

5.0 STAFF'S CONCLUSIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a proposed project, we equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the proposed project with staff-recommended modifications (Staff Alternative), as the preferred option. We recommend this option because: (1) issuance of a new hydropower license by the Commission would allow PGE to operate the project as an economically beneficial and dependable source of electrical energy for its customers; (2) the 173-MW project would eliminate the need for an equivalent amount of fossil-fueled derived energy and capacity, which helps conserve these nonrenewable resources and limits atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish, wildlife, and cultural resources and would provide improved recreation opportunities at the project.

Table 5.1-1 summarizes the proposed environmental measures we recommend and do not recommend be included as provisions of any new license. In addition, we also recommend the following measures:

- PGE proposes to both maintain a minimum Timothy Lake elevation of 3,189.0 feet at any time before the day after Labor Day and release 60 cfs or inflow, whichever is less, below Timothy Lake from Memorial Day through Labor Day (Proposed Article 6). We determined that in some years, especially dry years, PGE may not be able to concurrently comply with both requirements. Therefore, as part of our recommended Operations Compliance Plan (Proposed Article 16), we also recommend that PGE establish the priority between the minimum lake elevation and the minimum flows.
- undertake any and all additional measures necessary to ensure that the proposed upgrade of Forest Road 5700 is completed, notwithstanding the proposed limitation on expenditures for the upgrade.

- undertake any and all additional measures necessary to ensure that the proposed stranding evaluation downstream of River Mill dam is completed, notwithstanding the limitation on expenditures for the evaluation.
- in consultation with the Forest Service, include within the Form 80 Recreation Report any proposals for recreation enhancement at Lake Harriet.
- enclose within the project boundary, three improved recreation sites in the Three Lynx reach.
- fully implement the proposed pulse flow evaluation and interim pulse flow protocol if not completed under the existing license.
- file for Commission approval proposed interim and final pulse flows to be released downstream of the Faraday diversion dam.

The following is a discussion of the basis for the Staff Alternative and proposed measures we do not recommend be made provisions of any new license.

Stranding Evaluation Below River Mill Dam

PGE proposes to file with the Commission for approval, a plan for a study to evaluate the risk for juvenile salmonid stranding in the lower Clackamas River associated with proposed flow releases downstream of River Mill dam. The plan would include a provision that PGE provide up to \$50,000 of the cost of the study.

This study would be used to monitor the risk of juvenile salmonid stranding associated with low flows below River Mill dam. Although we are recommending the study, we are also requiring PGE to undertake any and all additional measures necessary to ensure the evaluation is completed, notwithstanding the proposed limitation on expenditures for the study.

Faraday Diversion Pulse Flow Study

PGE proposes, and ODFW recommends, to release and evaluate pulse flows in 120-cfs increments between 120 cfs and 480 cfs for purposes of establishing a permanent pulse flow at the Faraday diversion to encourage upstream migrations of spring Chinook salmon past the Faraday powerhouse and through the Faraday bypassed reach. The minimum and maximum duration of the pulse flows would be 12 and 72 hours respectively. The frequency would vary during the migration season and would range from once every two weeks to every fourth day. In the interim, PGE would release interim pulse flows within the

magnitudes, durations, and frequencies noted above. PGE proposes to release the interim pulse flows and commence the pulse flow evaluation by January 2007, which could occur prior to issuance of any license issued for the project.

PGE's proposal and the agencies' recommendations for the interim and permanent pulse flows and evaluations utilize an adaptive management approach with clearly defined upper and lower bounds. In section 3.2.3.2, we analyze the benefits of the pulse flows, and in section 4 we analyze the cost of PGE's proposed operations for the entire project, which includes the pulse flows at the Faraday diversion. In this section, we recommend the pulse flows and study as proposed by PGE. If the pulse flow evaluation and establishment of an interim pulse flow protocol would not be fully implemented under the existing license (with prior Commission approval as necessary), then we recommend the full implementation of the evaluation and protocol under any new license. We also recommend that provisions be included in any new license for PGE to include for Commission approval, proposed interim pulse flows with their proposed pulse flow study plan (if the plan would not already be implemented under the existing license) and proposed final pulse flows with their study plan results.

Oak Grove Fork Fish Enhancements

PGE proposes to develop and implement an Oak Grove Fork Mainstem Fish Habitat Enhancement Plan with provisions for instream fish habitat structures and gravel augmentation. With regard to the instream fish habitat component, PGE would create complexes of large woody debris (i.e., engineered log jams) at six sites on the Oak Grove Fork. PGE would also prepare work plans to identify monitoring, maintenance, reconstruction, construction, or administrative needs associated with the habitat structures. PGE would provide funding to the Forest Service to implement the annual work plans. Funding amounts would be \$15,000 per year commencing the first year of construction and continue for a period of 10 years, after which the annual contribution would be reduced to \$7,500 for the remainder of the license term. The large woody debris complexes would be included in the project boundary.

We note that the Commission recently affirmed in its Settlement Policy Statement¹ that while a licensee may hire a third party to perform a requirement of the license, as PGE proposes to do here, the ultimate responsibility for ensuring compliance with the conditions of the license rests with the licensee. Therefore, although we are recommending the proposed instream habitat structures, including

¹ *Settlements in Hydropower Licensing Proceedings under Part I of the Federal Power Act*, 116 FERC ¶61,270 at P 3-6 (2006).

the annual work plans, we do not recommend a provision for PGE to provide funding to the Forest Service to implement the annual work plans on PGE's behalf.

Disruption of Kokanee and Brook Trout Spawning at Timothy Lake Tributaries

PGE proposes, and Oregon HART recommends, that PGE develop and implement a plan to install weirs within tributaries to Timothy Lake for purposes of disrupting kokanee and brook trout spawning and with the overall goal of improving conditions for cutthroat trout. The plan would include provisions for visually monitoring the weirs to assess their effectiveness as barriers to upstream migrations of kokanee and brook trout. The plan further includes provisions for periodic sampling of fish populations of Timothy Lake and tributaries as part of the determination of the effectiveness of the weirs. If the weirs prove to be ineffective, PGE would provide annual funding to be used at the discretion of a Fish Committee for mitigation projects in the Oak Grove Fork basin. Annual funding would be equivalent to the average annual cost (escalated to account for inflation) of the spawning disruption program during years 3 through 7 but in an amount no less than \$5,000. The project boundary at Timothy Lake would be expanded where necessary to include the weirs.

In section 3.2.3.2, we determined that the weirs would be beneficial to increasing populations of cutthroat trout (by reducing or eliminating competition for resources with brook trout and kokanee) in the Timothy Lake tributaries; therefore, in this section, we recommend that PGE develop and implement a plan for Commission approval to disrupt kokanee and brook trout spawning in the tributaries. However, PGE has not identified either the alternative measures that would be implemented if the weirs would be unsuccessful or the site-specific effects that the measures would address (including the location where the measures would be implemented). Because the measures and site-specific effects that the measures would address have not been identified, we are unable to determine either the benefits of the measures or whether the measures would have a nexus to the project. We therefore have no basis for recommending a provision that PGE implement additional measures, in lieu of the weirs, for enhancing cutthroat trout populations.

Reconnection of Cutthroat Trout Populations Upstream and Downstream of Timothy Lake Dam

PGE proposes studies to evaluate the need to transfer cutthroat trout from below Timothy Lake dam to above the dam in order to provide genetic exchange. If the studies would indicate that such a transfer would be beneficial as determined

by a Fish Committee, then PGE would implement a program for providing upstream connectivity between the two subpopulations. The measure is also recommended by ODFW.

We find that the proposed measure would not fulfill the project purpose of protecting or enhancing fish populations as would other measures that we recommend for fishery resources in the project area. Although we recognize that connectivity measures in general (e.g., a fishway) may be beneficial to fish populations, a genetic study itself does not constitute an environmental measure in this instance, in that it would neither protect or enhance the cutthroat trout population nor be related to any specific and concrete measures at Timothy Lake that have been proposed or recommended for the cutthroat trout population to date.²

Additionally, we find that the information submitted in the project record is sufficient for us to conduct our NEPA analysis of the environmental issues and related protection, mitigation, and enhancement measures. We do not find a need for still more baseline information that would be gained through a post-license genetic study that very well could have been conducted prior to license issuance. For these reasons, we find that conducting genetic studies of cutthroat trout populations at Timothy Lake would have no benefits for fisheries resources, and therefore, we have no justification for recommending that PGE conduct such studies.

Juvenile Lamprey Standards

PGE proposes to adopt a technology-based juvenile lamprey passage standard at the project as part of a downstream lamprey passage plan for the project should the Pacific Region of the USFWS adopt such a standard during the term of any new license issued for the project. PGE would consult with a Fish Committee regarding potential measures needed to comply with the standard. After consultation with the Fish Committee and with approval of the Fish Agencies, PGE would develop a plan to implement the new standard after Commission approval. These measures were also recommended by ODFW.

We have no justification for recommending compliance with standards that have yet to be established and where we are unable to determine the benefits and costs of measures necessary to ensure compliance with the standards. If juvenile lamprey passage standards would be established in the future, PGE, in

² In fact, we note in section 3.2.3.2 that no upstream passage measures have been proposed or recommended at Timothy Lake dam.

consultation with the settlement parties, could file an application to amend any license to incorporate the standards and associated measures. At that time, the Commission could analyze the benefits and costs of the measures and make a determination as to whether to require the standards and measures. Approval of the standards and associated measures for inclusion in any license would rest with the Commission.

Lamprey Guidance Efficiency

PGE proposes to develop a plan to estimate juvenile Pacific lamprey guidance efficiency at proposed juvenile bypass collection facilities at the River Mill and North Fork dams after a determination would be made by the Fish Committee that such a study would be feasible and “appropriate” technology were developed for studies of this type on juvenile lamprey. This measure was also recommended by ODFW.

In section 3.2.3.2, we note that no reliable technology currently exists for tracking individual juvenile lamprey past the project dams, and we have no way of assessing the benefits and costs of the measure. We therefore have no justification for recommending this measure. Should reliable technology be developed in the future, PGE could conduct such an evaluation on their own outside of any license issued for the project, because such a measure would not result in long-term changes to project operations or facilities. If PGE, in consultation with the Fish Committee, would desire to include a requirement for the study in any license, then PGE could file an application to amend the license to incorporate the measure.

Hatchery Funding

PGE proposes to enter into, and file with the Commission for approval, an agreement with Oregon DFW that provides for partial funding of the operation of Oregon DFW’s Clackamas River Fish Hatchery and for funding specified studies and improvements to the hatchery. The funding would be paid during the first 11 years commencing after the first calendar year of license issuance and would total between \$2,250,000 and \$2,500,000. Measures funded at the hatchery would include: (1) \$750,000 for the production and marking of spring Chinook salmon; (2) \$750,000 for the monitoring of the effects hatchery anadromous salmonids on wild anadromous salmonids in the river; and (3) between \$750,000 and \$1,000,000 to fund the replacement of existing hatchery screens to meet current NMFS screening criteria. PGE stated that these provisions would fulfill the project purposes of enhancing the recreational fishery affected by project operations and limiting the adverse effects that hatchery fish could have on wild

fish (see letter by Julie A. Keil, Director of Hydro Licensing; PGE; Portland, Oregon; filed on August 17, 2006).

PGE also clarifies that the timing of the funding for hatchery production is purposefully intended to coincide with the time it would take to get proposed fish passage improvements at the project constructed and operational, implying that the improved fish passage at the project, once operational, would take the place of hatchery funding that PGE has provided since 1977 to enhance the recreational fishery (see letter by Julie A. Keil, Director of Hydro Licensing; PGE; Portland, Oregon; filed on August 17, 2006)

Providing for the continued stocking of spring Chinook salmon in the Clackamas River during the construction and testing of the proposed fish passage facilities would continue to benefit the recreational fishery. About one hundred thousand spring Chinook salmon per year would be released to rear in the ocean, some of which would return to the Clackamas River as adults, thereby providing a fishing opportunity for anglers. Providing for the monitoring of the stocked spring Chinook would assist in limiting the adverse effects that stocking would have on wild, federally listed anadromous salmonids. We, therefore, find that the annual cost of \$150,000 to provide for the stocking of spring Chinook salmon and monitoring of any resulting effects on anadromous fish would be justified by the aforementioned benefits.

With respect to providing funds to third parties to perform a measure, the Commission noted in its recently issued Settlement Policy Statement that it has no jurisdiction over any party to a hydroelectric licensing proceeding other than the licensee, and that, it will look to the licensee to undertake a particular measure that it requires to fulfill a project purpose. We find that a license requirement for PGE to simply provide \$1.5 million over 10 years to Oregon DFW would not ensure that the performance of the proposed measures (i.e., stocking and monitoring of effects) would be fulfilled considering that the Commission does not have the necessary jurisdiction over Oregon DFW. We, therefore, recommend that PGE be fully responsible for providing the measures by filing a plan for Commission approval to provide for the stocking of the spring Chinook salmon and the evaluation of the effects of the hatchery fish on wild anadromous salmonids. We note that PGE would be free to reach an agreement with Oregon DFW to provide for the stocking and monitoring; however, under our recommendation, they would not be required to do so.

We note that the hatchery is not a project facility, and therefore, any adverse environmental effects caused by Oregon DFW's operation of the hatchery, including any related screening effects, are unrelated to the Clackamas Project.

We therefore, have no justification for recommending that PGE take responsibility for providing for the hatchery screen upgrade.³

Funds for Maintaining Bird Nest Boxes

As part of a terrestrial resources management plan (TRMP), PGE proposes to contribute \$500 annually to the Forest Service to help fund a volunteer program for maintaining and monitoring wildlife use of the nest boxes installed around Timothy Lake. The Forest Service, ODFW, and FWS recommend this measure.

In section 3.2.4.2, we find that the nest boxes at Timothy Lake are benefiting cavity nesting birds. In this section, we find that continuing to monitor and maintain the boxes would be worth the minimal cost of doing so, and therefore, we recommend a license provision requiring PGE to be responsible for ensuring that the boxes are monitored and maintained in good working condition. However, we recommend that PGE be responsible for monitoring and maintaining bird nest boxes at Timothy Lake, not just providing funding to the Forest Service. 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.

Additional Wildlife Measures

As part of their proposed TRMP, PGE, in consultation with the terrestrial resources working group (TRWG), would develop, fund, and implement additional measures to improve wildlife habitat connectivity and protect threatened, endangered, and sensitive species and habitats in the project area, as determined necessary by the TRWG during the term of the new license.

We are not recommending these items in the TRMP. The measures are as yet unidentified; therefore, we are unable to determine the benefits and costs associated with the measures, determine whether the measures would have a nexus to the project, and make a public interest finding with respect to the measures. If PGE, in consultation with the TRWG, proposes to construct additional measures at the project in the future, then PGE could file an application to amend the license to incorporate the measures.

³ We also add that we have no reason to conclude that Oregon DFW would be unable to fulfill its obligations with respect to the operation and maintenance of its hatchery for the purpose of enhancing the recreational fishery in the project area; therefore, we have no justification for recommending that PGE acquire the rights to the hatchery, include it within the project boundary, and undertake the operation and maintenance of it as part of the Clackamas Project.

Wetland Enhancements

PGE proposes to restore wetlands at Davis Ranch, Promontory Park, and North Mountain. The Forest Service, ODFW, and FWS also recommend the proposed wetland enhancement measures. PGE would include the restored wetlands at Davis Ranch and Promontory Park within the project boundary.

In section 3.2.4.2, we find that the wetland enhancement measures at Davis Ranch and Promontory Park would increase the quality and quantity of wetlands in the project area and would benefit amphibians and other wetland-dependent wildlife. However, we do not recommend the North Mountain wetland site for several reasons. First, the site is in an adjacent river basin and has no hydraulic connection to the project; it therefore has little relationship to project purposes or effects. Further, the measure is not intended to mitigate for wetland impacts associated with new Project construction, changes in operation, or some action resulting from the proposed license application. Also, PGE would not own and manage the site under the Proposed Action. Instead, the Western Rivers Conservancy would purchase the site and transfer it to the Forest Service. Either the Forest Service or the Western Rivers Conservancy would manage the site. PGE's role is limited to providing up to \$800,000 to the Western Rivers Conservancy to facilitate the purchase. In general, we recommend licensees be responsible for all proposed measures that have ongoing operation and maintenance responsibilities, rather than providing funds to third parties. Given the tenuous nexus to the project, and the fact that PGE would have no responsibilities for this site, we do not recommend the North Mountain wetland site be included in any license.

Law Enforcement

PGE proposes to annually contribute \$25,000 toward law enforcement support for project facilities on Forest Service lands. PGE would also provide \$30,000 annually to the Oregon State Marine Board to be used for a Clackamas County Marine Deputy Sheriff position to patrol Timothy Lake, Lake Harriet, North Fork reservoir, and Estacada Lake. PGE would include use of a boat slip at North Fork reservoir for a County Marine Patrol boat. The Forest Service has recommended these law enforcement measures.

We do not recommend that PGE's proposed \$25,000 contribution be made a license requirement. In Section 3.2.7.2.1 of the FEIS we conclude that increased law enforcement presence could provide better coverage and response to safety and security throughout the Project area. The Commission; however, has no way of assuring that any payment made by PGE for hiring of law enforcement personnel or providing facilities for law enforcement personnel use will actually

accomplish the intended goal or ameliorate project effects. While PGE may hire others to perform certain tasks, the burden of compliance rests with PGE, not a third party. PGE may enter into any “side” agreement, “off license” it desires with OSMB to accomplish the law enforcement goal.

Clackamas Lake Campground

PGE proposes as part of an RRMP for the project to provide \$50,000 toward a one-time upgrade of facilities at the Forest Service’s, non-project Clackamas Lake Campground. The upgrade would likely include 10-15 corrals for horses, 5-10 highlines for horses, and between one and three restroom facilities (depending upon cost).

Clackamas Lake Campground is a Forest Service facility on Clackamas Lake, which is located about 3 miles from Timothy Lake. As the campground is located on a non-project lake, the campground bears no relationship to the project; therefore, we do not recommend this measure.

Forest Service Annual Administrative Fee

PGE proposes as part of an RRMP for the project to pay an annual administrative fee to the Forest Service in the amount of \$7,000. The fee would be used to pay for the Forest Service’s participation in the review of annual operating plans associated with project recreation sites on Forest Service managed lands surrounding Timothy Lake.

In Section 3.2.7.2.1 of the FEIS we acknowledge PGE’s intent to provide \$7,000 to fund Forest Service administrative costs for its participation in the preparation of a RRMP and review of any annual operating plans and any site and construction plans. We consider such participation and review practices as a matter of normal management of the Mt. Hood National Forest that does not warrant special compensation. Furthermore, we have no jurisdiction to enforce Forest Service participation in the preparation and review of any plans. It would therefore be an inappropriate use of our authority to require PGE to pay for administrative costs that the Forest Service may incur in the implementation of the RRMP. This does not mean that PGE and the USFS are precluded from such an arrangement. In any settlement, the settling parties are free to enter into “off-license” or “side” agreements with respect to matters that the Commission does not include in a license.

Lake Harriet Site Enhancements

PGE proposes as part of an RRMP for the project to provide up to \$50,000 of recreation site enhancements at Lake Harriet upon a one-time request by the Forest Service any time after year 15 of any license issued for the project.

We are not recommending this element of the RRMP, because the enhancements are as yet unidentified and implementation is uncertain. We are unable to identify the costs and benefits of the measures as well as the need for the measures.

Every 6 years during a license term, PGE would be required to file a Form 80 Report explaining whether existing recreation facilities are meeting recreation needs. To address the concern regarding the future need for recreation enhancements at Lake Harriet, we recommend that PGE, in consultation with the Forest Service, file with their Form 80 reports any proposals for Lake Harriet recreation enhancements. At that time, the Commission could analyze the benefits and costs of the measures and make a determination as to whether to require the measures.

Annual Contributions for Area Whitewater Boating Activities

PGE proposes, as part of an RRMP, to make annual contributions to local whitewater events held on the Clackamas River and Oak Grove Fork between Timothy Lake and River Mill dam. The contributions would include providing access at the project's Promontory Park, other in-kind support, and direct financial support of \$4,000 annually.

PGE has not identified the specific measures that would be funded or provided supporting information for such measures. We find that the other measures that are proposed for whitewater boating that we recommend would provide sufficient whitewater recreation enhancement in the project area; therefore, we do not recommend that any new license include a provision for funding local whitewater events on the Clackamas River.

Improved River Access Sites in the Three Lynx Reach

PGE proposes as part of an RRMP to provide three improved river access sites (with shoreline access and staging and parking areas), three year-round toilets, and one seasonal toilet along the Clackamas River for boaters in the Three Lynx reach of the Clackamas River (*i.e.*, the Oak Grove powerhouse area). If the improvements would ultimately be sited in the proposed project boundary, PGE would maintain the facilities. If the sites would not be in the proposed project

boundary, a Boater Logistics User Body or “BLUB” consisting of PGE, the Forest Service, and various boating groups and interests would be responsible for maintaining the sites.

In section 3.2.7.2.1, we find that the number of boaters in the project area has increased significantly over the last few years and is projected to continue to increase and grow in popularity. We also note the need for improved parking, access, and sanitation facilities at put-in and take-out locations in the river. We conclude that improved sanitation facilities, parking, and access at boater put-in and take-out locations would be beneficial for recreation resources in the project area, and in this section, we recommend the measures.

We note that the Commission must retain adequate oversight over all project facilities and associated lands; therefore, we also recommend that PGE enclose all three of the proposed river access sites within the project boundary.

Playboating Features

PGE proposes as part of an RRMP to determine, in consultation with the BLUB, Fish Agencies, and Fish Committee, the feasibility of constructing playboating features in the Faraday diversion reach and below River Mill dam. If the sites would be feasible in terms of access, security, and resource concerns, PGE would make a one-time contribution of \$50,000 for the measures and \$5,000 per year for annual maintenance. If the two sites would be infeasible, PGE would either consider other sites or provide the funding for other as yet unidentified measures. PGE proposes to include the playboating features within the project boundary.

In section 3.2.7.2.1, we noted that adding playboating features to the Faraday diversion and River Mill reaches would improve whitewater boating opportunities in the project area, thereby providing an alternative to the heavily used Three Lynx reach located upstream. In this section, we recommend that PGE conduct the feasibility study and file for Commission approval a report of the results, including recommendations to construct or not construct the features at the aforementioned sites, based on the results of the study. If PGE, in consultation with the BLUB, Fish Agencies, and Fish Committee, would recommend alternative measures based on the feasibility study, the Commission would at that time analyze the benefits and costs of the alternative measures and make a determination as to whether to require the specific measures as provisions of any new license through a license amendment.

Feasibility Studies for Non-Project Recreation Facilities

PGE proposes as part of an RRMP to conduct a feasibility study for siting the OPRD's Springwater Corridor Trail Extensions across project lands once OPRD decides where the trail would intersect project lands. PGE also proposes to conduct a feasibility assessment for linking pedestrian traffic between the City of Estacada, the project's Timber Park, the OPRD's Springwater Trail Corridor, and Milo McIver State Park through a pedestrian bridge if: (1) the City of Estacada identifies the component as a key component in their Parks and Recreation Master Plan; and (2) OPRD identifies the linkage as a priority through their Park Master Planning Process in a park plan adopted for Milo McIver State Park adopted by the State Park Commission or as a critical connectivity link through the Springwater Corridor/Urban Link Trail Project Plan.

In both cases, PGE proposes to conduct feasibility studies, presumably in order 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. Because these measures are administrative in nature and not related to actual project recreation enhancements, we make no recommendations for the feasibility studies to be included as provisions of any new license issued for the project.

Road Maintenance

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. 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 \$1,000,000 dedicated toward an upgrade of the Road 5700 segment.

In section 3.2.8.2.1, we describe the road segments, including location, approximate length, and predominant users, and 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. We, therefore, recommend that the roads be made a part of the project and included within the project boundary, and that PGE file a plan for Commission approval to complete upgrades of Road 5700.

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. We note that the Commission carries out their regulatory responsibilities with respect to licensed projects through their licensees and cannot look to non-licensees for fulfillment of license requirements, including maintenance of project facilities. While a licensee may hire a third party to perform a requirement of the license, as PGE proposes to indirectly do here through a Project Roads Account, the ultimate responsibility for ensuring compliance with the conditions of the license rests with the licensee. Therefore, although we are recommending the inclusion of the access roads as project facilities, we do not recommend that a provision for PGE to establish a Project Roads Account be included in any license issued for the project.

Although we recommend that PGE upgrade the Road 5700 segment, we also recommend that the Commission reserve the right to require PGE to undertake any and all additional measures necessary to ensure the proper and safe functioning and maintenance of the access road, notwithstanding the limitation on expenditures proposed for the upgrade.

Modifications of Approved Plans

In a number of instances, PGE proposes modifications of approved plans as the situation dictates and in consultation with resource committees. For example, as part of their proposal for a comprehensive program of downstream fish passage studies (Proposed Article 32), PGE may, in consultation with the Fish Committee, make “minor” modifications to the study methodology for multi-year studies.

All revisions to a license, no matter how small, are by definition amendments, although the procedural and substantive requirements will vary according to the nature of the amendment.⁴ As such, we do not recommend including license requirements allowing PGE the discretion to implement modifications to previously approved plans or license requirements without prior Commission approval. If modifications are desired during the term of any license issued for the project, PGE could on a case-by-case basis consult with the

⁴ See Consumers Energy Company and The Detroit Edison Company, 87 FERC ¶ 61, 150 (1999) (P-2680, Ludington).

Commission's Division of Hydropower Administration and Compliance on appropriate procedures to follow for implementing such modifications.

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
FLOW REGIME/RESERVOIR LEVELS/OPERATIONS			
Timothy Lake	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)	Adopt	3-57, 3-63
	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.	Adopt	3-57, 3-63
Timothy Lake Dam to Stone Creek Diversion	Memorial Day through Labor Day - <ul style="list-style-type: none"> • Minimum 60 cfs or inflow, whichever is less • Maximum inflow +70 cfs 	Adopt	3-63
	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 	Adopt	3-63
	October 1 through October 31 – <ul style="list-style-type: none"> • Minimum 60 cfs or inflow, whichever is less • Maximum inflow +150 cfs 	Adopt	3-63
	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 	Adopt	3-63
	December 1 through February 28/29 <ul style="list-style-type: none"> • Minimum 30 cfs or inflow, whichever is less • Maximum inflow +300 cfs 	Adopt	3-63
	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 	Adopt	3-63
	Changes in stream stage at USGS gage not to exceed 0.2 ft/hr year round (except on days with inflow to TL exceeds 600 cfs).	Adopt	3-63
	Minimize frequency and duration of downramping and upramping rates above 0.2 ft/hr)	Adopt	3-63
Stone Creek Powerhouse to Lake Harriet	Flows as influenced by conditions listed for Timothy to Stone Creek Diversion	Adopt	3-161
Lake Harriet	Maintain water level of Lake Harriet at 2,039.0 ft, with minimum water level 2,020.0 ft	Adopt	3-69, 3-71
Frog Lake	Maintain lake elevation year round as follows: 1,988.0 ft maximum, 1,970.0 ft normal minimum, and 1,958.0 ft extreme minimum	Adopt	3-69, 3-71

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
Lake Harriet to Clackamas	Release base flows throughout the year, combined with higher flow releases during winter floods and spring runoff events: 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) 	Adopt	3-71
	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	Adopt	3-71
	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 	Adopt	3-71
	Fall pulse flows will be considered if members of Fish Committee provide information that shows the need for such flows	Adopt.	3-72
Oak Grove Powerhouse to North Fork	Maximum discharge is 740 cfs (turbine capacity)	Adopt	3-79
	Maximum upramping rate is 0.4 ft/hr year round except during spinning reserve call events	Adopt	3-79
	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 > 1200 cfs or 0.17 ft/hr if flow is < 1200 cfs February 1 through September 30 • 0.3 ft/hr October 1 through October 31 	Adopt	3-79, 3-191
	Complete two juvenile salmonid stranding studies; modify October rate to 0.17 ft/hr if necessary depending on results	Adopt. However, prior Commission approval would be required to permanently modify the interim ramping rate.	3-194
North Fork Reservoir	Maintain normal water levels between 663.0 and 665.0 ft except in winter when reservoir is drawn down up to 5 ft	Adopt	3-191
	Maintain flows in the North Fork Fish Ladder around 43 (45) cfs	Adopt	3-191
North Fork Dam to Faraday Diversion Dam	Maintain year round water levels as follows: 526.0 ft maximum, 521.0 ft normal minimum, 516.0 ft extreme minimum	Adopt	3-196
Faraday Diversion Dam	From April 1 –June 30 and October 1 – December 15, spill 50% 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	Adopt	3-197
Faraday Diversion Dam to Faraday Powerhouse	Maintain year round base flow of 270 cfs. Baseflow may be reduced after 2013 if spillway entrainment reduced by at least 50% by spillway exclusion net at spills up to 4,000 cfs.	Adopt. However, prior Commission approval would be required to reduce baseflow.	3-83, 3-196
	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)	Adopt	3-83, 3-196

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
Faraday Lake/ Faraday Powerhouse	Maintain Faraday Lake water level as follows: 520.2 ft maximum, with a 515.0 ft minimum, and 510.2 ft extreme minimum	Adopt	3-196
Estacada Lake	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.	Adopt	3-198
River Mill Dam	See flow regime for lower Clackamas River (below)	Adopt	3-199
Lower Clackamas River Below River Mill Dam	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)	Adopt	3-167
	During maintenance activities, maintain minimum flow of 500 cfs or inflow, whichever is less	Adopt	3-167
	Flow adjustments not to exceed 50 cfs per hour	Adopt	3-199
	Ramping prohibited	Adopt	3-199
	Manage flows as described in Table 3 of the Environmental Assessment accompanying the River Mill license amendment (FERC 2003)	Adopt	3-199
FISH PASSAGE			
Timothy Lake	Replace the top bar rack section with a solid panel increasing the depth of solid panel protection to 29 feet below water surface at 3190.0 ft and monitor the performance of the racks and panels for two years after installation	Adopt	3-207
	Replace Dinger Creek culvert to provide passage for cutthroat trout	Adopt. However, because the culvert would become a project facility, we also recommend that PGE maintain the culvert to ensure passage throughout the term of any license issued for the Project.	3-206
Timothy Lake Dam to Stone Creek Diversion	Install 225 1.5'-4' diameter boulders between the dam and Hammer Springs, spaced ~10 ft apart; incorporate large wood to extent possible	Adopt	3-168
	Replace Anvil Creek culvert to provide passage for cutthroat trout	Adopt. However, because the culvert would become a project facility, we also recommend that PGE maintain the culvert to ensure passage throughout the term of any license issued for the Project.	3-206
Lake Harriet	Provide minimum baseflows as per Settlement Agreement using water withdrawn through the Harriet Lake intake and tunnel to a new pipeline ending at the rivers edge	Adopt	3-173
Frog Lake	Replace the existing bar rack at the Frog Lake flowline intake with a rack with 0.75-inch open spacing and an approach velocity of approximately 1 ft/sec. If monitoring demonstrates a need, install cleaners.	Adopt. However, prior Commission approval would be required to install cleaners.	3-207
Lake Harriet to Clackamas	Provide minimum baseflows per Settlement Agreement.	Adopt	3-173
	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.	Adopt. However, prior Commission approval would be required to modify the bar rack.	3-207

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
North Fork Reservoir	Until the downstream fish passage collector is in operation at the North Fork forebay, limit generation to one unit at NFP when flows are between 3,500 and 7,500 cfs to maximize salmonid protection: <ul style="list-style-type: none"> • Operate guidance net upstream of North Fork Spillway and limit flow to 3500 cfs when river flows are between 3500 and 7500 cfs • When river flows exceed 7500 cfs, adjust flow to maintain a spill flow of 4000 cfs • Construct a 500 cfs surface collector in the dam forebay within 2 years of license issuance 	Adopt	3-209
	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. 	Adopt	3-209
	Design new screen system for the north bypass with 500 cfs capacity at NMFS criteria within 6 years of license issuance	Adopt	3-209
North Fork Dam to Faraday Diversion Dam	Retrofit screens in existing bypass on north bank of North Fork Dam with screening material that is consistent with NMFS criteria in 2007	Adopt	3-209
	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	Adopt	3-208
	Decommission existing fish trap and construct new fish trap. Prior to completion of the new fish trap, prepare a post-construction evaluation plan including hydraulic and biological evaluation procedures	Adopt	3-209
	Within 6 years of license issuance, design and implement evaluations of the physical and hydraulic suitability of conditions in the North Fork Fish Ladder for adult Pacific lamprey. Undertake measures to correct potential passage problems including: <ul style="list-style-type: none"> • Rounding off 90-degree corners at critical junctures in the ladder • Installing infrared lighting at any counting stations, instead of bright lights • Modifying ladder entrances • Eliminating predator access • Other modifications identified through regional and/or national Pacific lamprey research • Incorporate measures into the new sorting/trapping facility to allow monitoring of adult Pacific lamprey passage • Prevent lamprey access to the existing North Fork trap facility after it is discontinued 	Adopt. “Other modifications” require prior Commission approval if such modifications result in long-term changes to Project facilities or operations.	3-209
Faraday Diversion Dam to Faraday Powerhouse	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% of flow at Faraday Diversion Dam and spill minimum 400 cfs at River Mill Dam	Adopt	3-197
	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 hours after cessation of spill at North Fork Dam	Adopt	3-198
	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	Adopt	3-198

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	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% of the flow at Faraday Diversion Dam	Adopt	3-197
River Mill Dam	Operate and maintain the River Mill Fish Ladder and the North Fork Fish Ladder and fish sorting facility to provide safe, timely, and effective upstream passage of resident and anadromous fish. 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	Adopt	3-208
	Operate River Mill Dam prototype juvenile bypass from time that improvements to spillway are completed until the permanent bypass is completed	Adopt	3-208
	River Mill Tailrace Barrier - Design and install tailrace barrier to prevent injury and mortality to salmonids attempting to swim up draft tubes	Adopt	3-208
	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	Adopt	3-208
	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	Adopt	3-208
	Construct a new River Mill fish ladder and juvenile bypass pipeline outfall in 2005	Adopt. Required by amendment of existing license.	3-208
	Install a juvenile sampling/counting facility on the juvenile bypass pipeline	Adopt	3-209
	Construct a 500 cfs surface collection facility in the River Mill forebay within 2 years of license issuance	Adopt	3-210
FISH HABITAT			
Timothy Lake	Install approximately 3 aggregates of 10-15 logs each in Dinger Creek	Adopt	3-162
	Install weirs to disrupt spawning kokanee and brook trout	Adopt	3-162
	Establish and implement a blue-green algae monitoring program	Adopt	3-162
	Minimize entrainment of surface-oriented cutthroat trout into the Timothy Lake Dam intake through structural modifications of the existing bar rack	Adopt	3-207
	Develop and implement plans for the following measures: <ul style="list-style-type: none"> • Replace Dinger and Anvil Creek Culverts • Dinger Creek Habitat Enhancement • Disruption of brook trout and kokanee spawning in Timothy Lake tributaries-if disruption fails, then provide funding for basin Projects • Habitat enhancement downstream of Timothy Reservoir Dam. 	Adopt.	3-162, 3-206
	Conduct studies to determine need for upstream transfer of cutthroat trout for genetic exchange	Not adopt. These studies would not directly benefit fish and wildlife resources. Other measures that we recommend would provide sufficient enhancement for cutthroat trout.	

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Within 1 year of license issuance, file plans to replace the top bar rack section with a solid panel, and replace panels below that with a new bar rack that are 3/8” with ¼” clear spacing. Complete construction within 2 years of license issuance	Adopt	3-207
Timothy Lake Dam to Stone Creek Diversion	Enhance habitat in Oak Grove Fork mainstem and side channels. This includes: <ul style="list-style-type: none"> • Provide upstream and downstream access for all life stages of cutthroat trout on streams where current upstream access is blocked by road-related culvert barriers. Reconstruction of culvert barriers shall accommodate a 100-year flood event, including passage of bedload and debris. • Enhance instream habitat conditions for juvenile and adult cutthroat trout in Project-affected stream reaches and nearby tributaries 	Adopt	3-162, 3-206
Oak Grove Fork	Provide funds to the Forest Service to implement annual work plans to identify monitoring, maintenance, reconstruction, construction, or administrative needs associated with the Oak Grove Fork habitat structures.	Not Adopt. PGE would be responsible for ensuring compliance with the conditions of any license. Therefore, we do not recommend that a provision for PGE to provide funding to the Forest Service to implement the annual work plans be included in any license issued for the project.	
Lake Harriet to Clackamas	Transport all woody debris captured in Lake Harriet around dam and place it in the Oak Grove Fork below the dam	Adopt	3-173
	Create 40,000 ft ² of 1+ coho side channel habitat during summer base flow conditions through a combination of base flow increases and on-site Projects	Adopt	3-184
	Install large wood structures at 6 sites (Oak Grove Fork).	Adopt	3-189
	Augment 2,200-3,000 tons/yr of spawning gravel in first three years; 50-80 tons/yr thereafter	Adopt	3-172
	As part of an overall restoration strategy for the lower Oak Grove Fork, develop and implement two separate plans to create and enhance salmonid habitats with the following objectives: <ul style="list-style-type: none"> • Creation and Enhancement of Juvenile Coho Side Channel Habitat • Creation and Enhancement of Steelhead Mainstem Habitat • Creation and Enhancement of Anadromous Spawning Habitat • Creation and Enhancement of Spring Chinook Holding Habitat • Creation of Juvenile Salmonid Refugia Habitat during High Flows • Restoration and Enhancement of Natural Fluvial Process 	Adopt	3-172 through 3-189
North Fork Reservoir	Remove and stockpile all large wood entering North Fork Reservoir, reserve for instream habitat Projects in river and elsewhere in basin	Adopt	3-195
	Establish and implement a blue-green algae monitoring program	Adopt	3-162
Lower Clackamas River Below River Mill Dam	Implement Coarse Sediment Augmentation Plan in the Clackamas River below River Mill Dam: <ul style="list-style-type: none"> • 10-year plan to restore channel geomorphology 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 	Adopt	3-199

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
TERRESTRIAL RESOURCES			
	Implement the Terrestrial Resources Monitoring Plan, including: <ul style="list-style-type: none"> • Monitoring amphibians at the North Arm of Timothy Lake and within the drawdown zone • Monitoring wetlands in the North Arm of Timothy Lake • Monitoring cold water corydalis in the Oak Grove Fork between Stone Creek powerhouse and Lake Harriet • Monitoring sensitive plant species that are known to occur within the Project area 	Adopt	3-234
	Implement the Habitat Connectivity and Species Disturbance Plan, including: <ul style="list-style-type: none"> • Installation of 6 earthen ramps along Oak Grove pipeline • Installation of up to 20 low profile crossings over the Oak Grove pipeline • Implementation of a Frog Lake Wildlife Habitat Improvement Program, including vegetative screening • Installation of 2 wildlife bridges along the North Fork Fish Ladder and monitor seasonal wildlife use of the bridges during years 2 and 5 following construction • Installation of 8-ft high wildlife exclusion fence along the uphill side of the North Fork Fish Ladder between the separator and upstream access road crossing • Monitoring animal entrapment, injury, and mortality in the North Fork Fish Ladder • Schedules for routine maintenance and construction to avoid sensitive species and habitats during critical periods of the year • Development of management plans for all known bald eagle nest sites within 0.25 mile of Project facilities or within 0.5 mile in a direct line of sight of Project facilities. 	Adopt. Long-term changes to Project facilities associated with the plan would require Commission approval. We are not recommending measures that are as yet unidentified, because the benefits and costs associated with the measures, the nexus to the project, and the public interest are as yet undefined.	3-231
	As part of the Habitat Connectivity and Species Disturbance Plan, implement other measures if recommended by the terrestrial resource working group.	Not adopt. We have no justification for recommending the unidentified measures, because we are unable to determine the benefits and costs associated with the measures, and whether the measures would have a nexus to the project and be in the public interest.	3-231
	Implement the Vegetation Management Plan, including: <ul style="list-style-type: none"> • Methods for maintaining vegetation along transmission lines, distribution lines, Oak Grove Pipeline, other Project facilities on USDA-FS lands, PGE lands, or private lands. • Invasive, non-native plant species prevention and control • Methods for revegetation, where necessary 	Adopt	3-234

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Provide funding to the Forest Service to maintain and monitor bird nest boxes	Adopt. However, we recommend PGE monitor and maintain nest boxes, not just provide funding to the Forest Service.	
	Implement the Wetlands Mitigation Plan	Adopt, except for North Mountain wetlands which are located outside the Clackamas River basin (in the greater Sandy River basin). We have no justification for recommending that the measure be included as a part of a license, because the North Mountain wetlands lack a nexus to the project.	3-236
RECREATION			
	Contribute \$25,000 annually towards law enforcement on USDA-FS lands	Not adopt. Enforcement of local laws is not a matter of Commission jurisdiction.	3-304
	Contribute \$30,000 annually towards a Clackamas County Marine Deputy Sheriff position	Not adopt. Enforcement of local laws is not a matter of Commission jurisdiction.	3-304
	Provide a boat slip at North Fork Reservoir for a County Marine Patrol boat	Not adopt. Enforcement of local laws is not a matter of Commission jurisdiction.	3-304
Timothy Lake	Develop site plans for and reconfigure the Pine Point, Hoodview, Gone Creek, and Oak Fork campgrounds	Adopt	3-307
	Upgrade existing water supply infrastructure at Timothy Lake recreation sites	Adopt	3-307
	Repair or upgrade the two docks at Hoodview and Oak Fork campgrounds	Adopt	3-307
	Design and implement the shoreline enhancements plan at or adjacent to Timothy Lake recreation areas	Adopt	3-307
	Replace or upgrade elements (e.g., toilets/restrooms, picnic tables, fire rings, cooking grills, signage, tent pads, bumper pads, interior campground roads, parking spurs, graywater sumps, and Gone Creek amphitheater) 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	Adopt	3-307
	Improve/replace fishing pier near Pine Point and modify access	Adopt	3-307
	Enhance vegetative screening between campsites	Adopt	3-308
	Improve North Arm campground	Adopt	3-308
	Repair/upgrade six existing boat launches on Timothy Lake	Adopt	3-307
	Improve Cove walk-in campground	Adopt	3-308

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Stabilize shoreline erosion at Meditation Point	Adopt	3-307
	Develop an amphitheater to serve Hoodview and Pine Point campgrounds.	Adopt.	3-309
	Construct new 50-site campground	Adopt.	3-310
	Construct two new group sites	Adopt	3-310
	Assume maintenance and operations responsibilities at the developed campgrounds abutting Timothy Lake	Adopt	3-311
	Relocate or improve the Timothy Lake Trail	Adopt	3-312
	Construct four additional smaller loop trails for hiking and mountain biking	Adopt	3-312
	Convert the old road from the Timothy Lake campgrounds to the Clackamas Lake Guard Station to a trail for hiking and mountain biking.	Adopt	3-312
	Prepare a detailed Dispersed Sites Management Plan	Adopt	3-312
	Continue to use Timothy Lake Lodge for Project operations purposes	Adopt.	3-313
Clackamas Lake	Provide \$50,000 toward a one-time upgrade of facilities at the Forest Service’s, non-project Clackamas Lake Campground.	Not adopt. As the campground is located on a non-project lake, the campground bears no relationship to the project; therefore, we do not recommend this measure.	3-314
Lake Harriet	Reconfigure the Harriet Lake day use area to accommodate parking	Adopt	3-314
	Relocate the boat launch	Adopt	3-314
	Replace the existing outdated restroom at the Lake Harriet Campground	Adopt	3-314
	Adjust fishing dock at Lake Harriet to improve accessibility and accommodate the higher pool	Adopt	3-314
	Improve Forest Road 4630 adjacent to Lake Harriet, including annual dust abatement adjacent to the Lake Harriet campground	Adopt	3-315
	Improve shoreline access for anglers by constructing a shoreline walkway	Adopt	3-315
	Place large rocks at appropriate sites for sitting and angling. USFS will provide a suitable source for rocks within approximately five miles of Lake Harriet.	Adopt	3-315
	Provide two accessible parking spaces and access routes to shoreline walkway	Adopt	3-315
	Take steps to discourage pedestrian angler access to Lake Harriet Dam	Adopt	3-316
Clackamas River	Improve warnings to boaters regarding the emergency release valve at Oak Grove Powerhouse	Adopt	3-316
	Optimize generation schedules to benefit the Bob’s Hole Rodeo kayaking event when possible	Adopt	3-317
	Provide for the annual maintenance of USGS gage 14209000 and fund an upgrade of USGS gage 14209500	Adopt	3-318

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Contribute to local whitewater events on the Clackamas River	Not adopt. The proposal lacks specificity as to the exact measures and actions that would be implemented, and we find that other measures that we recommend would provide adequate whitewater recreation enhancement in the project area.	3-318
	Provide three improved river access sites, three year-round toilets and one seasonal toilet at sites along the Clackamas River to benefit private and commercial boaters.	Adopt. Include sites within Project boundary.	3-319
North Fork Reservoir	Continue to operate and maintain Promontory Park recreation area	Adopt	3-320
	Manage boat-in day use area on south shore of North Fork	Adopt	3-320
	Install amenities and provide trash removal and disposal, servicing of the sanitation station, and minor maintenance of the campsites at Paradise Island, and include the site in the Project boundary.	Adopt	3-321
	Conduct feasibility assessment of siting the Springwater Corridor Trail Extension across Project lands	Not adopt. The feasibility study would presumably be conducted in order 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 a study is administrative in nature and not related to actual project recreation enhancements.	3-321
Faraday Lake/ Faraday Powerhouse	Continue to operate and maintain the Faraday Day Use area	Adopt	3-322
	Improve accessible elements (tables, parking)	Adopt	3-322
	Alter railing on dam to consider needs of disabled anglers	Adopt	3-322
	Watch for conflicts with anglers and proposed structural changes	Adopt	3-322
	Determine the feasibility of a playboating feature along the Clackamas River in the Faraday Diversion Reach or below River Mill Dam, and if feasible, contribute to the construction of the feature. If not feasible, PGE will provide funds toward new whitewater boating-related opportunities or improvements on the Clackamas River. Include the playboating feature in Project boundary.	Adopt, except funding for unidentified alternative whitewater boating-related opportunities or improvements.	3-322
Estacada Lake	Enhance angler access at Timber Park	Adopt	3-324
	Maintain disc golf course opportunities at Timber Park	Adopt	3-324
	Retain on-going use of Timber Park for appropriate community events	Adopt	3-324
	Replace and relocate boat launch at Timber Park	Adopt.	3-324
	Evaluate the potential to provide public access to the south side of the Clackamas River below River Mill dam for angling.	Adopt	3-323
	Close the boat ramp near the new fish ladder at River Mill dam to motorized boating.	Adopt	3-323

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Provide one additional slide type car-top boat launch in a location to be determined by the City of Estacada	Adopt	3-323
	Provide a single-lane boat launch and trailer parking on south shore of Estacada Lake and a gravel road through McIver State Park. Include the launch and road in Project boundary.	Adopt.	3-324
	Conduct a feasibility assessment for a pedestrian bridge across the Clackamas River.	Not adopt. The feasibility study would presumably be conducted in order 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 a study is administrative in nature and not related to actual project recreation enhancements.	3-324
STUDIES			
	Develop Auxiliary Flow Improvements Hydraulic and Biological Evaluations	Adopt	Section 3.2.3
	Conduct field studies that clarify fish route selection, guidance efficiency, travel time, frequency of injury, and mortality rates at specific Project features over the range of flows	Adopt	Section 3.2.3
	Conduct Project-wide studies that provide an estimate of cumulative survival of outmigrant fish	Adopt	Section 3.2.3
	Conduct a Verification Study of the effects of Project-induced flow changes below River Mill Dam (PGE to fund up to \$50,000)	Adopt. However, we recommend that PGE be responsible for conducting and managing the study, rather than providing funding for the study.	Section 3.2.3
	Develop Upstream Passage Study Plan for River Mill, Faraday, North Fork, and Oak Grove Developments	Adopt	Section 3.2.3
	Evaluate cutthroat trout movements in the Oak Grove Fork below Timothy Lake Dam and investigate the genetic diversity and profile of cutthroat trout above and below Timothy Lake Dam to determine the need for transferring fish to maintain genetic diversity between isolated sub-populations. Develop and implement a cutthroat trout reconnection plan for isolated sub-populations, if warranted.	Not adopt. The study would not directly benefit aquatic resources, and we find that providing this information for agency management decisions is not needed for project purposes.	Section 3.2.3
	Develop Faraday Diversion Reach Pulse Flow Regime Study Plan	Adopt. Interim and final study plans and pulse flows would require prior Commission approval prior to implementation.	Section 3.2.3
	Complete studies necessary to identify the appropriate flow rate for the Faraday Bypass Reach	Adopt	Section 3.2.3

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Prepare and implement an evaluation plan that includes components that evaluate the flow depths and passage conditions using methodologies developed in consultation with the Fish Committee	Adopt	Section 3.2.3
	Monitor cutthroat trout sub-populations and aquatic habitat conditions above and below Timothy Lake Dam to assess changes in Project operations and effectiveness of enhancement actions	Adopt	Section 3.2.3
	Evaluate upstream and downstream Pacific lamprey populations at the Project.	Adopt.	Section 3.2.3
	As part of the lamprey passage evaluation, modify facilities based on monitoring results, conduct additional monitoring, and comply with future lamprey passage standards should such standards be established.	Not adopt. We have no justification for recommending these additional provisions at this time, because these measures are as yet unidentified and uncertain with regard to implementation. We, therefore, are unable to evaluate the benefits and costs of the measures and make a subsequent public interest determination.	Section 3.2.3
MANAGEMENT PLANS			
	Develop River Mill Fish Ladder and Faraday-North Fork Fish Ladder Operation and Maintenance Plan (Fishway O&M Plan)	Adopt	Section 3.2.3
	Develop North Fork Fish Ladder modification and Trap Plan	Adopt	Section 3.2.3
	Develop North Fork Fish Ladder and Trap Upstream Passage Measures Biological and Hydraulic Evaluation Plan	Adopt	Section 3.2.3
	Develop a Downstream Fish Passage Completion (Implementation) Plan	Adopt	Section 3.2.3
	Develop and implement an Oak Grove Fork Side Channel Enhancement Construction Plan to restore 1+ coho side channel habitat	Adopt	Section 3.2.3
	Develop and implement the Mainstem Oak Grove Fork Enhancement Plan, including the Coarse Sediment Augmentation Plan	Adopt	Section 3.2.3
	Develop and implement a Large Woody Debris Plan for the North Fork Reservoir.	Adopt	Section 3.2.3
	Develop and implement a downstream passage plan for Pacific lamprey through the mainstem Project features, specifically the River Mill, Faraday, and North Fork developments. Based on the results, implement additional passage measures.	Adopt.	Section 3.2.3
	Develop and implement a Monitoring Plan to ensure that instream flows and operational criteria are being met at the Oak Grove Fork and Mainstem Clackamas Projects and to continuously measure the stage of water in Project-affected stream reaches and reservoirs via a network of stream gages	Adopt	Section 3.2.3
	Develop and implement a post-construction evaluation plan and operation and maintenance plan within 60 days following construction activities	Adopt, except for unidentified and uncertain future measures.	Section 3.2.3
	Develop and implement an upstream passage plan for Pacific lamprey through the mainstem Project features, specifically the River Mill, Faraday and North Fork developments; with provisions for capture and haul and evaluate passage success with the project area. Based on the results, implement additional passage messages	Adopt	Section 3.2.3

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Develop an Operation and Maintenance Plan for Project fish passage facilities including operating criteria to meet Narrative Standards for Steelhead Kelts, Salmonid Fry, and Salmonid Pre-Smolts	Adopt	Section 3.2.3
	Develop and implement an Oak Grove Fork Side Channel Enhancement Construction Plan	Adopt	Section 3.2.3
	Develop and implement an Oak Grove Fork Mainstem Fish Habitat Enhancement Plan	Adopt	Section 3.2.3
	Develop and implement Frog Lake Spillway Management and Remediation Plan	Adopt	Section 3.2.3
	Develop and implement a USDA-FS-approved Road Management and Maintenance Plan. PGE will assume all responsibility for maintaining the following road sections: (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. In addition, PGE will make available \$102,400 annually for road improvements, reconstruction Projects, natural disaster repairs, and road closures on other designated roads that would continue to be maintained by the USFS. PGE will also make available \$1000,000 (not to be adjusted for inflation) dedicated toward the Segment 4 upgrade in (each) Years 15 and 20.	Adopt, except for establishment of a funding account to be used by PGE or the Forest Service to implement the measures. PGE would ultimately be responsible for ensuring implementation of the measure, including the upgrades and maintenance of the roads; therefore, we have no basis for recommending the establishment of the project roads account.	Section 3.2.8.2.1
	Prepare a Notification and Minimization of Emergency and Planned Maintenance Outage Spill Plan	Adopt	Not applicable
	Develop a Spoils Disposal Plan for all Project-related construction activities	Adopt	Not applicable
	Develop and implement a Safety During Construction Plan	Adopt	Not applicable
	Develop and implement a Resource Coordination Plan	Adopt	Not applicable
	Develop and implement a Hazardous Substances Plan	Adopt	Section 3.2.8
	Develop and implement a Fire Prevention Plan (land use issue)	Adopt	Section 3.2.8
	Implement the Recreation Resources Management Plan	Adopt specifically defined measures only. Not adopt enhancements that are as yet unidentified and for which implementation is uncertain.	3-303
	Implement the Historic Properties Management Plan	Adopt	Section 3.2.6
PROJECT WIDE MEASURES AND OTHER MISCELLANEOUS REQUIREMENTS			
	Obtain written authorization from the USDA-FS prior to any activities on USDA-FS lands and avoid disturbance to land survey monuments, private property corners, and forest boundary markers	Adopt for Project lands that occur on USDA-FS property.	Not applicable
	Furnish, install, and maintain temporary traffic controls for road work on or adjacent to FS lands	Adopt for Project lands that occur on USDA-FS property	Not applicable
	Maintain Project-related FS lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the USDA-FS	Adopt for Project lands that occur on USDA-FS property	Not applicable
	Establish and provide administrative support for a Fish Committee to facilitate license implementation related to studies fish/aquatic resources	Adopt.	Not applicable
	Implement the Terrestrial Resources Coordination Plan, which involves establishing and providing funding and administrative support for a Terrestrial Resource Working Group	Adopt	Not applicable

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Restrict pesticides/herbicides use on FS lands without prior written approval from the USDA-FS	Adopt for Project lands that occur on USDA-FS property	Page 3-234
	Prior to surrender of this license, restore USDA-FS lands to a condition satisfactory to the USDA-FS. File with FERC a USDA-FS-approved restoration plan at least 1 year prior to the proposed application for license surrender	Not adopt. Measure is not associated with the proposed license action.	Not applicable
	Construct, operate, and maintain effective downstream fish passage facilities at Mainstem Clackamas Project features and/or operate powerhouses to meet the PSS for each species of salmonid smolts as identified in the tiered decision-making process in the Settlement Agreement. Maintain all fishways in proper order.	Adopt. Prior Commission approval required for implementation of unidentified “C” and “D” measures.	Section 3.2.3
	Ensure that each passage facility has a design objective of less than, or equal to, 0.5 percent mortality and less than or equal to 4 percent for injury of fry. Evaluate the causes of observed injuries and complete appropriate measure to reduce injury and mortality	Adopt. Prior Commission approval required for implementation of unidentified “C” and “D” measures.	Section 3.2.3
	Perform daily (or on a schedule otherwise agreed to by the USDA-FS in writing) inspections of Project-related construction operations on FS lands during all construction activities	Adopt	Not applicable
	Indemnify, defend, and hold the United States harmless for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the Licensee in connection with the use and/or occupancy authorized by this license	Not adopt. This is a legal matter and not associated with any environmental resource.	Not applicable
	<p>Contribute funding to ODFW for the Clackamas Hatchery as follows:</p> <ul style="list-style-type: none"> • Hatchery Production - \$750,000 over 10 years (\$100,000/yr for the first 5 years, \$50,000/yr for the second 5 years) • Spring Chinook Hatchery Releases – these will be terminated by summer 2009 • Assessing and Addressing Impacts to Wild Fish from Hatchery Fish - \$750,000 over 10 years (\$50,000/yr and \$250,000 one time to implement measures that reduce impacts) • Hatchery Intake Screens in the Clackamas River – up to \$750,000 by 2007 • North Fork Ladder Adult Sorting Facility – PGE shall operate and maintain the adult sorting facility for the life of the license. 	<p>Adopt except for providing for upgrading the hatchery screens. PGE would be responsible for stocking and monitoring spring Chinook salmon rather than simply providing funds to Oregon DFW to do so on their behalf. The Clackamas Hatchery is not a Project facility and is not needed to meet a Project purpose in light of our extensive recommendations for measures at the Project for enhancement and protection of salmonids. Therefore, we have no justification for requiring PGE to provide for the hatchery screen upgrades.</p>	Section 3.2.3.2

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
	Provide Clackamas Mitigation Fund - establish eight million dollar mitigation fund	Adopt. Consistent with the Commission’s recently issued Settlement Policy Statement, we recommend that the Commission require PGE to retain sufficient control over the fund that the Commission can ensure the satisfaction of the underlying project purposes supporting the fund.	
	<p>The license issued for the Project shall include the following general conditions:</p> <ul style="list-style-type: none"> • If at any time, unanticipated circumstances or emergency situations arise where fish or wildlife are being killed, harmed or endangered by any of the Project facilities or as a result of Project operation, the Licensee shall immediately take appropriate action to prevent further loss. The Licensee shall immediately notify the nearest office of the ODFW, ODEQ, FWS, NMFS, and USDA-FS, and comply with any reasonable restorative measures required by the appropriate resource agencies; • Consult with all appropriate local, State, or Federal agencies before repairing or modifying the hydroelectric Project and obtain and comply with all required permits 	Not adopt. The Commission retains exclusive authority to implement and enforce the terms of any license issued for the Project, including requirements for licensees to take any additional action to correct instances of noncompliance.	Not applicable
	Meet all Federal and State water quality standards required by the Clean Water Act in accordance with the water quality certification issued by the ODEQ. The Licensee shall provide, at a minimum, flows specified by the ODEQ to meet water quality standards.	Not adopt. Licensees are required to comply with all timely filed section 401 certifications for the Project.	Not applicable
	Abide by all water rights recommendations included in the Settlement Agreement.	Not adopt. State water rights are not a matter of Commission jurisdiction.	Not applicable
	ODFW recommends a 45 year license term for the Clackamas River Hydroelectric Project. In addition, ODFW supports an extension of the license term to 50 years if the Licensee constructs the 3,000 cfs surface collector pursuant to the Settlement Agreement.	Not adopt. Should the Commission decide to issue a license for the Project, the Commission would define the term of the new license in the order.	Not applicable

Table 5.1-1. Summary of All Measures Considered in the Staff Alternative (Source: Staff).

REACH	PROPOSED ACTION – SETTLEMENT AGREEMENT	STAFF ALTERNATIVE	FEIS REFERENCE (Page or Section of FEIS)
Oak Grove Fork Development	<ol style="list-style-type: none"> 1. Extension of the 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) 2. 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. 3. Create property 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. 4. Extend the boundary to include the proposed Brook Trout Spawning Disruption structures and the following USFS Roads: Segment 2, Segment 3, Segment 4, Road 4600200, and Road 4630. 	Adopt	Section 3.2.7
North Fork Development	Extend 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.	Adopt	Section 3.2.7
Faraday Development	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.	Adopt	Section 3.2.7
River Mill Development	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.	Adopt	Section 3.2.7

5.2 CONSISTENCY WITH FISH AND WILDLIFE RECOMMENDATIONS

5.2.1 Recommendations Pursuant to Section 10(j) of the FPA

Section 10(j) of the FPA,⁵ requires the Commission, when issuing a license, to include conditions based on recommendations by federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act⁶ to “adequately and equitably protect, mitigate damages to, and enhance fish and wildlife (including related spawning grounds and habitat)” affected by the project. If the Commission believes that any such recommendation may be inconsistent with the purpose and requirements of Part I of the FPA, or other applicable law, section 10(j)(2) requires the Commission and the agencies to attempt to resolve such inconsistencies, giving due weight to the recommendations, expertise, and statutory responsibilities of such agencies. If the Commission still does not adopt a recommendation, it must explain how the recommendation is inconsistent with Part I of the FPA, or other applicable law and how the conditions imposed by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources.

The USFWS and NMFS filed draft recommendations pursuant to section 10(j) in July 2005 and August 2006. The ODFW filed preliminary recommendations pursuant to section 10(j) on July 8, 2005 and modified 10(j) recommendations on August 21, 2006. Table 5.2-1 summarizes the agencies’ 10(j) recommendations for the Clackamas Project and whether or not staff is recommending them for adoption. Recommendations that we consider to be outside the scope of 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this EIS. For reference purposes, we have included in table 5.2-1 the Settlement Agreement’s proposed license article(s) that is consistent with each agency recommendation.

⁵ 16 U.S.C. §803(j)(1).

⁶ 16 U.S.C. §§61, et seq.

Table 5.2-1. Analysis of Fish and Wildlife Agency 10(j) Recommendations for the Clackamas Project (Source: Staff).

Recommendation	Recommending Agency	Within Scope of 10j?	Annualized Cost (2006\$)	Conclusion
Operational Measures Related to Flows/Ramping Rates/Lake levels/Fishways				
1. Provide instream flows and ramping rates in the Oak Grove Fork below Timothy dam and Harriet dam, in the mainstem Clackamas River below River Mill dam, and in the Faraday Bypass reach as per the Settlement Agreement (Proposed Articles 6-9, 11, and 13-15)	USFWS, Oregon DFW, NMFS	Yes	1,022,000	Adopt
2. Operate Timothy Lake levels to minimize impacts to amphibians and wetlands as agreed in the Settlement Agreement (Proposed Article 6)	USFWS, Oregon DFW	Yes	Included in the cost for item 1	Adopt
Studies and Plans				
3. Develop and implement a plan to establish rules for flows and ramping rates for River Mill Powerhouse operations (Proposed Article 15)	USFWS, Oregon DFW, NMFS	Yes	Cost not applicable (conducted as part of the Settlement Agreement)	Adopt
4. Develop and implement a stranding evaluation plan downstream of River Mill dam (Proposed Article 35)	Oregon DFW	Yes.	5,000	Adopt.
5. Cap the cost of the stranding evaluation plan in item 6 above at \$50,000 (Proposed Article 35)	Oregon DFW	No. Funding is not a specific fish and wildlife measure.	Included in the cost for Item 6	Adopt. However, we also recommend that the Commission reserve the right to require PGE to undertake any and all additional measures necessary to ensure the evaluation is completed, notwithstanding the proposed \$50,000-limitation on expenditures.
6. Prepare and implement an Emergency and Planned Maintenance Outage Spill Plan to minimize negative effects on aquatic resources from high flows caused by emergency and planned maintenance outages (Proposed Articles 3 and 16)	USFWS, Oregon DFW	Yes	Minimal	Adopt

Table 5.2-1. Analysis of Fish and Wildlife Agency 10(j) Recommendations for the Clackamas Project (Source: Staff).

Recommendation	Recommending Agency	Within Scope of 10j?	Annualized Cost (2006\$)	Conclusion
Habitat Enhancements				
7. Provide coarse sediment augmentation in the Lower Oak Grove Fork (Proposed Article 44)	USFWS, Oregon DFW	Yes	Included in cost for item 21	Adopt
8. Provide coarse sediment augmentation in the mainsteam Clackamas River (Proposed Article 46)	USFWS, Oregon DFW, NMFS	Yes	744,000	Adopt
9. If the results of the evaluations of the weirs in item 25 show that the weirs do not effectively disrupt brook trout and kokanee salmon spawning, then fund additional measures (Proposed Article 42)	USFWS, Oregon DFW	No. Funding is not a specific fish and wildlife measure..	Indeterminate	<p>Not Adopt. We have no justification for recommending these additional provisions, because the measures are as yet unidentified and uncertain with regard to future implementation. We can not evaluate the benefits of the measures and make a subsequent public interest determination.</p> <p>Consistent with the tiered approach contemplated by PGE's proposal, the Commission would make a determination on any additional measures at the time PGE would file the monitoring results along with recommendations for additional measures.</p>
10. Implement wildlife habitat connectivity measures including small and large animal crossings over Oak Grove Pipeline and exclusionary fencing and wildlife crossings over North Fork Fish Ladder (Proposed Article 50)	USFWS, Oregon DFW	Yes	12,000	Adopt

Table 5.2-1. Analysis of Fish and Wildlife Agency 10(j) Recommendations for the Clackamas Project (Source: Staff).

Recommendation	Recommending Agency	Within Scope of 10j?	Annualized Cost (2006\$)	Conclusion
11. Implement additional measures to improve wildlife habitat connectivity in the project area as determined necessary by the TRWG (Proposed Article 50)	Oregon DFW	No. Additional unspecified, future connectivity measures are not specific fish and wildlife measures.	Indeterminate	<p>Not Adopt. We have no justification for recommending these additional provisions, because the measures are as yet unidentified and uncertain with regard to future implantation. We can not evaluate the benefits and costs of the measures and make a subsequent public interest determination.</p> <p>Any additional wildlife connectivity measures that result in long-term changes to project facilities or operations would require prior Commission approval after the filing of an application to amend any license issued for the project.</p>
12. Implement Frog Lake Wildlife Habitat Improvement Plan (vegetative screening project) (Proposed Article 50)	USFWS, Oregon DFW	Yes	3,000	Adopt
Facility Modifications				
13. Provide increased flows to for juvenile salmonid rearing habitat in the Faraday bypass reach (Proposed Article 13)	USFWS, Oregon DFW, NMFS	Yes	10,000	Adopt

Table 5.2-1. Analysis of Fish and Wildlife Agency 10(j) Recommendations for the Clackamas Project (Source: Staff).

Other 10(j) Measures				
14. As part of the Wetlands Mitigation Plan, provide up to \$800,000 to purchase and transfer to the Forest Service a 320-acre parcel near North Mountain in the headwaters of the Little Sandy River in the Bull Run watershed (Proposed Article 52)	Oregon DFW	No. Funding is not a specific fish and wildlife measure, and the North Mountain wetlands has no nexus to project effects, because the wetland is located in an entirely different basin from the Clackamas River.	80,000	Not Adopt. We have no justification to recommend the measure as a provision in a license, because the wetlands do not have a nexus to project operations or effects.
15. Fund maintenance and monitoring of bird nest boxes at Timothy Lake (Proposed Article 50)	USFWS, Oregon DFW	No. Funding is not a specific fish and wildlife measure.	700	Adopt. However, we recommend a requirement in any license that PGE be responsible for monitoring and maintaining the nest boxes rather than simply funding the measure.

Table 5.2-1. Analysis of Fish and Wildlife Agency 10(j) Recommendations for the Clackamas Project (Source: Staff).

<p>16. Provide funding for the ODFW’s Clackamas Hatchery (Proposed Article 45)</p>	<p>Oregon DFW , NMFS</p>	<p>No. Funding is not a specific fish and wildlife measure.</p>	<p>231,000</p>	<p>Not Adopt. Oregon DFW’s hatchery is a non-project facility, the need for the measure has not been established, and we have no basis for recommending the funding measure in light of the extensive other measures we recommend for the protection and enhancement of anadromous salmonids at the project. However, we do recommend that PGE provide for the stocking and monitoring of spring Chinook salmon in the Clackamas River. PGE would be free to reach a funding arrangement with Oregon DFW to provide for the stocking and monitoring; however, under our recommendation, PGE would not be required to do so.</p>
------------------------------------------------------------------------------------	--------------------------	-----------------------------------------------------------------	----------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Of the 16 recommendations listed in Table 5.2-1, we identified 10 that fall within the scope of section 10(j) (Items 5, 9, 11, 14, 15, and 16). We recommend that all of these recommendations that fall within the scope of section 10(j) be included as provisions of any license issued for the project.

5.2.2 Recommendations Pursuant to Section 10(a)(1) of the FPA

Section 10(a)(1) requires that any project for which the Commission issues a license shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes.

We find six of the 16 recommendations listed in Table 5.2-1 as outside of the scope of section 10(j), because they are recommendations for measures that are not specific measures to protect fish and wildlife. We consider these measures under section 10(a) of the FPA (Table 5.2-2).

Of the six recommendations, we do not adopt four of them, because: (1) we can not make a public interest determination with regard to future uncertain or unspecified measures; (2) we identify no need to address project effects at off-site locations where we address such effects through other recommendations at the project; or (3) we find no nexus between the resource addressed by the measure and the project. A more detailed explanation of our analysis of the recommendations under section 10(a) that are not adopted can be found in section 5.1.

5.3 CONSISTENCY WITH COMPREHENSIVE AND OTHER RESOURCE PLANS

Section 10 (a)(2)(A) of the Federal Power Act requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing or conserving waterways affected by the Project. Accordingly various agencies have filed comprehensive plans that address resource issues in Oregon. Of these, the plans listed below are relevant to the Project area and were reviewed to determine whether the continued operation of the Clackamas River Project would be consistent with their provisions (EDAW, 2004b; FERC 2006). We conclude that the Proposed Action and Staff Alternative would not conflict with these plans.

- Northwest Conservation and Electric Power Plan, 1991, Northwest Power Planning Council, Portland, Oregon.
- Columbia River Basin Fish and Wildlife Program, 1984, 1987, 1994 and 2000, Northwest Power Planning Council, Portland, Oregon.
- Comprehensive Plan for Protection and Management of Oregon's Anadromous Salmon and Trout Part I, 1982, Oregon Department of Fish and Wildlife.
- Comprehensive Plan for Protection and Management of Oregon's Anadromous Salmon and Trout Part II, Coho Salmon Plan 1982, Oregon Department of Fish and Wildlife.
- Comprehensive Plan for Production and Management of Oregon's Anadromous Salmon and Trout Part III: Steelhead Plan, 1995, Oregon Department of Fish and Wildlife.
- Species at Risk: Sensitive, Threatened, and Endangered Vertebrates of Oregon, 1996, Oregon Department of Fish and Wildlife.
- Clackamas River Sub-basin Fish Management Plan, 1992, Oregon Department of Fish and Wildlife.
- Biennial Report on the Status of Fish in Oregon, 1995, Oregon Department of Fish and Wildlife.
- The Statewide Trout Management Plan, 1987, Oregon Department of Fish and Wildlife.
- Oregon Plan for Salmon and Watersheds, Supplement 1: Steelhead, 1997, Oregon Department of Fish and Wildlife.
- The Northwest Forest Plan, 1994, 2000, 20001, U.S. Forest Service and Bureau of Land Management
- Mt. Hood National Forest Land and Resource Management Plan, 1990, USFS
- Oregon State-Wide Water Quality Management Plan, Oregon Department of Environmental Quality
- Oregon State Salmon Habitat Designation, Oregon Division of State Lands

- Clackamas National Wild and Scenic River and State Scenic Waterway Environmental Assessment and Management Plan (USFS 1993)
- Roaring National Wild and Scenic River and State Scenic Waterway Environmental Assessment and Management Plan (USFS 1993)
- Salem District Record of Decision and Resource Management Plan (BLM 1995)
- Oregon's Statewide Planning Goals and Guidelines (Oregon Department of land Conservation and Development 1995)
- Clackamas County, Oregon Comprehensive Plan and Zoning and Development Ordinance (Clackamas County 2000a and 2000b)
- Tri-County Regional Water Supply Plan for the Portland Metropolitan Area (Water Providers of the Portland Metropolitan Area 1996)
- City of Estacada Comprehensive Plan and Municipal Code (City of Estacada 2001)
- City of Estacada Timber Park Master Plan (City of Estacada 1993)

5.4 RELATIONSHIP OF LICENSE PROCESS TO LAWS AND POLICIES

5.4.1 Clean Water Act Section 401 Water Quality Certification

PGE filed a revised application for Water Quality Certification for the Clackamas Project on June 30, 2005 as required under section 401(a)(1) of the Federal Water Pollution Control Act (Clean Water Act). ODEQ has not responded to this application or submitted section 401 conditions at this time.

5.4.2 Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species.

PGE prepared and filed with the Commission a Biological Evaluation/Assessment (BA) of the Project-related effects on federally-listed species (Stillwater, 2005). Five federally listed species, one candidate for federal listing, and seven federal species of concern occur in the vicinity of the Project (Stillwater, 2005). The BA concluded that the Proposed Action is likely to adversely affect but not jeopardize or appreciably reduce the likelihood of either survival or recovery of federally listed threatened and endangered species.

Staff reviewed the BA and concur with its findings. 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 FEIS. USFWS concurred on September 10, 2006, and NMFS did not concur on July 19, 2006. Formal consultation with NMFS is ongoing.

5.4.3 National Historic Preservation Act

Relicensing is considered an undertaking within section 106 of the NHPA of 1966, as amended (P.L. 89-665; 16 U.S.C. 470). Section 106 requires that every federal agency “take into account” how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places.

To meet the requirements of section 106, PGE filed with the Commission a Historic Properties Management Plan (HPMP) that includes measures to avoid potential adverse effects on historic resources. In February 2006, Commission staff issued a Draft Programmatic Agreement (PA) to the Advisory Council on Historic Preservation (Council) and the Oregon State Historic Preservation Officer (SHPO) for review and concurrence. The Council responded in March 2006 that it does find a need to participate in the PA. Commission staff intends to issue a final PA to be executed between the SHPO and the Commission.

The terms of the PA would ensure that PGE would address and treat all historic properties identified within the Project Area of Potential Effect through the HPMP. The HPMP entails on-going consultation involving historic properties for the term of the license.

5.4.4 Coastal Zone Management Act

The Project is not located within the Columbia River Basin coastal zone and is not anticipated to have any negative impacts on the coastal zone.

5.4.5 Americans with Disabilities Act

Public recreation facilities must comply with the Americans with Disabilities Act (ADA) of 1990 (P.L. 101-336) to the extent possible. It is important to note that the Commission has no statutory role in implementing or enforcing the ADA as it applies to its licensees. A licensee's obligation to comply with the ADA exists independent of its FERC license.

However, section 2.7(b) of the Commission's regulations requires a project licensee to consider the needs of physically handicapped in the design and construction of public recreational facilities within project lands and waters, including public access to such facilities. The draft Recreation Management Plan (PGE, 2005) for the Project addresses how the needs of physically handicapped individuals would be considered in the design and construction of Project-related recreation facilities during the new license term.

5.4.6 Federal Power Act Section 18 Fishway Prescriptions

The United States Department of Commerce - NMFS and the United States Department of Interior – USFWS filed preliminary section 18 Fishway Prescriptions in July 2005 and modified Prescriptions in August 2006.. The prescriptions filed by NMFS and USFWS were developed cooperatively among the agencies and in consultation with PGE. The agency filings are posted on the FERC website (www.ferc.gov) and section 3.2.3 of this FEIS evaluates the effects of those prescriptions on fish resources.

5.4.7 Oregon State Land Board

PGE will work with the Oregon Department of State Lands (ODSL), the division that manages publicly owned land on behalf of the State Land Board Land Board, to determine which Project-related facilities occupying state land in the project boundary, if any, are subject to lease requirements. To date, no such lands have been identified. If such lands are identified, PGE will enter into the required lease agreement with ODSL consistent with OAR 141-087-0001 through 141-087-0050 that governs the issuance of leases and easements for hydroelectric projects on lands managed by the ODSL.

5.4.8 Columbia River Basin Fish and Wildlife Program

Under section 4(h) of the Pacific Northwest Power Planning and Conservation Act, the Northwest Power and Conservation Council (NPCC) developed the Columbia River Basin Fish and Wildlife Program (CRBFWP) to protect, mitigate, and enhance the fish and wildlife resources associated with development and operation of hydroelectric projects within the Columbia River basin. Section 4 (h) states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies should take the Program into account, to the fullest extent possible.

The CRBFWP directs agencies to consult with fish and wildlife managers and the NPCC during the study, design, construction, and operation of any hydroelectric development in the basin. The Commission's regulations require the Applicant to initiate pre-filing consultation with the appropriate federal and state fish and wildlife agencies and Indian Tribes and to provide these groups with post-filing opportunities to review and to comment on the application. As summarized in sections 1.4, 1.5, and 2.2 of this FEIS, this consultation has occurred and resulted in the Settlement Agreement, for which all applicable federal and state agencies and Indian Tribes are signatories.

The Hydroelectric Development Conditions (Appendix B of the CRBFWP) (NPCC, 2000) state that authorization for new and existing hydroelectric projects should include conditions to mitigate the effects of the project on fish and wildlife resources. Specifically, the Hydroelectric Development Conditions call for: (1) consultation with fish and wildlife managers and the NPCC throughout the study, design, construction, and operation of the project; (2) the best available means for aiding downstream and upstream passage of anadromous and resident fish; (3) flows of specific quantity to protect fish spawning, incubation, rearing, and migration; (4) full compensation for unavoidable fish losses or fish habitat losses consistent with the provisions of this program; (5) the collection of data needed to monitor and evaluate the results of fish protection efforts; (6) assurance that the project would not degrade water quality beyond the point to sustain sensitive fish species (as designated in consultation with the fish managers); (7) providing artificial habitat structures when appropriate; (8) avoiding critical riparian habitat during project-related construction or maintenance; and (9) collecting data needed to monitor and evaluate the results of the wildlife protection efforts.

The Proposed Action and Staff Alternative include measures that are consistent with the applicable provisions of the CRBFWP.

5.5 CUMULATIVE EFFECTS SUMMARY

According to the Council on Environmental Quality's (CEQ) regulations for implementing NEPA⁷, an action may cause cumulative impacts on the environment if its effects overlap in space and/or time with the effects of other past, present, or reasonably foreseeable future actions, regardless of what agency or person undertakes the action. Cumulative effects can result from individually minor, but collectively significant actions, taking place over a period of time, including hydropower and other land and water development activities.

The geographic scope of the cumulative analysis includes the Oak Grove Fork and the Clackamas River below the confluence with the Oak Grove Fork, including all Project facilities and operations related to the Oak Grove, North Fork, Faraday, and River Mill developments. This analysis evaluates actions occurring within the Project boundary as well as Project and non-Project activities occurring outside of the Project boundary that potentially affect the Clackamas River basin.

The temporal scope of this cumulative analysis includes past, present, and future actions and their impacts on the specific resources identified during scoping that could be cumulatively affected. We evaluate past impacts to the extent possible, based on availability of historical information. Analysis of future impacts looks ahead 30 to 50 years through the prospective license term of the Project.

With input from the stakeholder group, we identified the resources listed below as potentially subject to cumulative effects resulting from the Project and other activities within the watershed.

- Streambed composition and channel geomorphology (including the influence of sediment and large woody debris) on the Oak Grove Fork and Clackamas River.
- Upstream and downstream fish passage, especially for both state and federally-listed threatened and endangered species in the Clackamas River Basin, cutthroat trout, and other resident fish species.
- The loss or change in value of fish, reptile, amphibian, and aquatic macroinvertebrate habitat.

⁷ 40 CFR§1508.7

- The loss or change in value of wetlands and riparian areas throughout the Clackamas River Basin.
- The effects of water management, Project operations, and on-going maintenance on listed threatened or endangered and other rare species and their habitats.
- The effects of Project operations on recreational whitewater boating along the Clackamas River and other recreational opportunities in the Project area.

For purposes of discussion, we categorize these issues into four major resources: water quality and quantity; fisheries resources; riparian/wetland habitats and species; and recreation use patterns. For each cumulatively affected resource, we: 1) discuss the past and present factors that contribute to current resource conditions; 2) discuss reasonable foreseeable actions and trends that are likely to contribute to future resource conditions; and 3) evaluate the cumulative effects of the Proposed Action, Staff Alternative, and the No-Action Alternative in light of other factors influencing current and future resource conditions.

5.5.1 Water Quantity and Quality

Factors Leading to Current Conditions

Water Quantity

The current basin flow conditions are a function of the water used in the watershed, which is discussed in Section 3.3.2.1.1. Hydropower facilities along with agricultural, public, domestic, and industrial water users withdraw water along the Clackamas River and Oak Grove Fork and contribute to current flow conditions.

The primary factor influencing current flow conditions in the Clackamas River and Oak Grove Fork is the presence of reservoirs, which alters the magnitude and timing of flows primarily in the Oak Grove Fork and, to a smaller degree, in the Clackamas River. Project operations do not appear to have significantly altered the magnitude of peak flows relative to unregulated conditions that existed prior to Project construction, but they have shifted the timing, duration, and frequency of other hydrograph components, particularly baseflows and spring runoff. Project operations reduced fall and winter baseflows by retaining or diverting water, particularly at Lake Harriet, and also reduced the variability of baseflows. Spring snowmelt runoff has been greatly reduced in the Oak Grove Fork because of reservoir operations at Timothy Lake. Water supply

inputs from the Clackamas River upstream of the Oak Grove Fork have typically tempered the effects of Project operations on the timing and amount of water in the Clackamas River. However, flows have been altered on the Clackamas River downstream of the Oak Grove Fork in the immediate vicinity of Project dams. Currently, the areas of greatest concern for low flows occur in the Oak Grove Fork below Timothy Lake during the summer when water is being retained in the reservoir for recreation and below Lake Harriet where water is diverted to the Oak Grove Powerhouse.

Water Quality

Temperature is the primary water quality concern in the Clackamas River and certain reaches of the Clackamas River system currently violate state temperature standards. These violations are primarily due to water being held in reservoirs because of dam operations for both electricity production and recreation. The area of greatest concern for temperature is downstream of River Mill dam on the Lower Clackamas River (Wampler, 2003).

As water discharges to the Lower Clackamas River from Estacada Lake, it has very little diurnal variation. As this discharge travels downstream, it begins to regain its natural diurnal variation because of solar heating. The overall pattern of increased temperature between the River Mill tailrace and Eagle Creek, along with the subsequent decline in temperature between Eagle Creek and the mouth, reflects that the temperature of the River Mill discharge is out of phase with surface heat forcing. In other words, water at various locations along the river experiences different exposures to solar radiation. Because the travel time from River Mill dam to the Willamette River is less than one day, equilibrium cannot be achieved, which results in reduced diurnal temperature fluctuation. Because of the reduced diurnal temperature fluctuation and because the average temperature of the discharge is higher than what it would be in the absence of the Project, exposure to solar radiation results in heating of the discharged water to an amplitude higher than the natural amplitude of free-flowing water.

River Mill dam was constructed in a landscape with a complex and dynamic geomorphic and geologic history and so current conditions must be viewed within this context. Over the last 150 years, significant morphological changes have occurred in several reaches of the Lower Clackamas River below River Mill dam including changes in sediment supply resulting from dam closure, isolation of the floodplain by bank protection structures, and in-stream gravel mining. These actions may have affected the formation and persistence of deep pools and meander bends and caused channel reconfiguration and/or relocation. Significant width changes in the Lower Clackamas River were documented between the years 1938 and 2000 (Wampler, 2003).

To the extent that natural sediment transport patterns contribute to the formation of shallow bars and other off-channel habitat that experience more rapid fluctuations in temperature than deeper channels, sediment transport, erosion, and deposition can indirectly influence water temperature. In large river systems where sediment from several different parent materials occur together, sediment transport may also affect water temperature by influencing the ability of the stream to absorb solar radiation and heat up. Studies suggest there have been measurable changes in sediment transport, erosion, and deposition to the Lower Clackamas River for at least two miles below River Mill dam that can be attributed to Clackamas Project operations (Wampler, 2003). More subtle changes to the channel may occur for as many as 9 miles below the dam. Geomorphic analysis of erosion and deposition between 1938 and 2000 using aerial photography indicates that the bedload transport rate in the two-mile reach below River Mill dam is between 2,085 and 6,186 yd³/year, an order of magnitude smaller than the maximum bedload transport rate derived from reservoir trapping data (~66,464 yd³/year) (Cramer, 2003). The discrepancy between the two rates may be explained by: 1) changes in transport rate below River Mill dam due to bed coarsening; 2) greater bedload transport rates due to different channel geomorphology and slope above North Fork and River Mill dams; 3) exposure of bedrock and isolation of bars and channel margin deposits by incision; or 4) a systematic bias in aerial-photo derived bedload transport rate due to in-channel transport not visible in aerial photos.

Channel incision may influence water temperature by restricting exposure of surface water to solar radiation, and decreasing the surface area available for thermal exchange at the surface of the stream. The Lower Clackamas River is incised due to avulsion events (i.e., rapid channel movement) and dam construction as well as natural influences such as climate change and catastrophic events. This incision has decreased the incidence of low flows in side channels, increased exposed bedrock, and reduced bedload transport. Pre-dam topographic data from 1908 suggest that between 1908 and 2000, the Clackamas River degraded an average of 2.7 feet from River Mill dam downstream to approximately River Mile 14 near Barton Park. Systematic degradation between the dam and River Mile 14 may have resulted in avulsions such as “cutoffs,” which isolated the river from the floodplain and left affected reaches unable to reestablish sinuosity with the main channel.

Depending on the depth and morphology of the channel, deep pools may also have an effect on water temperature. Dense cold water may accumulate in deep pools, and in some river systems deep pools provide cool refugia for thermally sensitive biota during low-water periods. River soundings collected in 1910 from the area within 1,300 feet downstream of River Mill dam suggest that

the Lower Clackamas River had deep pools in the reach below River Mill dam prior to dam construction. In at least one case, a deep pool present in 1910 has been completely filled with sediment. The pool was likely filled by storage of construction spoils following dam construction. This suggests that prior to dam construction, the location of deep pools, and perhaps their presence, may have been transitory and affected by sediment input from the upper watershed.

Reasonably Foreseeable Conditions

Water quantity will continue to be an issue with conflicting interests including fish production and protection, recreation, and power generation. Fisheries concerns require increased flows through Project dams, while power generation and recreation, particularly at Timothy Lake, sometimes call for lower flows. The Proposed Action and Staff Alternative include flow-related management actions (i.e., increased flows) in the Clackamas River basin with the goal of improving fish habitat. These flow increases will positively affect water quality by lowering stream temperatures and raising dissolved oxygen levels in affected reaches. There are no other proposed or reasonably foreseeable actions that would otherwise adversely affect water quantity or quality in the basin.

Cumulative Impacts

Under the No-Action Alternative, Staff Alternative, and the Proposed Action, water quantity would continue to be altered by the presence of dams and operation of reservoirs. These factors would continue to influence water quality variables. The No-Action alternative would not improve water quality in the basin. The Proposed Action and Staff Alternative would improve water quality in the Clackamas River Basin, specifically by lowering water temperature in the Lower Oak Grove Fork and the Clackamas River downstream to the Oak Grove Powerhouse. Water quality in the Lower Clackamas River would not be improved significantly under any of the alternatives due to the lack of influence of the Project on water quantity and quality in the Lower Clackamas River system.

5.5.2 Fisheries resources

Factors Contributing to Current Conditions

Modification of the Clackamas River Basin for hydropower production has had an adverse effect on aquatic resources in the basin. Activities undertaken as part of the management of Mt. Hood National Forest, such as logging activities and development of shoreline recreational facilities, also have had adverse impacts on the aquatic ecosystems in the basin. Recreational use has increased disturbance of aquatic habitats within the basin at commonly-used access points. Some urban

development has occurred within the basin, and may have had a small cumulative effect on aquatic resources in the basin, but the effects of urban development on aquatic species are small when compared to the effects of hydropower development and other activities in the forest. Introduction of non-native species throughout the basin has also reduced the habitat available to native species.

The entire Project area supports populations of resident or anadromous fish species. Hydropower development has adversely affected fish and other aquatic organisms primarily by physically altering aquatic habitats through interruption of sediment and LWD transport, negative effects on water quality, impeding migration and passage, and loss of individuals to entrainment.

Surface grain-size analysis reveals elevated surface grain-size for roughly two miles below the dam. Observed deviations in grain-size trends are likely produced by a combination of selective transport of fine-grained sediment from surface sediments below River Mill dam, and large sediment bias introduced by the presence of residual boulders from the Sardine Formation. Sediment motion studies indicate that spawning-size gravels (up to 128 mm) are mobile even during moderate flood events (~1-year recurrence interval) on the Clackamas River. Particle mobility data combined with pre-dam ground photos suggest that the amount and surface area of spawning-size gravel has been reduced for about two miles below River Mill dam due to selective transport of smaller size classes. Holocene (<10,000 year-old) terraces appear to provide a local source of pockets of spawning gravel.

Reasonably Foreseeable Conditions

Altering the flow regime and modifying the channel in the Upper Oak Grove Fork would likely provide higher-quality habitat for cutthroat trout in that reach, and altering the flow regime in the Oak Grove Fork below Lake Harriet would be expected to improve the availability of habitat for juvenile salmonids. Improvements to existing fish passage facilities at North Fork dam would likely improve habitat connectivity in the Clackamas River, and reduce entrainment mortality of outmigrant salmonids at the dam. Supplementation of gravel beds used by spawning fish downstream of Project dams would likely improve the condition of spawning habitat.

Cumulative Impacts

Under the No-Action Alternative, Staff Alternative, and the Proposed Action, interruption of natural sediment and LWD transport would continue and the physical barriers to fish passage presented by some of the Project dams would remain in place. Impacts to aquatic habitat from residential or commercial

development and recreational activities would remain unchanged, and competition between native and introduced species would continue to adversely affect habitat availability for native species. Under the No-Action Alternative, no additional provisions for fish passage would be made at Project dams, no physical habitat improvement projects would be completed, and flow regimes at Project dams would not be revised to improve habitat availability or condition. Impacts to nearshore aquatic habitats from recreational uses would remain unchanged.

Under the Proposed Action and Staff Alternative, flows in the fish passage facilities at North Fork dam would be enhanced to reduce injuries to outmigrant smolts and reduce stress on individuals in the fish ladder. The North Fork fish bypass would be extended and partially replaced. The North Fork fish collector would increase survivorship of downstream migrants. Catchable-sized trout would be prevented from exiting Lake Harriet via the diversion pipeline, and fish habitat in the upper Oak Grove Fork would be improved by provision of supplemental flows and structural improvements to the channel. Additional alterations to shallow-water habitat would be incurred as a result of retrofitting the Lake Harriet fishing dock, construction of a shoreline trail, and construction of a new boat ramp at Lake Harriet. Shoreline access and boating access improvements would also require additional impacts to shallow water habitat at Timothy Lake under these alternatives.

In addition, the Proposed Action and Staff Alternative include installation of fry criteria screens at all Project dams and the bypass pipeline at Lake Harriet to prevent the loss of fry at these locations. The spillway at the North Fork fish ladder would be improved to increase survivorship of juvenile salmonids passing downstream via the spillway and fry criteria screens would be installed. The Proposed Action and Staff Alternative also would impact shallow aquatic habitats through expansion of shoreline access at Timothy Lake and increased recreational access facilities on the Clackamas River between the Oak Grove Powerhouse and North Fork Reservoir.

5.5.3 Riparian/Wetland Habitats and Species

Factors Contributing to Current Conditions

Terrestrial habitat conditions in the Clackamas River Basin have been altered by human activities and land use since the 1800s. Specifically, livestock grazing, timber harvesting, forest management, agriculture, irrigation diversions, hydroelectric development, road and culvert installation, and residential and commercial development have been the primary factors influencing current terrestrial habitat conditions and wildlife use in the basin. Recreation, both project-related (Timothy Lake) and non-Project related (Clackamas River), has

degraded wildlife habitat conditions and increased wildlife disturbance to varying degrees throughout the basin.

Project development and operation has altered tributary flows and reduced sediment loads in the Clackamas River and Oak Grove Fork. These alterations have reduced the extent and species composition of riparian vegetation communities along the Clackamas River and Oak Grove Fork and their tributaries. Recreation and human disturbance also have altered the extent and species composition of riparian communities. 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 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 unrelated to the Project and presence of invasive plant species.

The creation of Timothy Lake altered riparian, wetland, and terrestrial habitats in the area by submerging wet meadows, forests, and other upland areas, and shifting wetland types from predominantly forested to emergent. 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 its creation. For example, the dominant wetland cover type in the Timothy Lake area has shifted from palustrine forested wetland (58% of total wetlands in 1946) to palustrine emergent wetland (67% of total wetlands in 2002). High quality palustrine emergent wetlands have developed along the Timothy Lake shoreline, particularly along the North Arm of the Lake. Also, timber harvest and recreational development have converted roughly 55 to 60 percent of old-growth and mature conifer forest types around Timothy Lake to low-impact recreational development (campground with conifer forest overstory) or mid-successional forest.

Reasonably Foreseeable Conditions

The USDA Forest Service, pursuant to the requirements of the Mt. Hood National Forest Land and Resource Management Plan, the Northwest Forest Plan, guidance from the ODFW, and state plans and policies, will be implementing management actions in the Clackamas River basin with the goal of improving wildlife habitat conditions. These measures include, but are not limited to, road decommissioning and repairs, culvert replacement, boulder and LWD placement, forest thinning, snag creation, exotic and invasive species control, habitat

restoration, and down wood management. These measures should have a positive effect on wetland and riparian habitat conditions.

Free range livestock grazing continues to affect wetland and riparian habitats. Although improvements to control livestock access to wetland and riparian habitats (e.g. fencing) have been made, grazing on private and Forest Service lands continues to adversely affect wetlands and riparian habitats in the basin. There are no other proposed or reasonably foreseeable actions that would otherwise adversely affect wetland and riparian habitats in the basin.

Cumulative Impacts

The No-Action Alternative, Staff Alternative, and the Proposed Action would not result in significant adverse impacts on riparian, wetland, or other terrestrial habitats. The Project reservoirs would continue to limit the extent of wetlands and other vegetation communities in areas inundated by the reservoirs and associated shorelines. Project dams would limit sediment transport, which would continue to limit growth and establishment of riparian vegetation in some locations downstream of Project dams.

Under the No-Action Alternative, current habitat conditions would be maintained and terrestrial resources at the Project would not benefit from the wetland restoration/acquisition projects, invasive species management, or vegetative management proposed under the Proposed Action and recommended under the Staff Alternative.

Under the Proposed Action and Staff Alternative, the quality and long term viability of wetland and riparian habitats in the region would improve as a result of implementation of the wetland and riparian habitat mitigation and enhancement plan, which includes enhancement, acquisition, or restoration of wetland and/or riparian habitats in the region. Implementation of the vegetation management plan, which includes exotic and invasive vegetation species control, also would improve wetland and riparian habitat conditions at the Project.

The Proposed Action and Staff Alternative could adversely affect terrestrial resources in the vicinity of Timothy Lake. The reduction in Timothy Lake levels in summer could adversely affect existing emergent wetlands in the North Arm of Timothy Lake by desiccation and potential invasion of exotic and invasive plant species in newly exposed areas. While wetland vegetation currently present at the Lake is typical of seasonal wetlands that often dry out in mid to late summer it is possible that the North Arm area would not be wet enough during the growing season to support the diversity of wetland species that currently occur.

5.5.4 Recreation Use Patterns

Factors Contributing to Current Conditions

Reservoirs constructed for hydropower production have created an entirely new set of recreational opportunities within the Clackamas River Basin, while at the same time eliminating or diminishing other recreational opportunities. Several recreation areas, recreation access points, and flatwater boating areas have been created in conjunction with the Clackamas River Project, but at the expense of whitewater reaches that were inundated with the construction of the North Fork, Faraday, and River Mill developments. This has reduced the opportunity for an overnight whitewater boating trip on the Clackamas River. Further, Project operations influence flow in the Clackamas River downstream of the confluence with the Oak Grove Fork. These effects have led to more opportunities for flatwater boating and swimming and fewer opportunities for whitewater boating.

Reasonably Foreseeable Conditions

The USDA Forest Service, pursuant to the requirements of the Northwest Forest Plan, the ODFW, and state plans and policies, will be implementing management actions in the Clackamas River Basin with the goal of improving fish habitat, which would also benefit water-based recreation. There are no proposed or reasonably foreseeable actions that would otherwise adversely affect recreational opportunities along the Clackamas River, especially in terms of whitewater boating or angling from the confluence of the Oak Grove Fork to River Mill dam.

Cumulative Impacts

Under the No-Action Alternative, current recreational opportunities provided at the Project would be maintained.

Under the Proposed Action and Staff Alternative, the additive effects of the proposed recreational measures, in conjunction with anticipated improvements in angling from the proposed fishery measures, would provide meaningful enhancement of whitewater boating and angling opportunities along the Clackamas River.