., reduced by the volume of water shunted to Frog Lake via the pipeline</p>	<p>Flow Regime/Reservoir Levels/Operations: Flows as influenced by lower Oak Grove Fork flow regime</p>
Oak Grove Powerhouse to North Fork (Reach 2B)	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) Maximum discharge is 704 cfs, i.e., turbine capacity 2) Maximum upramping rate is 64 cfs/5 min except in emergency such as powerhouse trip 3) No maximum downramping rate 	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) Maximum discharge is 740 cfs (turbine capacity) 2) Maximum upramping rate is 0.4 ft/hr year round except during spinning reserve call events 3) Maximum downramping rate: <ul style="list-style-type: none"> • 0.3 ft/hr from November 1 through January 31 • 0.3 ft/hr if flow is > 1,200 cfs or 0.17 ft/hr if flow is < 1,200 cfs February 1 through September 30 • 0.3 ft/hr October 1 through October 31 4) Complete two juvenile salmonid stranding studies; modify October rate to 0.17 ft/hr if necessary depending on results
North Fork Reservoir	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) Recent operation of North Fork powerhouse has been daily peaking using the upper 2 ft of storage 2) Minimum discharge is 0 cfs (no license requirement) 3) Maximum discharge is 6,000 cfs, i.e., hydraulic capacity after turbine upgrade; current water right is 5,400 cfs 4) No maximum ramping rate license requirement <p>Fish Passage:</p> <ol style="list-style-type: none"> 1) Flow in the fish ladder: 45 cfs derived from surface of NF Reservoir enters at the head of the ladder; 20 cfs derived from the Faraday Diversion pool (NF Reservoir deep release) enters at the adult fish trap; 55 cfs from the Faraday Diversion pool enters at the diffuser (total 120 cfs) 2) Sorting of upstream migrants at the adult fish trap 3) Separator (about 1.5 miles downstream of NF reservoir) diverts smolts from ladder into downstream pipeline 	<p>Flow Regime/Reservoir Levels/Operations: Maintain normal water levels between 663.0 and 665.0 ft except in winter when reservoir is drawn down up to 5 ft</p> <p>Fish Passage:</p> <ol style="list-style-type: none"> 1) Until the downstream fish passage collector is in operation at the North Fork forebay, PGE will limit generation to one unit at NFP when flows are between 3,500 and 7,500 cfs to maximize salmonid protection per the terms of the AIP: <ul style="list-style-type: none"> • Operate guidance net upstream of North Fork Spillway and limit flow to 3,500 cfs when river flows are between 3,500 and 7,500 cfs • When river flows exceed 7,500 cfs, adjust flow to maintain a spill flow of 4,000 cfs • Construct a 500-cfs surface collector in the North Fork dam forebay within 2 years of license issuance 2) Within 5 years of license issuance: <ul style="list-style-type: none"> • Construct a 1,000-cfs surface collector in the North Fork dam forebay. • Construct a guidance curtain/net from the south bank • Limit generation to one unit for flows between 3,500 and 7,500 cfs from April 1-June 30, and October 15-December 31 • Install strobe deterrents to guide fish toward the surface collector. 3) Design new screen system for the north bypass with 500-cfs capacity at NOAA criteria within 6 years of license issuance

REACH	CURRENT OPERATIONS/FACILITIES	PROPOSED ACTION – SETTLEMENT AGREEMENT
		<p>Fish Habitat:</p> <ol style="list-style-type: none"> 1) Remove and stockpile all large wood entering North Fork Reservoir, reserve for instream habitat projects in river and elsewhere in basin 2) Establish and implement a blue-green algae monitoring program <p>Recreation:</p> <ol style="list-style-type: none"> 1) Continue to operate and maintain Promontory Park recreation area 2) Manage boat-in day use area on south shore of North Fork 3) Make improvements at areas serving North Fork Reservoir 4) Conduct a feasibility/ viability assessment of siting the proposed Springwater Corridor Trail Extension across Project lands
North Fork Dam to Faraday Diversion dam	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>The diversion pool varies in elevation by about 5 ft to regulate flow variation associated with peaking at North Fork Powerhouse</p>	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>Maintain year round water levels as follows: 526.0 ft maximum, 521.0 ft normal minimum, 516.0 ft extreme minimum</p> <p>Fish Passage</p> <ol style="list-style-type: none"> 1) Retrofit screens in existing bypass on north bank of North Fork dam with screening material that is consistent with NOAA criteria in 2007 2) Rebuild and extend juvenile bypass pipeline to North Fork dam, construct new downstream migrant sampling facility, and decommission the existing downstream migrant separator and bifurcation box 3) Decommission existing fish trap and construct new fish trap <p>Terrestrial Resources:</p> <ol style="list-style-type: none"> 1) Install 2 wildlife bridges along the North Fork Fish Ladder and monitor seasonal wildlife use of the bridges during years 2 and 5 following construction 2) Install 8-ft high wildlife exclusion fence along the uphill side of the North Fork Fish Ladder between the separator and upstream access road crossing 3) Monitor animal entrapment, injury, and mortality in the North Fork Fish Ladder
Faraday Diversion Dam	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>From Apr-Jun and Sep-Oct, 50 percent of the river's flow is spilled at the Faraday Diversion dam (for smolt passage) beginning with onset of spill at NF Reservoir and lasting 24 to 48 hours depending on NF spill volume/ background flow conditions</p>	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>From April 1 – June 30 and October 1 – December 15, spill 50 percent of the river's flow at the Faraday Diversion dam (for smolt passage) beginning with onset of spill at North Fork Reservoir and lasting 24 to 48 hours depending on North Fork spill volume/background flow conditions</p>
Faraday Diversion Dam to Faraday Powerhouse (Reach 2D)	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>1956 Memorandum of Agreement (MOA) set minimum flows at 50 to 90 cfs; PGE normally routes 100 cfs through the bypass reach</p>	<p>Flow Regime/Reservoir Levels/Operations:</p> <ol style="list-style-type: none"> 1) Maintain year round base flow of 270 cfs. Baseflow may be reduced after 2013 if spillway entrainment reduced by at least 50 percent by spillway exclusion net at spills up to 4,000 cfs NOTE – State Instream water right with varying minimum flows below Faraday corresponding to July 1-Sept 15 of 400 cfs, and Sept 16-June 30 of 640 cfs. 2) Provide pulsed flow releases from April to October between 120-480 cfs (frequency and duration of pulsed flows vary – see Fish Passage and Protection plan) <p>Fish Passage:</p> <ol style="list-style-type: none"> 1) During periods of unscreened spill at North Fork dam greater than 1 hour during major smolt migrations (between April 1 – June 30 and October 1 – December 15), spill 50 percent of flow at Faraday Diversion dam and spill minimum 400 cfs at River Mill dam 2) Until the downstream fry criteria fish screening facilities at River Mill dam are fully operational, during periods of unscreened spill at North Fork dam lasting 1-12 hours during major smolt migrations, spill at Faraday dam for 24

REACH	CURRENT OPERATIONS/FACILITIES	PROPOSED ACTION – SETTLEMENT AGREEMENT
		<p>hours after cessation of spill at North Fork dam</p> <p>3) Until the downstream fry criteria fish screening facilities at River Mill dam are fully operational, during periods of unscreened spill at North Fork dam lasting longer than 12 hours during major smolt migrations, or spills greater than 2,000 cfs regardless of duration, spill at Faraday dam for 48 hours after cessation of spill at North Fork dam</p> <p>4) After the downstream fry criteria fish screening facilities at River Mill dam are fully operational, when spill at North Fork dam exceeds the capacity of the spillway exclusion net during major smolt migrations, spill 50 percent of the flow at Faraday Diversion dam</p> <p>5) Implement a revised pulsed flow protocol</p>
Faraday Lake/ Faraday Powerhouse	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>1) Minimum flow is 0 cfs</p> <p>2) Maximum flow is 5,120 cfs (hydraulic capacity after turbine upgrade; current water right is 5,020 cfs)</p> <p>3) Maximum ramping rate: no license requirement</p> <p>4) Faraday Lake elevation is held nearly constant</p>	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>Maintain Faraday Lake water level as follows: 520.2 ft maximum, with a 515.0 ft minimum, and 510.2 ft extreme minimum</p> <p>Recreation:</p> <p>1) Continue to operate and maintain the Faraday Day Use area</p> <p>2) Improve accessible elements (tables, parking)</p> <p>3) Alter railing on dam to consider needs of disabled anglers</p>
Estacada Lake	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>Current operations involve up to 3 ft of reservoir fluctuation behind the Obermeyer weir on a regular basis.</p>	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>Maintain Estacada Lake levels as follows: 389.0 ft maximum, 387.0 ft normal minimum (flashboards up), and 384.5 ft extreme minimum (flashboards down). Limit lake level fluctuations to 2.0 ft during periods when winter steelhead and coho redds are present.</p> <p>Fish Passage</p> <p>1) Close Timber Lake public boat launch</p> <p>Recreation:</p> <p>1) Replace and relocate boat launch at Timber Park</p> <p>2) Provide an accessible restroom at Timber Park</p> <p>3) Enhance angler access at Timber Park</p> <p>4) Provide additional slide-type launch in a location to be determined by the City of Estacada</p> <p>5) Provide a single-lane boat launch and trailer parking</p>
River Mill Dam	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>See flow regime for lower Clackamas River (below)</p> <p>Fish Passage:</p> <p>1) New fish ladder as mandated in the June 18, 2003 FERC license amendment</p> <p>2) Spillway slot for downstream passage of smolts (June 18, 2003 FERC license amendment)</p> <p>3) Modified downstream migrant bypass exit pipe, i.e., “outfall”(June 18, 2003 FERC license amendment)</p>	<p>Flow Regime/Reservoir Levels/Operations:</p> <p>See flow regime for lower Clackamas River (below)</p> <p>Fish Passage:</p> <p>1) River Mill dam - Design and construct juvenile downstream fry criteria fish screening facilities to accommodate full powerhouse flow (up to 4,000 cfs) within 3 years of license issuance</p> <p>2) Operate River Mill dam prototype juvenile bypass from time that improvements to spillway are completed until the permanent bypass is completed</p> <p>3) River Mill Tailrace Barrier - Design and install tailrace barrier to prevent injury and mortality to salmonids attempting to swim up draft tubes</p> <p>4) Until the downstream fry criteria fish screening facilities are fully operational, during periods of unscreened spill at North Fork dam lasting 1-12 hours, spill at River Mill dam will commence with spill at North Fork dam and continue for 36 hours after cessation of spill at North Fork dam</p> <p>5) Until the downstream fry criteria fish screening facilities are fully operational, during periods of unscreened spill at North Fork dam lasting longer than 12 hours, or spills greater than 2,000 cfs regardless of duration, spill at River Mill dam will commence with spill at North Fork dam and continue for 60 hours after cessation of spill at North Fork dam</p> <p>6) Construct a new River Mill fish ladder and juvenile bypass pipeline outfall in 2005</p>

REACH	CURRENT OPERATIONS/FACILITIES	PROPOSED ACTION – SETTLEMENT AGREEMENT
Lower Clackamas River Below River Mill Dam (Reach 2F)	<p>Flow Regime/Reservoir Levels/Operations: Flows downstream of River Mill dam as described in the November 21, 2001 Biological Evaluation, Table 9.1, and section 9.1.4; minimum discharge does not go below 600 cfs except when natural flow, and is considerably higher than 600 cfs during many months of the year.</p>	<p>7) Install a juvenile sampling/counting facility on the juvenile bypass pipeline 8) Construct a 500-cfs surface collection facility in the River Mill forebay within 2 years of license issuance</p> <p>Flow Regime/Reservoir Levels/Operations: 1) Operate the Project in an inflow-matching mode to provide flow releases below River Mill dam that equal the RMU inflow (a monitoring system will be developed to estimate the RMU inflow) 2) During maintenance activities, maintain minimum flow of 500 cfs or inflow, whichever is less 3) Flow adjustments not to exceed 50 cfs per hour 4) Ramping prohibited 5) Manage flows as described in Table 3 of the Environmental Assessment accompanying the River Mill license amendment (FERC, 2003)</p> <p>Fish Habitat: Augment gravel below River Mill dam - 8,000 cubic yards 850 feet below River Mill dam on the right bank. Augment roughly 8,000 cubic yards/yr for life of license.</p> <p>Recreation 1) Improve warnings to boaters regarding the emergency release valve at Oak Grove Powerhouse 2) Optimize generation schedules to benefit the Bob's Hole Rodeo kayaking event, when appropriate per the terms of the AIP 3) Continue to fund operation of USGS gage 14209000 and fund an upgrade of USGS gage 14209500 4) Contribute to local whitewater events per the terms of the AIP 5) Provide two access points, one permanent toilet, and one seasonal toilet during years 1-5 after issuance of the license, and maintain these facilities if they are sited within the Project boundary 6) Provide one additional access point and two additional permanent toilet within 6-15 years after issuance of the license, and maintain these facilities if they are sited within the Project boundary 7) Within 5 years of license issuance, determine the feasibility of a playboating feature at one of the two most highly-rated sites identified during the Faraday Diversion Whitewater Boating Study, and contribute to the construction and development of a feature as appropriate per the terms of the AIP</p>

PROJECT-WIDE MEASURES	PROPOSED ACTION – SETTLEMENT AGREEMENT
Fish and Aquatics	1) Provide the ODFW with the following hatchery funding: <ul style="list-style-type: none"> • Hatchery Production - \$750,000 • Assessing and Addressing Impacts to Wild Fish from Hatchery Fish - \$750,000 • Hatchery Intake Screens in the Clackamas River - \$750,000 • North Fork ladder Adult Sorting Facility – All funding necessary 2) Provide Clackamas Mitigation Fund - establish eight million dollar mitigation fund 3) Contract an external expert to design and implement a fish population assessment 4) Implement the tiered decision-making process as follows (see AIP for definition of A-D measures): <ul style="list-style-type: none"> • Implement “A” and “B” measures from the Downstream Juvenile Salmonid Passage Settlement Agreement • If survival standards are not met after implementation of “A” and “B” measures and survival of all species exceeds 88 percent, implement “C Round 1” measures • If survival standards are not met after implementation of “C Round 1” measures and survival of all species exceeds 91 percent, implement “C Round 2” measures • If survival standards are not met after implementation of “C Round 2” measures and survival of any one species is less than 91 percent, develop a plan for construction of D measures to be implemented within 4 years of completion of the studies • If survival standards are not met after implementation of “A” and “B” measures and survival of all species is less than 88 percent, develop a plan for construction of D measures to be implemented within 4 years of completion of the studies 5) Establish and provide administrative support for a Clackamas River Fish Committee 6) Implement measures necessary to accomplish narrative standard of safe, timely, and effective upstream and downstream passage of Pacific lamprey
Geology and Soils	Address shoreline erosion at Meditation Point or other appropriate sites through targeted engineering measures
Terrestrial Resources	1) Implement a Terrestrial Resource Coordination Plan within one year of license issuance in consultation with the USDA Forest Service 2) Establish and provide administrative support for a Clackamas Terrestrial Resources Working Group 3) Schedule routine maintenance and new construction in accordance with spatial and temporal constraints for sensitive plants and animals 4) Implement Habitat Connectivity and Species Disturbance Plan 5) Implement Vegetation Management Plan 5) Implement Wetland and Riparian Habitat Mitigation and Enhancement Plan 6) Implement Terrestrial Resources Monitoring Plan 7) Develop, fund, and implement additional measures to improve wildlife habitat connectivity as determine necessary by the TRWG during the term of the new license 8) To the extent that public safety and is not compromised, adhere to temporal constraints on routine maintenance, new construction, and facility inspection in sensitive species’ habitats
Recreation	1) Implement the Recreation Resource Management Plan 2) Contribute \$25,000 annually toward law enforcement for Project facilities on National Forest System lands 3) Provide \$30,000 annually to the Oregon State Marine Board to be used for a Clackamas County Marine Deputy Sheriff position
Land Use and Aesthetics	1) Assume all annual and periodic maintenance responsibilities to maintain Segments 1,2,3,4, Road 4600-200, and Road 4630 at their current level. If USFS upgrades Segment 4, it will be maintained at that new level of development. 2) Conduct maintenance and upgrades on portions of Road 57 in years 12 and 13 of new license 3) Provide \$80,000 annually to a Project Roads account. Provide \$1,000,000 toward Segment 4 upgrades in (each) Years 15 and 20 4) Maintain responsibility for fire prevention and suppression costs on Project lands
Cultural Resources	Implement the Historic Properties Management Plan

PROJECT-WIDE MEASURES	PROPOSED ACTION – SETTLEMENT AGREEMENT
Changes to the Project Boundary	<ul style="list-style-type: none"> • Extend the Project boundary downstream along both side of the Upper (approx. 0.25 mile) and Lower Oak Grove Fork (approx. 4.8 miles) to encompass cutthroat trout habitat improvement measures and the base flow release structure (Proposed License Condition 7) and habitat improvement measures (Fish Passage and Protection Plan, Section VIII) • Extend the Project boundary above Timothy Lake to include the Oak Fork, Pine Point, “the Cove” walk-in, proposed Hoodview, proposed Gone Creek, and proposed groups sites described in the RRMP. • Create Project boundary “islands” to include recreation sites near Timothy Lake and Lake Harriet; wetlands mitigation sites at Davis Ranch; and proposed cutthroat trout habitat mitigation structures along Dinger Creek. • Extend the Project boundary to include the proposed Brook Trout Spawning Disruption structures and the following USFS Roads: Road 4600200 Segment 2, Segment 3, and Segment 4 and Road 4630. • Extend the Project boundary to include: (i) the day use area on Paradise Island; (ii) all new and modified fish passage facilities as well as any other construction and operation for fish passage require an extension; (iii) the secure storage site for large woody debris from the North Fork Reservoir; and (iv) the wetlands mitigation area at Promontory Park. • Extend the Project boundary to include the play boating feature to be developed in the Faraday Diversion Reach if it is in an area not already within the boundary. • Extend the Project boundary to include: (i) the areas utilized in implementing the gravel augmentation program below River Mill Dam; (ii) areas of Timber Park included in the RRMP but not within the boundary; and (iii) all portions of the new boat launch at Estacada Lake not already within the boundary at the time of license issuance.

2.3 STAFF ALTERNATIVE

Based on our independent review of the Proposed Action (Settlement Agreement) with respect to our recently issued Settlement Policy Statement (FERC, 2006), our review of the record in this proceeding, and our assessment of the environmental and economic effects of the proposed Project, we developed the Staff Alternative, which includes the Proposed Action with staff-recommended modifications (Staff Alternative). We discuss this alternative in section 5 of this FEIS.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

We considered several other alternatives to the relicensing proposals presented herein, but eliminated them from detailed study, because they are not reasonable under the circumstances of this case. These alternatives include: 1) federal government takeover and operation of the Project; 2) issuance of a non-power license upon expiration of the current Project license; 3) retiring the Project; and 4) increasing Timothy Lake levels for water providers downstream. We discuss the rationale for eliminating these alternatives from detailed study in the following sections.

2.4.1 Federal Government Takeover of the Project

In accordance with §16.14 of the Commission's regulations, a federal department or agency may file a recommendation that the United States exercise its right to take over a hydroelectric project with a license that is subject to sections 14 and 15 of the FPA (16 U.S.C sections 791(a) – 825(r)). Federal takeover of the Project would require Congressional approval. No federal agency has recommended federal takeover of the Project and no federal agency has expressed interest in operating the Project. In this case, we do not consider federal takeover to be a reasonable alternative.

2.4.2 Issuing a Nonpower License

A nonpower license is a temporary license that the Commission would terminate whenever it determines that another governmental agency would assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. No agency has sought a nonpower license and we have no basis for concluding that the Project should no longer be used to produce power. Thus, a nonpower license is not a reasonable alternative.

2.4.3 Retiring the Project

Retiring the project would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions. Termination or surrender of the existing license would entail one of two project retirement alternatives: 1) Project retirement without dam removal, or 2) Project retirement with dam removal.

Project retirement without dam removal would involve retaining the dams and reservoirs, while disabling or removing equipment used to generate electricity. This option would result in the loss of the Project's energy production, system operating benefits, tax revenues, and operation-related employment and would require the Commission to identify another government agency willing and able to assume regulatory control and supervision of the remaining facilities. The changes to Project operations and the additional measures proposed by PGE and any required by the Commission at relicensing would not occur. This retirement option avoids the temporary adverse impacts of dam removal, but it also precludes the long-term benefits of the additional measures proposed by PGE or required by the Commission at relicensing. No agency or other party has recommended this alternative. Moreover, the Portland metropolitan region relies, in part, on the power generated by the Project, and decommissioning the Project would require a source of replacement power, which has not been identified. Because decommissioning in-place provides no incremental benefits to any resource area different from other alternatives we examine in detail, eliminates the power benefit, and still continues a maintenance cost burden, we do not consider this decommissioning alternative further.

Removal of the Project works would also provide no significant benefits over other alternatives we evaluate in detail. This alternative would also involve several significant adverse effects in addition to the loss of generation capacity. Most significantly, it would involve management of at least 12 million tons of accumulated sediment by either dredging or release downstream (McBain and Trush, 2002). Both sediment management alternatives involve potentially significant adverse environmental and economic impacts. Potential environmental effects include mobilization of stored and immobilized contaminants behind the dams, increased turbidity and sedimentation, and lowered water quality in the Clackamas River. It would also involve conversion of flatwater resources to riverine resources. Because decommissioning with removal of the Project facilities would induce a significantly higher economic and environmental cost than other alternatives and has not been recommended by any of the resource agencies, we do not evaluate this alternative further.

2.4.4 Increasing Timothy Lake Water Storage Capacity for Downstream Water Providers

The Sunrise Water Authority and the Oak Lodge Water District expressed interest in an alternative to increase the storage capacity (and therefore raise the water level) of Timothy Lake for water suppliers in the Lower Clackamas River Basin. Water providers cite critical needs for additional water storage capacities throughout the region as justification of this alternative and support all options potentially available for meeting future water demands in Clackamas County. Water providers also suggest that increasing the storage capacity could have power benefits to the Project.

Staff evaluated this alternative within the context of the current collaborative process and concluded that this alternative is not reasonable for the following reasons:

- There is insufficient evidence that additional water yield exists in the Upper Oak Grove Fork Watershed to provide for additional storage needs. Existing data suggest that the average water yield in the watershed is essentially captured by the current design and operation of Timothy Lake.
- There is insufficient evidence that Sunrise Water Authority or Oak Lodge Water District have or can obtain the required water rights in the Upper Oak Grove Fork Watershed.

For these reasons, we do not consider increasing Timothy Lake water levels to increase water storage for downstream water providers to be a reasonable alternative.