5.0 STAFF'S CONCLUSIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA, 16 U.S.C. 797(e) and 803(a)(1) require the Commission to give equal consideration to developmental and non-developmental uses of the waterway on which a project is located. When we review a hydropower project, we consider the water quality, fish and wildlife, recreational, and other non-developmental values of the waterway equally with the project's electric energy and other developmental values.

This section presents our rationale in balancing the developmental and non-developmental values and our recommendations for the plan best adapted to comprehensive development of the waterway. Our balancing analysis considers the comparative environmental effects of the alternatives (section 3.0), their economic viability (section 4.0), and their consistency with relevant agency recommendations, comprehensive plans, and laws and policies (sections 5.2, 5.3, and 5.4, respectively).

Based on our independent review and analysis of the project, the measures proposed by Grant PUD, and the additional measures recommended by agencies and other stakeholders, we recommend relicensing the project as proposed with our additional staff-recommended environmental measures (staff alternative) as discussed below.

We are recommending the staff alternative because: (1) issuance of a new license would allow Grant PUD to continue to operate the project as a dependable source of electric energy for its customers; (2) the 1,768.8-MW project, which Grant proposes to expand to a capacity of 1,993.6 MW by replacing the project turbines with more efficient and higher capacity turbines, would avoid the need for an equivalent amount of fossil-fuel fired electric generation and capacity elsewhere, continuing to help conserve these non-renewable energy resources while reducing atmospheric pollution; and (3) the recommended environmental protection and enhancement measures would improve water quality, protect or enhance fish and terrestrial resources, improve public use of recreational facilities and resources, and maintain and protect historic and archaeological resources within the area affected by project operation. The overall benefits of this alternative would be worth the cost of proposed environmental measures.

5.1.1 Recommended Environmental Measures

Based on the preceding analyses (sections 3.0 and 4.0), we recommend including the following environmental measures (Grant PUD's proposal minus measures we are *not* recommending, and Staff's additional measures and modification to Grant PUD's proposal) in any license issued for this project because they contribute to the best comprehensive use of the Columbia River water resources, exhibit sufficient nexus to project environmental effects, and would result in benefits to non-power resources that would be worth their cost. We discuss the environmental benefits of the measures in section 3.0 and the power and economic benefits of the project in section 4.0. Section 5.0 presents our rational in balancing the developmental and non-developmental values and our recommendations. In some instances, Grant PUD has proposed funding for measures, whereas staff is recommending the measure itself. Thus, any cost listed herein should be considered as an estimate or guide, rather than an absolute spending cap.[119]

Geology and Soils Resources

- Continue to monitor the project impoundment rims for indications of instability and erosion.
- Develop and implement erosion and sediment control measures related to project land-disturbing activities.

Water Quantity and Quality

- Implement a Water Quality Monitoring Plan (401 Application) that includes:
  - Continued reservoir management and maintenance operations, and monitoring of spill patterns to minimize ambient total dissolved gas levels.
  - A water temperature monitoring plan at four fixed sites.
  - Monitor dissolved oxygen (DO), turbidity, and pH at the four fixed monitoring sites during the non fish-spill season (September 15 through April 1).
  - Operating according to the terms of the Hanford Reach Agreement.
  - A plan for managing nuisance aquatic plant species at key recreation sites within the Project area, including information and signage and assessing aquatic macrophyte density at eight transects within the Project every four years, and incorporating aerial photos into GIS maps of macrophyte coverage through the

[119] See *Policy Statement on Hydropower Licensing Settlements*, issued September 21, 2006.

reservoirs; as well as continuing to monitor for zebra mussels cooperatively with Washington DFW (see also Terrestrial Resources section).

- Addressing potential short-term water quality impacts associated with construction activities at the Project, emergency situations, and routine maintenance activities.
- Developing additional details for calibrating its four water quality monitoring sites following issuance of the 401 certificate.

- Coordinate the spill program for the project with the spill activities of other projects through the Priest Rapids Coordinating Committee (see also Aquatic Resources section).
- Continue to operate each Taintor gate at Wanapum dam (see also Aquatic Resources section).
- Continue to identify and implement experimental spill regimes as may be warranted to test opportunities for improving fish survivals with less spill flow and/or reducing TDG levels at either Priest Rapids or Wanapum Dams (see also Aquatic Resources section).
- Provide biological monitoring to determine the incidence of GBD symptoms in downstream migrating juvenile salmonids and continue development of its "real-time" TDG monitoring system at the fixed monitoring sites.
- Provide tailrace pumping to replace gravity fishway attraction water supply.

Aquatic Resources

- Implement and assess anadromous fish measures using an adaptive management process that would include establishment of a PRCC, various technical committees (includes hatchery and habitat subcommittees), and a dispute resolution process. This measure is part of the SSA.
- Make steady progress towards achieving a minimum 91 percent combined adult and juvenile salmonid survival performance standard at the project. This measure is part of the SSA.
- Develop and annually revise a DPAAP to contribute to achievement of the applicable performance standards at Wanapum and Priest Rapids dams. This measure is part of the SSA.
- Develop and implement a performance evaluation program to assess the hatchery program, habitat program, and improvements to juvenile and adult passage survival. This measure is part of the SSA.
- Produce annual progress and implementation plans to describe the implementation activities for spring-run Chinook salmon and steelhead. Prepare a performance evaluation report that assesses the ability of each program to meet program objectives

and contribute to achievement of performance standards. This measure is part of the SSA.

- Evaluate modifications to the spill regime and spill pattern at each dam to improve juvenile salmonid survival while remaining within applicable TDG limits. This measure is part of the SSA.
- Continue to operate and maintain two adult fishways at each dam according to Fishway Operating Plans and investigate methods for improving hydraulic conditions in the fishway collection channels, junction pools, and entrance pools. This measure is part of the SSA.
- Use the spill and bypass programs for juvenile downstream passage to provide fallback passage routes for adult spring and summer Chinook salmon. Operate the sluiceways at both Priest Rapids and Wanapum dams to provide fallback routes for steelhead and fall Chinook salmon. This measure is part of the SSA.
- Construct, operate, and maintain an off-ladder adult trapping facility in the left-bank fishway at Priest Rapids dam. This measure is part of the SSA.
- Operate and maintain PIT-tag detection equipment at the Priest Rapids fishways. This measure is part of the SSA.
- Fund fish counting at Priest Rapids and Wanapum dams and provide daily fish counts for both facilities. Develop video monitoring capability for counting adults in fishways at both dams. This measure is part of the SSA.
- Modify diffusion chambers on both fishways at Priest Rapids to improve adult lamprey passage. Modify the design of the fish count stations at Priest Rapids and Wanapum dams to improve adult lamprey passage and enumeration. If appropriate, reduce fishway flows at night to improve adult lamprey passage.
- Continue to study possible ways to improve downstream juvenile salmonid survival at Priest Rapids dam, including alternative application of top-spill concepts. This measure is part of the SSA.
- Continue to provide spill (61 percent of river flow in spring and 39 percent in summer) for downstream passage at Priest Rapids dam until a better downstream passage alternative is designed, tested, and implemented. This measure is part of the SSA.
- Continue to provide spill (43 percent river of flow in spring and up to TDG limits in summer) for downstream passage at Wanapum dam until a better downstream passage alternative is designed, tested, and implemented. This measure is part of the SSA.
- To improve turbine passage survival at Priest Rapids and Wanapum dams, develop and implement operating criteria to avoid settings that have been shown to result in poor survival and, in the future, install new Advanced Design Turbines. This measure is part of the SSA.

- Construct a downstream fish bypass at Wanapum dam consisting of an ogee-crested weir through the center of Unit 11 and a submerged tailrace chute. This measure is part of the SSA.
- If the proposed downstream bypass for Wanapum dam fails to achieve 95 percent dam passage survival, consult with the joint fisheries parties to improve survival through additional operational or structural modifications.
- Fund a northern pikeminnow removal program to improve smolt passage survival through the reservoirs and tailraces of Priest Rapids and Wanapum dams. This measure is part of the SSA.
- Fund and implement an avian hazing and control program to improve smolt passage survival through the tailraces of Priest Rapids and Wanapum dams. This measure is part of the SSA.
- As part of anadromous fish monitoring and evaluation studies, use radiotelemetry or other techniques to evaluate upstream and downstream route-specific survival at Priest Rapids and Wanapum dams.
- As part of anadromous fish monitoring and evaluation studies, conduct survival studies using PIT-tag technology or other suitable study methods to obtain dam and project passage survival estimates.
- Develop and implement an HGMP for spring, summer, and fall Chinook salmon, steelhead, and sockeye salmon. This measure is part of the SSA.
- To help recover natural populations to self-sustaining and harvestable levels and to mitigate for 7 percent unavoidable losses for each development, fund and develop the hatchery facilities necessary to annually produce 600,000 yearling spring Chinook salmon, 833,000 yearling summer Chinook salmon, 1,143,000 sockeye salmon smolts, and 100,000 steelhead smolts. Upgrade and renovate the Priest Rapids Hatchery and continue to annually produce 6,000,000 fall Chinook salmon smolts and 1,000,000 fall Chinook salmon fry. Consult on options to develop equivalent alternative mitigation programs if annual production of 1,143,000 sockeye salmon smolts is unattainable. This measure is part of the SSA.
- Annually provide $1,096,552 to the Priest Rapids Project Habitat Fund to mitigate for a 2 percent per development unavoidable loss of upriver stocks. Develop a habitat plan to identify goals, objectives, a process for coordination, and a process by which habitat projects would be identified and implemented. This measure is part of the SSA.
- Investigate the feasibility of habitat modifications in the Wanapum dam tailrace to increase the amount of high quality fall Chinook salmon habitat.
- Implement operating agreements with the BPA, Douglas County PUD, and Chelan County PUD to address the cumulative effects of operations at the seven main stem dams (Priest Rapids to Grand Coulee) that control flows and result in flow

fluctuations in the Hanford Reach. This measure is part of the Hanford Reach Agreement.

- Provide a minimum flow of 55 to 70 kcfs in the Hanford Reach during the fall Chinook salmon spawning period. This measure is part of the Hanford Reach Agreement.
- Through monitoring of redd locations on Vernita Bar within the Hanford Reach, annually establish a Critical Flow for protection of fall Chinook salmon during the pre-hatch, post-hatch, and emergence periods. Flows within the Hanford Reach would be maintained at or above the Critical Flow subject to the constraints of the 3.7 foot draft limit for the Priest Rapids reservoir and the 2 foot draft limit for the Wanapum reservoir. Additional water beyond Grant PUD's ability to maintain the Critical Flow would need to be obtained from upstream operators, which could be coordinated as part of the operating agreements described above. This measure is part of the Hanford Reach Agreement.
- Within the constraints of the HCA, limit fluctuations in outflow from Priest Rapids dam during the fall Chinook rearing period within the Hanford Reach. This measure is part of the Hanford Reach Agreement.
- Maintain a minimum flow of 36 kcfs in the Hanford Reach during all times outside the fall Chinook salmon spawning, pre-hatch, post-hatch, and emergence periods. This measure is part of the Hanford Reach Agreement.
- Continue to use Standard Operating Procedures at both dams to provide operators with turbine operating criteria, spill patterns for use during downstream passage operations, fishway operation criteria, and other criteria pertaining to upstream and downstream passage of salmon and steelhead.
- To address the effect of the Project on white sturgeon, construct a white sturgeon conservation facility at the Priest Rapids Hatchery. Broodstock would be obtained from the Hanford Reach or Wanapum reservoir and the conservation facility would be designed to produce yearling white sturgeon for stocking into the Project reservoirs. This effort would include experimentation with hatchery supplementation to develop optimal rearing and release strategies and to monitor and evaluate the effectiveness of hatchery releases.
- Develop a detailed fishery operations plan.
- Investigate the gate seals at Wanapum dam as a source of juvenile salmonid mortality.
- Study the effects of gatewell exclusion screens on juvenile salmonid and lamprey passage.
- Develop and implement a bull trout monitoring plan to document occurrences of bull trout in the project area.
- Prepare a Pacific Lamprey Management Plan that includes the measures proposed by Grant PUD, an evaluation of ladder improvements proposed by Interior, criteria for

conducting lamprey passage studies, a lamprey salvage protocol, and periodic (10 year) updates of the plan.

- Develop and implement a White Sturgeon Management Plan.
- Prepare a final White Sturgeon Conservation Aquaculture Plan.
- Establish a Priest Rapids Fishery Forum.
- Develop a Crab Creek/Burkett Lake Enhancement Plan.

Terrestrial Resources

- Develop a Wildlife Habitat Management Plan (Wildlife Plan) that fully describes the actions that would be implemented in the first five years of any license and includes provisions for updating the plan every five years thereafter. The plan should identify the projects that would be implemented, where they would be implemented, how they would be implemented, how they would be maintained and monitored to ensure their continued success, and a schedule for their implementation—habitat improvement projects should identify and give priority to projects that address shrub steppe, riparian, and wetland habitats within and immediately adjacent to the project and should consider access controls.
- Develop and implement a Wildlife Habitat Monitoring and Information & Education Program to monitor the indirect effects of project-related recreation on wildlife and sensitive wildlife habitats. The wildlife monitoring and information and education program, coordinated with the Shoreline Management Plan and the Recreation Plan, should describe the methods that would be employed to educate the recreating public about the potential adverse affects of dispersed recreation on sensitive habitats and a detailed methodology for assessing recreation impacts on wildlife habitats and identifies potential corrective actions.
- Enhance riparian/wetland habitat within the lower five miles of Crab Creek and the Priest Rapids Wildlife Area; provide funding in the amount of $30,000 per year to support operations and maintenance related to the enhancement measures and capital funding in the amount of $7.2 million over the course of the license term.
- Develop a transmission line avian collision protection plan; provide capital funding in the amount of $500,000 over the course of the license to support the measures including marking transmission lines, over-head ground wires at specific crossings.
- Enhance wildlife habitat in the Colockum, Whiskey Dick, and Quilomine Wildlife Areas, provide annual O&M funding of $70,000, $1 million for land acquisitions, and capital funding over the term of the license of $2 million to support:
  - Development of the plan.
  - Noxious weed control on big-game winter range.

- Re-activation of agriculture program in the Colockum area and/or rehabilitation of agricultural lands to native bunch grasses.
- Improvements to riparian/wetland areas at West Bar Slough.
- Development of mountain meadows and maintenance of existing meadows.
- Fertilization of summer and winter ranges.
- Development of water sources.
- Land acquisitions to consolidate land holdings.

- Continue current programs of installation and maintenance of: 48 wood duck nest boxes around the project shoreline; maintenance of 12 raptor nesting, roosting, and perching structures; and installation of 50 waterfowl nesting platforms (mallard nest baskets and goose nesting tubs).
- Provide $60,000 per year to Washington DFW to support a fire suppression program in the Colockum, Quilomene, Whiskey Dick, Priest Rapids, Crab Creek, and Buckshot Wildlife Management Areas. Any unused funds at the end of the year would be allocated for habitat rehabilitation.
- Implement an AIS plan (same as nuisance aquatic plan proposed by Grant PUD) with three additional components:
  - Provisions for identifying and recommending any additional measures for detecting future AIS infestations;
  - A detailed information and education program that includes identifying boat access points and distributing education material during peak boating season (May 1 – October 30 each year), conducting voluntary boat inspection demonstrations to explain the AIS program and proper methods of cleaning boats, and distributing voluntary boater surveys prepared by Washington DFW; and
  - An implementation schedule.

Rare, Threatened and Endangered Species

- Develop a rare, threatened and endangered botanical species protection plan that includes:
  - Budgeting $7,000 per year to defray operations and maintenance expenses to address potential habitat disturbances resulting from maintenance activities within the project transmission line corridor and any future modifications or additions in the number and/or configuration of transmission lines and structures.
  - A provision for developing a construction schedule of any future projects to avoid disturbance of rare species.
  - A provision for conducting pre-construction surveys.
  - A provision for identifying measures to protect any species found during the surveys.

- A provision for developing an implementation schedule for protective measures.
- A provision for developing a monitoring plan to evaluate the effects on rare species and habitat.

- Develop a long-term plan to monitor rare, threatened and endangered plants within the project area that includes:
  - A description of the methods to be employed.
  - A provision to map and quantify population trends.
  - An implementation schedule.
  - A provision and schedule for reporting and consulting with appropriate agencies regarding the monitoring results.
  - Providing $13,500 per year to the Washington DNR's Natural Heritage Program for funding and management of research information to further the knowledge of the ecology of rare plants in the project area.
- Develop a bald eagle perching and roosting tree enhancement and protection program.
- Develop a northern wormwood conservation plan to protect and monitor populations within the Project area that would include: continuing annual demographic monitoring for 10 years; working with BOR to maintain 5,000 feet of fencing to eliminate vehicular access; and funding of ongoing noxious weed control, access control, data management, taxonomic investigations, and research to support long-term conservation of the species in the amount of $40,000 per year.

Cultural Resources

- Continue its commitments to the Wanapum reflected in the agreement entered on January 8, 1957, and subsequently modified, and through any future modifications agreed to by the parties.
- File with the Commission a Memorandum of Agreement between Grant PUD and the Wanapum, which may include any relevant portions of past agreements, to protect cultural resources of significance to the Wanapum.
- Develop a multiple property documentation format for National Register of Historic Places evaluation.
- Implement a proposed schedule for determining National Register eligibility and assess/address adverse effects on remaining cultural resource properties so far inventoried.
- Within one year of license issuance and in consultation with the established CRWG, finalize and implement an HPMP.
- Provide DAHP with the missing and incomplete information associated with the submitted site record and determination of eligibility forms.
- Develop and implement protection/mitigation measures for the 20 archeological sites

listed in Table 27 (see section 3.8, *Cultural Resources*) and all other archeological sites within the Project APE known to contain human remains.

- Determine National Register eligibility for all remaining inventoried archeological sites and other cultural resources located within the Project APE.
- Identify site-specific project-related effects on all National Register-eligible cultural resources and implement measures to protect such sites.
- Reconvene a committee similar to the Hanford Reach National Monument Federal Planning Advisory Committee to address shoreline-related effects on archeological sites in the Hanford Reach.

Recreation and Land Use

- Finalize its draft Recreation Plan that defines the management of existing and future recreation resources associated with the project, including O&M costs; recreation monitoring; interpretation and education (includes interpretive displays/kiosks); integration of recreation resources with other resource management plans; and review. The plan would be guided by an adaptive management strategy.
- Conduct recreational use monitoring on project lands, including BLM lands, every 6 years rather than every 12 years as proposed by Grant PUD.
- Provide additional signage at identified recreation sites.
- In a final Recreation Plan, include a provision (*e.g.*, signs) at Quilomene Dune and Bay to address boat wake.
- Dredge and lengthen the Kittitas County boat launch at Vantage.
- Concentrate new recreation development in suitable areas that is compatible with a final Shoreline Management Plan.
- Finalize its draft Shoreline Management Plan and manage lands accordingly; protect the scenic quality of the mid-Columbia River and its surrounding landscape.
- As part of a final Shoreline Management Plan, manage Crescent Bar Island under the land classifications proposed as planned development and conservation, but no further development should occur beyond the existing disturbed footprint (except as noted below for the proposed trail); delineate a shoreline buffer zone on the island.

5.1.2 Discussion of Staff Recommended Measures

A complete summary and analysis of the measures proposed by Grant PUD and others can be found in the applicable resource sections of section 3.0. The following summarizes the basis for the additional or modified environmental protection, mitigation and enhancement measures recommended by the staff.

Detailed Fishery Operations Plan

CRITFC recommends that Grant PUD develop a detailed fishery operations plan. The plan would address turbine operations, spillgate inspections, bypass system operations and inspections, and fishway operations, inspections, and modifications. Development of such a plan would ensure that protocols are developed for all fishery operations. It would also consolidate all operational protocols and inspection procedures into a single document which would simplify future reviews and updating. Currently, fisheries operations of different project features are described in separate plans. We estimate that compiling these plans into a single plan and including protocols for the operation of any new project features such as the future unit 11 bypass would cost approximately $7,500. We conclude that compiling all fisheries operations into a single document would help to ensure that project facilities are operated in a manner to minimize project effects on fisheries resources and would be worth the cost.

Study of Wanapum Gate Seals

As indicated by NMFS, the spillways at Wanapum dam are the most lethal route for downstream passage. As part of its preliminary section 18 prescriptions, NMFS suggested that the poor survival associated with spillway passage at Wanapum dam could be related to the spillway gate seals. Under the staff recommended alternative, spill at Wanapum dam would continue to be used to pass juvenile salmonids and involuntary spills would occur on occasion when juveniles may be present. Because the gate seals may play a role in the poor survival rates observed at Wanapum dam, it would be useful to study the effect of the gate seals and pursue a remedy, if possible. We estimate that the cost of a gate seal study would be approximately $50,000. Because this study could ultimately lead to reducing a documented adverse project effect on juvenile fish passage, we conclude it would be worth the cost and we recommend including a requirement for this study in any license that is issued for the project. Additionally, we recommend that if the gate seals are shown to reduce downstream passage survival, cost-effective modifications or remedies should be considered for implementation.

Gatewell Exclusion Screen Study

In the license application, Grant PUD proposed to install gatewell exclusion screens (at a cost of $500,000) and discontinue its ongoing program of dipping the gatewells for juvenile salmonids. Installation of gatewell exclusion screens may increase juvenile salmonid survival at each dam since it is likely that turbine passage survival is higher than for fish that are netted from the gatewell and

released in the tailrace. However, the specific effects of the screens on juvenile salmonids and lamprey passing through the turbines is unknown. Therefore, we recommend that Grant PUD experimentally install a set of gatewell exclusion screens and measure the potential effects on juvenile salmonid survival and monitor for lamprey impingement. We estimate this study would cost $100,000. We conclude that this study would be worth the cost and we recommend that any license issued for the project include a gatewell exclusion screen study. If the study demonstrates that gatewell exclusion screens would not reduce juvenile salmonid survival and would not result in significant impingement of juvenile lamprey, we recommend that Grant PUD develop and implement a plan for installing exclusion screens in each gatewell. After the exclusion screens are installed, Grant PUD could discontinue the gatewell dipping program.

Bull Trout Monitoring Plan

Available information suggests that bull trout occur only incidentally within the project area and they are rarely observed or captured in the project area. However, during the license term, ongoing bull trout recovery efforts may increase bull trout numbers throughout the mid-Columbia River region and the occurrence of bull trout within the project area may become more frequent. To track the occurrence of bull trout within the project area and help identify any potential project effects on bull trout that may occur if their numbers increase, we recommend that Grant PUD develop a bull trout monitoring plan for reporting all occurrences of bull trout within the project area. The plan would address monitoring and reporting bull trout occurrences during video fish counting at the fishways, juvenile bypass activities, gatewell dipping, turbine maintenance activities, fish ladder maintenance activities, hatchery activities, northern pikeminnow control program activities, or other related activities. As suggested by Grant PUD, reporting could be incorporated into the annual scientific collection report process. To address possible changes in the abundance of bull trout within the project area during the license term, we recommend that Grant PUD update the plan every 10 years after license issuance. The plan should be revised to describe any apparent trends in bull trout abundance or frequency of occurrence in the project area and should address technological or methodological advances that may allow evaluation of project effects on bull trout. We estimate that the cost of this plan would be $5,000. A bull trout monitoring plan would be worth the cost and we recommend including this measure in any license issued for the project.

Components of the Pacific Lamprey Plan

In this section we discuss several measures that we recommend as components of the proposed Pacific Lamprey Plan.

Grant PUD proposes to implement several measures to address project effects on lamprey including: 1) modification of the diffusion chambers in both Priest Rapids fishways to improve adult lamprey passage; 2) modification of the design of the fish count stations at Priest Rapids and Wanapum dams to improve adult lamprey passage and enumeration; 3) examination of the potential for improving upstream passage conditions for lamprey by reducing fishway flows at night; and 4) continuation of annual counts of adult lamprey passage through the project fishways. As part of the Pacific Lamprey Plan, Grant PUD should describe each of these proposed measures and provide a schedule for implementation. Grant PUD should also describe any follow-up monitoring, including radio-telemetry studies of adult passage rates that may be conducted to determine the effect of these measures.

Under section 18, Interior prescribes that Grant PUD modify the fish ladders for lamprey by improving orifices for passage, rounding sharp edges, constructing rest areas in front of submerged orifices, reducing diffuser grating spacing, and installing collection devices for adults. Grant PUD indicates that the corners of the fish ladder are already rounded; therefore, it appears that this action would be unnecessary. The other measures proposed by Interior could have some benefit to lamprey passage at the project; however, Nass et al. (2003) found no evidence of significant lamprey delays and it is not clear at this time that these measures would address the concerns within ladder entrances and submerged orifices identified by Nass et al. (2003). We estimate that the cost of these fishway modifications would be approximately $700,000. Some of these measures may improve passage conditions for adult lamprey; however, until the effectiveness of Grant PUD's proposed measures is evaluated, we do not believe implementing these measures would be worth the cost. We do, however, recommend that an evaluation of the need for these measures be included in the Pacific Lamprey Plan as potential future options for improving passage conditions for adult lamprey.

Interior prescribes under section 18 and Washington DFW recommends under section 10(j) that Grant PUD conduct radio-telemetry studies to measure the effectiveness of any measures implemented to improve upstream lamprey passage. Modifications made to the fishways or their operation, including those proposed by Grant PUD, would likely have some uncertainty associated with them. Occasionally monitoring upstream passage efficiency would be beneficial to lamprey by identifying effective, ineffective, or adverse passage measures. We estimate that radio-telemetry studies of lamprey passage would cost approximately $50,000 each time they would be conducted.

We conclude that lamprey passage studies should be conducted after the

modifications proposed by Grant PUD have been implemented. Additional studies may also be appropriate in the future after any significant modifications are made to fishway structures or features. Additional modifications could occur several times during the license term, which would result in the need for additional studies and would increase study costs beyond our estimated $50,000. However, we conclude that these studies would be worth the cost and should be included as part of the proposed Pacific Lamprey Plan to ensure the enhancements are achieving the desired results. Additionally, the Pacific Lamprey Plan should establish criteria that would trigger the need to conduct additional adult lamprey passage studies.

Interior prescribed and Washington DFW recommended that Grant PUD develop a protocol for lamprey salvage during fish ladder dewatering. Developing a protocol to address possible stranding of lamprey within the fish ladders during dewatering would likely reduce any mortalities associated with these events. The cost of developing a protocol would be approximately $5,000. We would anticipate that a lamprey salvage protocol could be incorporated into the PPMP or any existing fishway operations plans that address possible salmon and steelhead salvage. We conclude that developing a lamprey salvage protocol would be worth the cost and we recommend including this measure in any license issued for the project.

As explained below, we do not recommend that Grant PUD conduct downstream passage survival studies of juvenile lamprey. This decision was based, in part, on the lack of a proven technology for measuring juvenile lamprey survival. Bleich and Moursund (2006) have developed a promising technique for PIT-tagging juvenile lamprey; however, until this methodology is tested under a variety of conditions and is more widely accepted, we are reluctant to recommend it for use at the Project. Additionally, we are not currently recommending that Grant PUD conduct juvenile lamprey passage studies because available information suggests that juvenile lamprey turbine passage survival would likely be high (i.e., greater than 90 percent) and there currently is no reliable source for juvenile lamprey to be used in testing turbine passage survival. It is possible that during the license term, information regarding juvenile lamprey turbine passage survival and the feasibility of conducting survival studies could change. Therefore, to address these potential changes during the license term, we recommend that Grant PUD revise and update the Pacific Lamprey Plan every ten years after license issuance. These revisions should summarize any new information regarding juvenile lamprey turbine passage survival and assess the need and feasibility of conducting juvenile lamprey turbine passage survival studies at the Project.

White Sturgeon Plan

Washington DFW, Interior, and CRITFC recommend that Grant PUD develop and implement a White Sturgeon Plan that would include: 1) monitoring of natural and hatchery-raised white sturgeon, 2) evaluation of recruitment rates 3) determination of year-class distributions, 4) genetic analysis, and 5) measurement of growth rates, condition factors, and sex ratios. Development and implementation of a White Sturgeon Plan would provide information to establish the benefits, or potential inadequacies, of the proposed white sturgeon hatchery program.

In suggesting goals for a White Sturgeon Plan, Washington DFW and Interior indicate that Grant PUD should be responsible for increasing sturgeon abundance to levels commensurate with available habitat. Additionally, Washington DFW and CRITFC suggest that Grant PUD should increase sturgeon abundance to levels that can support reopening a harvest-based fishing season. While these may be reasonable goals for Washington DFW, Interior, and CRITFC, they are not appropriate goals in the context of relicensing since they are not related to the magnitude of project effects. The goals proposed by the agencies suggest that the depressed status of white sturgeon is entirely attributable to effects of the Project, which does not appear to be the case based on our analysis. We recommend that Grant PUD and the agencies establish goals for the White Sturgeon Plan that are designed to identify and address project effects on the species. Development and implementation of a White Sturgeon Plan would cost approximately $50,000 per year. We conclude that developing and implementing a White Sturgeon Plan would be worth the cost and we recommend including this measure in any license issued for the project.

Final White Sturgeon Conservation Aquaculture Plan

In the license application, Grant PUD presents a conceptual White Sturgeon Conservation Aquaculture Plan that includes construction of a white sturgeon hatchery at the Priest Rapids hatchery facility. We recommend that any license issued for the Project require Grant PUD to develop and implement a final version of this plan. We estimate the cost of finalizing this plan would be $7,500 and would be worth the cost. We recommend that as part of the plan, Grant PUD include an evaluation of suitable sites, including the Priest Rapids hatchery, for developing a white sturgeon hatchery facility.

Priest Rapids Fishery Forum

Washington DFW recommends that Grant PUD establish and convene a

Priest Rapids Fishery Forum to share information, coordinate efforts, and make recommendations regarding non-salmon and steelhead management plans that would be addressed by the Priest Rapids Coordinating Committee. The forum recommended by Washington DFW would provide a means for managing the programs for bull trout, resident fish, white sturgeon, and Pacific lamprey. We estimate that the cost of conducting a Priest Rapids Fishery Forum would be approximately $5,000 per year. This fishery forum would establish a formal process for reviewing annual mitigation and monitoring efforts related to bull trout, resident fish, white sturgeon, and lamprey. It would also provide a forum for fine tuning these fishery programs and planning and adjusting future efforts. We conclude that establishment of a Priest Rapids Fishery Forum would be worth the cost and we recommend including this measure in any license issued for the Project.

Crab Creek/Burkett Lake Enhancement Plan

In the license application, Grant PUD proposed to improve fish resources and fishing opportunities in the lower 5 miles of Crab Creek. Grant PUD provided few details describing the measures that would be implemented in Crab Creek; therefore, on October 15, 2004, we issued a request for additional information describing the measures to be implemented in or around Crab Creek. On January 14, 2005, Grant PUD filed a response indicating that while some measures may be implemented in Crab Creek, the primary measures they would consider would include enhancing the stocked trout program and improving facilities at Burkett Lake.

In comments on the draft EIS, the Port of Warden indicated that establishing salmon and steelhead in Crab Creek could affect Columbia Basin irrigators and the local agricultural industry. As indicated above, Grant PUD is considering enhancement of stocking and facility improvements at Burkett Lake as part of the Crab Creek enhancement project. We would not expect these measures to affect Columbia Basin irrigators and the local agricultural industry. However, because Grant PUD's Crab Creek proposal appears to be only conceptual at this time, we do not recommend implementing the proposed stocking and facility improvements at Burkett Lake until the proposal is more fully developed. Therefore, we recommend that Grant PUD develop a Crab Creek/Burkett Lake Enhancement Plan in consultation with the federal, state, and tribal entities, including representatives of the local agricultural community. This plan would define the specific measures that Grant PUD would implement and would address potential effects on other resources, including impacts on irrigators and the agricultural industry. We estimate that the cost of developing this plan would be $20,000. This plan would be worth the cost and we recommend including it in any license issued for the Project.

Aquatic Invasive Species Plan

As a component of its draft Recreation Plan, Grant PUD proposes to manage nuisance aquatic plants at key recreation sites within the project area and monitor project waters for indicators of nuisance levels of aquatic plant growth. Further, Grant PUD proposes to continue to work cooperatively with Washington DFW and monitor for zebra mussels within the Project area at an estimated annual cost including O&M of $2,000. Washington DFW's proposal to develop and implement an AIS Plan focuses on an education and outreach program that would help change boater behavior. Such efforts could help prevent, eradicate or control introductions of invasive species, especially at project-related recreation sites. In the draft EIS we recommended one invasive species plan that would address both aquatic and terrestrial invasive species. Based on Washington DFW comments at our section 10(j) meeting and clarification from Grant PUD, we agree that a separate AIS Plan would be more efficient to administer. We are also recommending that the AIS Plan include provisions for: (1) identifying and recommending any additional measures for detecting future AIS infestations; (2) a detailed information and education program that includes identifying boat access points and distributing education material during peak boating season (May 1-October 30 each year), conducting voluntary boat inspection demonstrations to explain the AIS program and proper methods of cleaning boats, and distributing voluntary boater surveys prepared by Washington DFW; and (3) an implementation schedule. The cost of developing an AIS plan with these three additional components would be approximately $10,000. We expect that implementation could be incorporated into Grant PUD's existing aquatic macrophyte control program for little additional cost. We conclude an AIS Plan would be worth the cost and we recommend including such a plan in any license that is issued for the project.

Wildlife Habitat Management Plan

Instead of developing and implementing two separate plans (Upper Wanapum management plan and Lower Crab Creek management plan) as originally proposed, Grant PUD proposes to develop and implement a single wildlife habitat management plan for the Priest Rapids Project. The plan would identify goals and objectives, describe a process for coordination, and provide support for wildlife habitat improvement projects in lower Crab Creek and in several wildlife management areas. Elements of these programs also include providing acquiring lands, providing for fire suppression programs, controlling noxious weeds, and coordinating recreation management. Grant PUD broadly identifies the various types of actions that could be undertaken in the Project area within defined spending limits, but suggests that such details would be worked out in consultation with the resource agencies and other interested parties.

It appears that Grant PUD intends to focus on measures that would be applied to lands within or immediately adjacent to the project. This is reasonable and appropriate because such measures would be expected to benefit wildlife and botanical resources related to the project; help support biodiversity; restore and enhance native shrub-steppe and riparian habitats adversely affected by ORV and recreation use; improve riparian habitat connectivity; enhance waterfowl migration, wintering, and breeding habitat using the project lands and waters; and enhance wildlife viewing and hunting opportunities at the project. In some cases, it may be prudent to consider upland habitat improvement projects outside the project boundary, because there are limited opportunities to benefit upland species in the project boundary and to address indirect effects of some recreation activities that may extend into adjoining upland habitats. However, we recommend that Grant PUD work with Washington DFW, Interior, and others to identify and prioritize projects that rehabilitate and enhance important shrub steppe, riparian, and wetland habitats within and immediately adjacent to the project because these areas are most closely tied to project effects and resources.

Because the habitat improvement measures and management objectives are conceptual at best, additional detail is needed to ensure that the implemented measures maintain a nexus to the project. Moreover, while we have estimated costs (estimated annualized cost of $997,500) for implementing habitat restoration and management measures based on the record, the final cost would depend on the specific habitat improvement projects that are ultimately identified. We recommend that a Wildlife Habitat Management Plan be filed for Commission approval that includes an identification of the projects that would be implemented, where they would be implemented, how they would be implemented, how they would be maintained and monitored to ensure their continued success, and a schedule for their implementation. The plan should be developed in consultation Washington DFW, FWS, BLM, BOR, tribes, Washington DNR, and the IAC because of the need to coordinate the Shoreline Management Plan and the Recreation Plan.

It is likely that management actions would need to be defined and coordinated on a regular basis (at least every five years) to ensure that they address changing conditions and resource needs. Consequently, we also recommend that Grant PUD file an updated management plan every five years for Commission approval that specifically describes habitat improvement projects that would be undertaken over the next five years. We estimate that it would cost about $2,000 to update the plan; this does not include an implementation cost because that would depend on the approved measures. We find the benefits to wildlife resources from implementing the above measures would be worth the cost.

Monitoring Habitat and Coordinating Recreation Measures

To ensure that management of project lands are consistent with adjoining land use goals, Washington DFW recommends that Grant PUD develop a habitat management and monitoring plan that is coordinated with Grant PUD's draft Shoreline Management Plan. The plan, to be developed within 18 months of license issuance, would include a map of land use designations within the project vicinity, management goals and strategies for land use designations, a monitoring strategy that would identify actions inconsistent with stated land use goals, and a timeline for restoring damaged habitats. Interior also recommends a coordinated recreation and wildlife management plan.

Dispersed recreation that occurs along the project reservoir can adversely affect sensitive wildlife habitats and plants and appears to be the principal concern of the resource agencies. The project reservoir also provides a travel corridor that facilitates access to surrounding state and federal lands that is difficult to control. Grant PUD intends to coordinate implementation of the Wildlife Habitat Management Plan with its Shoreline Management and Recreation Plans to further minimize disturbance to wildlife and degradation of sensitive habitats from project-related recreation. Grant PUD's draft Shoreline Management Plan defines existing land uses within the project boundary that reflect stakeholder input for intended land use goals. However, the draft Shoreline Management Plan does not identify adjacent land uses. Such knowledge can help guide management decisions, whether that be locating recreation facilities or implementing wildlife management projects or considering signage (see Signs at Identified Recreation Sites below) and recreation access controls to sensitive lands. Therefore, we recommend that the draft Shoreline Management Plan map be revised to reflect adjacent land uses. We do not expect this to increase the cost of finalizing the Shoreline Management Plan.

We also recommend that a Wildlife Habitat Monitoring and Information & Education Program be developed in consultation with the resource agencies to monitor the indirect effects of recreation on wildlife and wildlife habitats and to educate the public about the importance of sensitive habitats (see Signs at Identified Recreation Sites below). The draft Recreation Plan includes a monitoring protocol that is based on periodic surveys and qualitative observations of bare ground, litter, and vegetation damage. We find these methods to be too subjective and do not necessarily fully consider wildlife needs. Therefore, a more detailed habitat monitoring program at dispersed recreation sites along the project reservoir needs to be developed. The monitoring plan should be coordinated with the Recreation Plan and may include a further refinement of the proposed monitoring methods to more directly consider recreation-related effects on wildlife

and wildlife habitat immediately adjacent to the project

Washington DFW also recommends that the management and monitoring plan include provisions to mitigate for lost habitat and wildlife resource values that occur as a result of recreation development and dispersed recreation activities that are inconsistent with plan. Grant PUD's draft Recreation Plan identifies a number of actions that might be undertaken to curtail adverse recreation-related effects, including erecting access barriers, defining site boundaries, cleaning up the site, closing the site, hardening the site, and providing sanitation facilities. These actions would likely be adequate to stop further adverse impacts from occurring, but would not necessarily rehabilitate the sites. Because it may be difficult to discern how much adverse recreation-related affects on wildlife and wildlife habitats are attributable to the project and how much might be associated with adjoining land use and agency access policies, habitat improvement projects would need to be considered on a case-specific basis and would be legitimate candidates for habitat improvement projects developed in the context of the Wildlife Habitat Management Plan discussed above. We believe this is consistent with the objectives of Washington DFW and Interior's recommendations. We estimate it would cost about $15,000 to develop the monitoring program and to coordinate the development of the Wildlife Habitat Management Plan, Recreation Plan and Shoreline Management Plan. The cost of implementing the plan would depend on the methods employed. These efforts would continue to provide appropriate recreation access to the project lands and water, while benefiting wildlife and ensuring habitat improvement projects are consistent with management objectives. We find that these benefits would be worth the cost.

The Memorandum of Agreement between Grant PUD and the Wanapum

Under the original license for the Priest Rapids Project, Article 42 required Grant PUD to develop a MOA with the Wanapum for the protection of Indian graves in the project area, the removal of the pictographs from P'na Island, and the setting up of these pictographs as monuments. As a result of this requirement, the two parties signed a MOA on January 8, 1957. According to Grant PUD's license application (2003), the agreement was subsequently modified.

As previously discussed, Grant PUD proposes to continue its commitment with the Wanapum to protect the cultural resources. In comments on the draft EIS, Grant PUD and the Wanapum recommend that the MOA remain separate from the final HPMP, but part of a new license for the project. The Wanapum stated that the MOA reflected the need for identification, protection, and management of cultural resources, gravesites, and relics at the project, which are important to the Wanapum. As both the Wanapum and Grant PUD have expressed in their comments, we agree with the importance of Grant

PUD's continued commitment with the Wanapum. Therefore, to protect cultural resources of significance to the Wanapum at the project, we recommend the license include an article requiring Grant PUD to file, within 6 months after license issuance, a MOA for Commission review, which may include any relevant portions of past agreements. This MOA should provide for the identification, protection, and management of cultural resources, gravesites, and relics, in the same manner that the licensee has during the current license term.

In comments on the draft EIS, the Wanapum recommended that Grant PUD develop an agreement with them providing for reasonable funding, construction, and other assistance to assure cultural artifacts are properly handled. We recommend that the filing of a MOA include provisions to ensure cultural artifacts important to the Wanapum that are located at the Priest Rapids Project are properly handled and curated. While we support an agreement between Grant PUD and the Wanapum to properly handle cultural artifacts, we maintain that funding arrangements between the two parties can be concluded privately, without being subject to Commission enforcement. We, therefore, do not recommend this provision in any license issued for the project.

Historic Properties Management Plan and Related Measures

Along with implementing the HPMP within one year after license issuance as proposed by Grant PUD, we also recommend that Grant PUD implement the following six tasks associated with the final HPMP: (1) within 3 months after license issuance, provide DAHP with the missing and incomplete information associated with submitted site record and determination of eligibility forms; (2) within six months after license issuance, develop protection/mitigation measures for the 20 archeological sites listed in Table 27 and all other archeological sites located within the Project APE known to contain human remains; (3) within one year after license issuance, implement protection/mitigation measures on the archeological sites mentioned in (2) above; (4) within 2 years after license issuance, determine National Register eligibility for the remaining inventoried archeological sites and other cultural resources located within the Project APE; (5) within 2.5 years after license issuance, identify site-specific project-related effects to National Register-eligible cultural resources; and (6) within 3 years after license issuance, develop long-term treatment plans and associated schedule for carrying out remaining site-specific protection/mitigation measures on the National Register-eligible archeological sites.

We also recommend that Grant PUD reconvene a committee similar to the Hanford Reach National Monument Federal Advisory Committee within six months after license issuance and incorporate into the HPMP, steps, procedures, and protocols involving this committee. The purpose of the committee would be

to protect archeological sites being affected by project-related shoreline erosion in the Hanford Reach. In comments on the draft EIS, Grant PUD supports this concept. We also recommend that provisions be included in the final HPMP for addressing impacts from recreation use of Quilomene Dune and Bay on cultural resource sites. For further discussion see the Recreation and Land Use section.

The HPMP and associated additional Staff-recommended tasks would provide a framework for management of all identified National Register-eligible sites within the Project's APE for the term of the new license. Management actions would include site monitoring, shoreline stabilization, data recovery, curation, and Interpretation and Education programs to educate the public on historic properties. Grant PUD estimates the total estimated capital cost of its proposal is $20,000,000 with annual O&M costs estimated at $3,750,000. We believe that the costs of our additional recommendations could be incorporated in Grant PUD's total costs for the HPMP. The above measures would adequately protect the cultural resources within the Project's APE and believe the benefits to the rich cultural resources at the Project would be worth the cost.

Signs at Identified Recreation Sites

We have included in our recommended alternative two additional measures, one proposed by the Yakama and one proposed by CRITFC. The Yakama commented on project-related recreational use in the Quilomene Dune and Bay area. By allowing the number of boats in the Quilomene Dune and Bay area without any regulation for wake size, significant and on-going shoreline erosion occurs, thereby potentially affecting culturally sensitive areas of concern to the Yakama. In its filing of July 8, 2005, Grant PUD states that the impacts on the area are generally localized to the shoreline zone because visitors arrive by watercraft.

In our draft EIS, we recommended the final Recreation Plan include a provision (*e.g.*, signs) at Quilomene Dune and Bay to address wake size by boaters. We received no comments on our recommendation. We still find this recommendation would likely lessen shoreline erosion of historic properties, and associated riparian habitat, caused by project-related recreation use. Overall, to minimize erosion of historic properties caused by project-related recreation use within the Project boundary, the final HPMP would take into account such impacts and those impacts would be lessened through recommended measures. We estimate the cost at $3,000.

CRITFC recommends that Grant PUD install sign(s) at identified recreation sites within the existing project boundary to improve public awareness of and the

need to protect cultural resources. Although the cost of implementing this measure is unknown, we find that the measure could be developed in concert with the HPMP, which is a stipulation of the PA, but would be a component of Grant PUD's proposed Interpretation & Education Program, part of its draft Recreation Plan. We expect the cost to be nominal based on a coordinated effort among Grant PUD and the interested parties.

As previously discussed in the Recreation and Land Use section, the Project area provides an opportunity for the public to understand the Ice Age Floods and its role in creating water storage above the Project dams, as well as, its role in providing the materials used to construct the Project dams and those dams on the mid-Columbia River. We recommend, therefore, that Grant PUD develop and install at least two interpretive displays/kiosks regarding the Ice Age Floods to be located within the Project boundary. The displays/kiosks would be a component of Grant PUD's Interpretation and Education program, part of its final Recreation Plan. We estimate the cost of developing two interpretive displays/kiosks at $26,000. We conclude this measure would contribute to a beneficial effect on the recreation resource and we recommend including it in any license issued for the Project.

Recreational Use Monitoring on BLM Lands

In its draft Recreation Plan, Grant PUD proposes to conduct periodic recreation use monitoring surveys on project lands at 12 year intervals at an estimated cost of $75,000 per survey (or $225,000 for 3 surveys). We have included in our recommended alternative an additional measure proposed by Interior in its section 10(a) condition, which entails inclusion of recreation monitoring on an estimated 748.8 acres of BLM-administered land in the project boundary. The monitoring would be a component for gathering data for FERC Form 80-Recreation Report, which is required at six year intervals. Using Grant PUD's cost for recreation use monitoring, we estimate this measure would add $21,150 annually to the proposed Project cost. We find the benefit of providing coordinated planning for project-related recreation lands would help determine the adequacy of the proposed public access and recreation facilities to meet future recreation demand and would be worth the additional cost required by this measure.

Kittitas County Boat Launch at Vantage

In its draft Recreation Plan, Grant PUD proposes to improve the Kittitas County boat launch at Vantage by: (1) providing barrier-free facilities; (2) providing additional facilities, such as five picnic sites, interpretative signs, and a

trail; and (3) expanding the parking area.

Based on comments on the draft EIS, we include in our recommended alternative an additional measure for Grant PUD to dredge and lengthen the Kittitas County boat launch at Vantage. As previously discussed in section 3.9.2, the Kittitas County boat launch at Vantage provides access to Wanapum reservoir and is heavily utilized primarily because of its location (near I-90) and a fee is not required. The 1999 FERC Form 80-Recreation Report estimated 31,880 persons at the boat launch. Survey results (EDAW, Inc., 2000b) support the recreational use data. Our recommendation for Grant PUD to dredge and lengthen the Kittitas County boat launch at Vantage would not only address the effects of fluctuating impoundment surface elevations on recreational boating, but also address a recreation need. Overall, the recreation opportunities at the boat launch would be enhanced and would contribute toward a cumulative beneficial effect on recreation resources within the mid-Columbia River Basin. We estimate the cost to dredge and lengthen the Kittitas County boat launch at Vantage would be $200,000 and find the benefits of this measure would be worth the cost.

Crescent Bar Island

The estimated 160-acre Crescent Bar Island is situated within Wanapum reservoir, approximately 20 miles upstream from Wanapum dam. The island is located within the Project boundary and is owned entirely in-fee by Grant PUD.

Grant PUD proposes to manage Crescent Bar Island under two land classifications: 105 acres as "planned development" and 112 acres as "conservation land" (including small islands and the mainland shore). The planned development land within or adjacent to the Priest Rapids Project boundary has experienced intensive residential, vacation home, and/or commercial development. The conservation land contains fish, wildlife, scenic, historic and/or archaeological resources that have exceptional and specific value(s) that require special protection.

As previously discussed, a series of leases (since 1962) and sub-leases issued by Grant PUD under its current Project license enabled private and public facilities to be constructed on Crescent Bar Island, primarily the northern portion of the island. The southern portion of the island has remained undeveloped. The Commission record documents "unauthorized activities", for example clearing of wetland areas on the shoreline of Crescent Bar Island that resulted in the loss of riparian and wetland habitat. The record also documents concerns from the resource agencies and interested parties continue regarding the adverse effects of further development on the island.

In 1998, complainants (five groups representing business lessees, condominium lessees, and RV tenants on Crescent Bar Island) sought exclusion from the Project boundary of portions of Crescent Bar Island underlying their business and residences. In 1999, the Commission found Grant PUD owned the underlying lands in fee, and the lease agreements were subject to the terms and conditions of the Project license. The lease agreements reserved to Grant PUD a perpetual flowage easement over all of the lands.[120] Although the Commission determined the lands were needed for project purposes, the Commission anticipated that, during the relicensing process, the matter would be revisited.

Under Grant PUD's proposal to manage 105 acres of Crescent Bar Island for planned development, we find that private development would be allowed and could occur during the term of a new license. Such development would only occur if a master plan (developed by a representative community organization along with its proposed permit for a facility) was approved by Grant PUD that demonstrated the proposed uses were consistent with the license. We find, however, that any further development could potentially result in more habitat fragmentation and loss of riparian habitat and associated species, potential exclusion of public access to Project lands and waters, potential adverse effects on juvenile Chinook salmon that use near-shore habitat, disturbance to wintering bald eagles, and impacts on a state-sensitive plant, the shining flatsedge. Washington DFW identifies the Crescent Bar area as a Riparian Priority Habitat.

Based on these effects and that these lands are still needed for Project purposes, as discussed in this final EIS, we find that no further development on Crescent Bar Island should occur beyond the existing disturbed footprint (except as noted below for the proposed trail); the maps contained in the draft Shoreline Management Plan should be revised to reflect existing land uses within the project boundary and adjacent land uses; and, a shoreline buffer zone on Crescent Bar Island should be defined. For a buffer zone, the Commission uses 200 feet as a rule-of-thumb;[121] however, the width of a shoreline buffer and lands associated with certain recreation activities (*e.g.*, boating, fishing) to ensure public access and protect the resources may vary from project to project. Therefore, Grant PUD should, at a minimum, consult with the FWS, Washington DFW, and the IAC and determine the width and acceptable uses of a buffer zone, and upon Commission approval, delineate a shoreline buffer zone for Crescent Bar Island. For further discussion, see the section entitled Monitoring Habitat and Coordinating

[120] 88 FERC ¶ 61,012 (1999) and 89 FERC ¶ 61,177 (1999).

[121] The idea of a 200 foot buffer zone was established by Commission Order No. 313, 34 FPC 1546 (1965). *See, e.g. Northern States Power Company*, 83 FERC ¶ 62,194 (1998).

Recreation Measures above.

We recommend Grant PUD manage Crescent Bar Island under the land classifications proposed as planned development and conservation, but no further development should occur beyond the existing disturbed footprint (except as noted for the proposed trail). Grant PUD would be subject to the provisions of the Commission's standard land use article, if a new license is issued. The standard land use article contains provisions for Commission approval to authorize non-project use of project lands. This approval process would require Grant PUD to file, with the Commission, an application for non-project use of project lands, thereby initiating a process involving public input as well as agency and other interested entity input. It is a process intended to protect environmental resources, protect the scenic values of the mid-Columbia River, and to continue to allow for public access to Project lands and waters.

As discussed in section 3.9, *Recreation and Land Use*, Grant PUD proposes to improve public recreation facilities on Crescent Bar Island, which include provisions for the following: (1) a 5.5-mile-long trail; (2) dredging and lengthening the boat launch; (3) removing six existing RV campsites; (4) better publicity, information, and signage about existing public use areas; and (5) day-use facilities (*e.g.*, picnic sites, double-vault toilet). The 1999 FERC Form 80-Recreation Report estimated 32,100 persons at the boat launch.

While these actions would increase public use of Crescent Bar Island, the actions should not, except for the proposed trail, add new development outside the already disturbed footprint. The trail could be developed to minimize affects on terrestrial resources. Thus, overall, we find Grant PUD's proposed recreation improvements on the island would meet a recreation need as identified by the Washington SCORP, would be consistent with the conservation land classification objectives in Grant PUD's draft Shoreline Management Plan, and would be in the public interest.

5.1.3 Discussion of Measures Not Recommended by Staff

Staff finds that some of the measures proposed by Grant PUD or recommended by other interested parties would not contribute to the best comprehensive use of the Columbia River water resources, do not exhibit sufficient nexus to project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend such measures.

Alternative Passage Standards

CRITFC recommends that Grant PUD adopt a passage standard whereby direct and indirect juvenile salmon mortality through the reservoir, dam, and tailrace would not exceed 8.5 percent by 2013. The primary differences between the CRITFC standard and the standard proposed by Grant PUD, NMFS, Interior, and Washington DFW is inclusion of tailrace mortality and increased total mortality. CRITFC provided no justification for this standard and it is not clear that it would provide any greater benefit to salmon and steelhead than the standard proposed by Grant PUD and the agencies. Lastly, it is not apparent that tailrace mortality could be accurately measured at each dam with the existing technology.

The costs of implementing measures to achieve this standard are unknown; however, because there is no apparent justification or benefit to achieving CRITFC's alternative fish passage standard in comparison to the proposed standards, we do not recommend adopting them.

Passage Efficiency Standards

CRITFC recommends that Grant PUD achieve 80 percent fish passage efficiency (i.e., non-turbine passage) by 2013 and 90 percent fish passage efficiency by 2020. This standard would be in addition to achieving survival standards. CRITFC indicates that passage efficiency standards are necessary to address delayed mortality that is not accounted for by the survival standards. Grant PUD indicates that there are no known methodologies available to partition direct and indirect mortality and they state that there are no data to support the theory that delayed effects of turbine passage are greater than other routes.

Regardless of the ability to measure delayed mortality or its significance, it is not clear that Grant PUD could implement any techniques that are not already being employed or under consideration to further increase fish passage efficiency. Spills are currently the primary non-turbine route for passage of juvenile salmonids and they are currently limited by TDG at the project. Additional spills would likely cause further increases in TDG which could reduce fish survival or result in other adverse effects.

Both the Wanapum dam future unit 11 bypass and the potential top-spill bypass design at Priest Rapids dam have the potential to increase fish passage efficiency at each dam. The Wanapum bypass is currently under construction and Grant PUD is studying top-spill bypass designs for Priest Rapids dam. We are not aware of any other practical approaches that could be employed at the dams to increase fish passage efficiencies. Because there is no evidence that the delayed effects of turbine passage are greater than other routes and there are no practical approaches for increasing fish passage efficiencies

beyond what is already being considered, we do not recommend including this requirement as part of any license issued for the Project.

Adult Fishway Passage Standard

CRITFC recommends that Grant PUD be required to achieve a median upstream passage time of 24 hours for each dam. CRITFC indicates that median passage times for adult salmon moving upstream past the project range from 12 to 36 hours, while median passage times for most Columbia River mainstem dams is about 24 hours. CRITFC indicates that excessive passage times may reduce adult salmon and steelhead energy reserves and reproductive viability. CRITFC suggests that reducing upstream passage times would likely have some incremental benefit in regard to reproductive success.

Failure to achieve a fishway travel time standard would suggest a need to implement measures to reduce upstream travel times at the project dams. This is consistent with what Grant PUD is already doing and would continue to do under the staff-recommended alternative. Recently, Grant PUD addressed delay between the collection channel and the entrance to the left bank fishway at the Priest Rapids dam by closing the collection channel orifice gates and modifying the fishway entrance gate configurations. Additionally, as part of the staff-recommended alternative, Grant PUD would study methods to improve inadequate collection channel velocities which are a source of delay at both dams. After completion of the proposed fishway modifications, Grant PUD would monitor passage times to confirm that passage conditions were improved and passage times were reduced. Because we are recommending that Grant PUD improve fishway passage conditions and demonstrate improvement in passage times through subsequent monitoring, we conclude that a fishway passage time standard would be unnecessary and we do not recommend including this measure in any license issued for the Project.

Meeting Survival Standards by 2013

The Yakama and Alaska DFG indicate that Grant PUD should be required to meet the survival standards for all anadromous salmonid species by 2013. Under the SSA and NMFS' section 18 prescriptions, Grant PUD would develop and implement a plan to achieve 93 percent juvenile salmonid dam passage survival by 2010 and would measure passage survival of all species by 2013. If the survival standards are not met by 2013, Grant PUD would implement additional modifications to improve survival or implement additional mitigation or enhancements.

Alaska DFG states that because the SSA does not include a specific deadline for achieving the survival standards, Grant PUD could operate the project without meeting the survival standards for the entire license term. While this conclusion is technically

correct, it is inconsistent with the spirit of the SSA. Under the terms of the agreement, Grant PUD must "make steady progress" towards achieving the survival standards including continuing to examine approaches to improve survival throughout the license term or until the standards would be met. We anticipate that Grant PUD would achieve the survival standards for each species during the license term. It is not apparent that imposing a strict deadline would provide any additional certainty of achieving the survival standards, since with or without a deadline, it would be possible that Grant PUD would fail to achieve the survival standard for an individual species. Because there does not appear to be any benefit to imposing a deadline on achievement of the survival standards, we do not recommend including this measure in any license issued for the Project.

PIT Tag Detection at Wanapum dam

CRITFC and Alaska DFG recommend that Grant PUD install PIT tag detection equipment at Wanapum dam. CRITFC indicates that installation of PIT tag detection facilities at Wanapum dam would reduce critical uncertainties regarding fallback rates and the ultimate fate of adults passing Wanapum dam and would allow calculation of smolt-to-adult returns from returning adults from juvenile survival studies. Alaska DFG indicates that installation of PIT tag detection facilities at Wanapum could serve "as a check" of information collected at Priest Rapids dam.

Installation of PIT tag detection facilities at Wanapum dam would allow tracking of individual adult fish that have passed from Priest Rapids dam to Wanapum dam. However, it would provide little additional insight regarding fallback or the ultimate fate of adults since many other factors such as natural mortality, harvest, or straying could not be accounted for by PIT tag detection alone. For these same reasons, PIT tag detection at Wanapum dam could not be used to serve "as a check" of Priest Rapids data. Smolt-to-adult survival can be measured with the existing PIT tag detectors at Priest Rapids dam and there is no additional benefit to calculating this metric with PIT tag data collected at Wanapum dam.

Based on the cost estimates for Priest Rapids dam, the cost of installing PIT tag equipment at Wanapum dam would be about $320,000; annual O&M cost would be $10,000. However, because installation of PIT tag detectors at Wanapum dam would not provide any new or valuable information regarding smolt-to-adult survival or fallback, we conclude that it would not be worth the cost and we do not recommend adopting this measure.

Measures-Based Passage Plan

CRITFC recommends that Grant PUD develop and implement a measures-based upstream passage and fallback assessment and implementation plan for the project. They indicate that the plan should include: 1) an assessment of new fishway designs to decrease energy expenditure; 2) evaluation of extending the fishway exits into the project forebays to reduce fallback; 3) creation of additional attraction flows at ladder entrances to reduce adult tailrace delay; 4) evaluation of the effects of the surface bypass superstructure at the Wanapum sluiceway on fallback adults and kelts; 5) evaluation of extended spill periods for providing fallback and kelt passage; 6) investigation of the impacts of power peaking on adult passage; 7) implementation of measures that would allow independent operation of the left and right bank fishway water supply systems; and 8) estimation of adult salmon energy expenditure during upstream passage through the fishway. These studies could identify project effects on upstream passage and could lead to improvements that would increase the efficiency of the upstream passage facilities; however, CRITFC has provided no evidence or information to indicate that any of the studies are needed.

The specific cost of the measures-based approach proposed by CRITFC is unknown; however, it is clear that the various studies and evaluations would be costly. Upstream passage at the project dams appears to be comparable to other dams within the mid-Columbia River and continued monitoring and refinement proposed by Grant PUD and the agencies should improve upstream passage conditions even further. Because there is no evidence that this approach or these studies are needed or that existing passage conditions are inadequate, we conclude that a measures-based passage plan is unnecessary and would not be worth the cost.

Effects of Peaking on Passage

CRITFC recommends that Grant PUD study the effects of peaking operations on juvenile and adult fish passage through the project dams. CRITFC speculates that decreased discharge that occurs during peaking operations increases delay in the downstream passage of juvenile salmonids and exposes them to increased predation mortality in the project forebay. CRITFC provides no details regarding the mechanism for this delay; however, it is possible that reduced flows (i.e., dam discharge) would reduce steering flows in forebay areas and cause juvenile fish to be unable to locate available passage routes.

In regard to adult passage, CRITFC suggests that increased powerhouse discharge increases adult passage delay and may increase adult mortality during upstream passage. Increases in project discharge could influence the ability of

adult salmon or steelhead to locate fishway entrances by creating confusing flow conditions that conceal fishway attraction flows. However, Grant PUD has studied adult passage at both dams and found that the most significant delay problems occurred between the collection channel and the fishway entrance. The monitoring results collected by Grant PUD do not suggest that there is any significant delay of adult fish related to fluctuating flows. Grant PUD is proposing to continue monitoring adult upstream passage and implement corrective actions if problems are identified. We would expect that any significant delay problems associated with adult passage would be identified through this monitoring.

CRITFC provided no information describing the design of these peaking studies. We would expect that they would require tracking individual juvenile and adult passage times using radio telemetry under varying project operational scenarios (*i.e.*, peaking vs. not-peaking). We estimate that the cost of these studies would be approximately $200,000, not including any lost power sales associated with manipulating project operations. Because we have no evidence, other than speculation, to suggest that peaking adversely affects fish passage and because other measures would be implemented that would have direct benefits towards improving fish passage, we conclude that the recommended peaking study is unnecessary and it would not be worth the cost.

Index Testing All Turbines

CRITFC recommends that Grant PUD index-test all individual project turbines to identify peak efficiency ranges. CRITFC states that fish survival is generally higher when turbines are operated within 1 percent of peak efficiency and they recommend that the project turbines be operated at near peak efficiency to maximize fish passage survival. Grant PUD indicates that any new turbines installed at Wanapum dam would be index-tested and this information would be used to operate the new turbines at near peak efficiency to maximize passage survival. For the existing turbines at both Wanapum and Priest Rapids dams, Grant PUD has developed a fish mode of operation. The fish mode of operation restricts the operating ranges of the turbines to maximize survival based on empirical passage survival data. We would expect these empirical data to be more reliable for maximizing survival than the more theoretical relationship between operating efficiency and survival that would be employed through index-testing. The cost of index-testing is unknown; however, because there would be little benefit, if any, to index-testing the existing project turbines, we are not recommending it for any license that would be issued for the Project.

Adult Fallback and Kelt Passage Studies

In comments on the draft EIS, American Rivers recommended that Grant PUD conduct adult salmon and steelhead downstream passage studies. American Rivers indicates that they support the modifications proposed by Grant PUD to provide better adult downstream passage conditions; however, they state that there is a substantial information gap regarding adult downstream mortality and there must be scientifically credible data for determining whether the spillways and sluiceways provide a safe route for adult downstream passage. American Rivers did not specify how adult downstream passage survival would be measured.

Our analysis suggests that studies of adult spillway and sluiceway survival could be conducted with hatchery fish to avoid effects on ESA listed salmon and steelhead; however, it is not clear what methodology would be best for conducting adult salmon or steelhead survival studies. Telemetry studies do not allow direct observation and assessment of fish condition, which would prevent evaluation of injuries and accurate accounting of survival (i.e., non-moving tags may not be dead fish or moving tags may not be live fish). Balloon tag recovery with adult salmon or steelhead would likely be ineffective for fish recovery or would bias fish survival. Net recovery would introduce a significant potential for recovery injuries and bias that has been shown to be difficult to account for through use of control fish. We estimate the cost of conducting these studies would range from $500,000 to $1,000,000. Because the results of these studies would likely be unreliable, we conclude that these studies would not be worth the cost and we do not recommend including a requirement for these studies in any license that is issued for the Project.

Spillflows for Adult Fallback and Kelts

In comments on the draft EIS, Umatilla stated that sluiceway passage would not be adequate to protect adult fallbacks or kelts. Umatilla stated adult mortality through turbines is very high and sluiceway flows would be only a small fraction of total streamflow. Umatilla recommend that Grant PUD provide spillflows at Priest Rapids dam and spillflows or top-spillflows at Wanapum dam for protection of adult fallbacks and kelts.

As proposed in the SSA, Grant PUD would provide spill or top-spill flows at both dams for downstream passage of juvenile fish from April through the end of July or early August depending on juvenile run timing. Our analysis indicates that these spills would provide a safe alternative to turbine passage for the entire period when kelts would be present and during most of the period when adult salmon and steelhead would be migrating upstream. Once spillway flows would be discontinued, Grant PUD would provide sluiceway flows as a fallback route. The timing of this operation would

correspond to a portion of the fall Chinook salmon and steelhead migrations (from August through November 15 each year).

Sluiceway flows during the August to November 15 periods would provide a safe alternative to turbine passage. Providing additional spillway flows during this period, as recommended by Umatilla, would be costly and would reduce power generation (Umatilla did not specify a spill level; therefore, we are unable to quantify power losses and costs). Because Grant PUD's proposed sluiceway flows would provide a safe alternative to turbine passage for adult fallbacks and because providing additional spillflows from August to November 15 would reduce generation, we conclude that this proposal would not be worth the cost. We do not recommend including a requirement to provide spillflows from August to November 15 in any license that is issued for the Project.

Upgrade to State-of-the-art Hatchery Facilities

Alaska DFG and CRITFC recommend that Grant PUD initiate funding of improved state-of-the-art facilities at the Priest Rapids Hatchery. CRITFC also recommends that these state-of-the-art facilities should be employed at other hatcheries used to produce fish as mitigation for the Project.

Grant PUD acknowledges that many of the facilities at the Priest Rapids Hatchery are approaching the end of their useful life and Grant PUD is proposing to renovate the hatchery. Grant PUD's proposal includes construction of a new incubation building, a new office building, an emergency power system to provide uninterruptible water supply to the hatchery building, new early rearing raceways, an additional rearing pond, new adult trapping an holding facilities, a new weir on the return channel, predator control features, a pollution abatement settling pond, and up to three residences. These renovations would allow Grant PUD to produce the number of fall Chinook salmon needed for the proposed mitigation. Many of the measures recommended by CRITFC and Alaska DFG would be directly or partly addressed by Grant PUD's proposed renovations to the Priest Rapids Hatchery; however, it appears that not all facilities would be upgraded to "state-of-the-art" status.

Grant PUD indicates that the hatchery production goals for spring-run Chinook salmon, summer Chinook salmon, sockeye salmon, and steelhead would likely be achieved by hatcheries located in other portions of the Columbia River watershed. These hatcheries are not owned or operated by Grant PUD and hatchery production at these facilities would likely be contracted by Grant PUD to some other entity. CRITFC suggests that the facilities at these hatcheries should be improved to state-of-the-art status.

Alaska DFG and CRITFC do not provide any evidence to indicate that state-of-the-art facilities are necessary to produce adequate numbers of healthy fish for mitigation. The costs of these upgrades are unknown; however, because of the numbers of hatcheries being considered for producing fish, it is apparent that these upgrades would be fairly costly. Ultimately, if the Priest Rapids hatchery or any other hatchery that is selected is capable of producing healthy fish that meet the targeted production goals there would be no basis for additional hatchery improvements. Based on this information, we conclude that these general and non-specific upgrades and improvements are unnecessary and unwarranted.

No Net Impact Fund

NMFS and Washington DFW indicate that the Project should achieve No Net Impact (NNI) if combined adult and juvenile passage survival is 91 percent and the remaining 9 percent unavoidable loss is made up through 7 percent hatchery mitigation and 2 percent habitat mitigation. The passage survival standards are currently not being achieved for certain stocks; therefore, the project is not achieving NNI for these stocks. As part of the SSA, Grant PUD is proposing that they contribute to a NNI fund to compensate for providing passage survival at rates less than the survival standards. Based on the calculations included in the SSA, Grant PUD is proposing to annually contribute $1,112,500 to a NNI fund to compensate for failing to achieve the survival standards for summer Chinook salmon and sockeye salmon.

In comments filed on March 8, 2006, Alaska DFG indicated that survival estimates used in the NNI fund should account for differences in survival of sub-yearling and yearling summer Chinook salmon. Alaska DFG suggests that Grant PUD should conduct studies of sub-yearling Chinook salmon survival and adjust the contribution to the NNI fund accordingly. Grant PUD is proposing to study sub-yearling Chinook salmon survival rates during the license term (years 2009 to 2011). After completion of these studies, the PRCC would use the survival estimates to adjust Grant PUD's contributions to the NNI fund for summer and fall Chinook salmon. These studies and adjustments of the NNI fund contributions would address Alaska DFG's concerns.

NNI funds would provide the agencies with additional financial capacity to undertake measures to improve survival of stocks failing to meet the survival standards, which could include supplementation of ongoing hatchery production, providing additional habitat improvements, or implementation of other measures.

We are recommending multiple actions and measures that would substantially improve conditions for salmon and steelhead stocks inhabiting the mid-Columbia River. In general, these measures would improve upstream and downstream passage conditions

and increase smolt production through hatchery supplementation and habitat improvements. Some losses would continue in spite of these substantial measures; however, because the staff-recommended measures would greatly improve conditions for salmon and steelhead and the FPA does not impose a no-net-loss requirement[122], we do not recommend including this measure in any license that is issued for the Project.

Future Populations

NMFS recommends that if a long-term hatchery program or a threshold population of naturally reproducing Coho salmon and/or Okanogan spring-run Chinook salmon is established, Grant PUD should develop, fund, and implement comprehensive protection programs for these species. The endemic stock of Coho salmon from the mid-Columbia River and the Okanogan spring-run Chinook salmon are considered extinct. Reintroduction efforts have been undertaken for both species; however, at this time both programs are considered experimental and there is no evidence that either population has established a threshold population. No long-term hatchery programs exist for either species. The cost of implementing specific protection programs for these species is unknown. Based on the information above, we conclude that requiring Grant PUD to implement protection programs for these species is premature and unwarranted at this time.

As part of their proposal included in the SSA, Grant PUD indicated that the Priest Rapids Coordinating Committee would evaluate the status of these reintroduction efforts in 2007 and determine the success of these programs and the need for mitigation. If the Priest Rapids Coordinating Committee determines that the reintroduction efforts have been successful in achieving threshold levels and project-related mitigation or enhancement would be appropriate, these efforts could be addressed through reopening the license or a request to amend the license.

Funding Regional Salmon Stock Evaluations

CRITFC recommends that Grant PUD contribute funding to regional evaluations of salmon stocks affected by the project. They suggest that these funds could be used to perform life-cycle analyses, genetic assessments, stock productivity analyses, and carrying capacity analyses. CRITFC states that these studies are needed to quantify or ground-truth the benefit of the passage survival standards proposed by Grant PUD and the agencies. They state that assessment of the survival standards is needed to determine if the standards are adequate for

[122] See, *e.g.*, *Ohio Power*, 71 FERC ¶ 61,092 (1995) and *Indiana Michigan Power Co.*, 82 FERC ¶ 61,274 (1998).

achieving regional productivity/escapement goals for salmon and steelhead.

The ability to achieve regional salmon and steelhead production goals or escapement goals encompasses numerous factors that are unrelated to effects of the Project. As a result, failure to achieve these goals would not necessarily indicate that the effects of the Project have not been adequately mitigated. Our analysis indicates that achieving the passage survival standards, providing hatchery supplementation, and improving tributary habitat conditions would mitigate for virtually all project effects on salmon and steelhead stocks. Additionally, we are recommending multiple studies, evaluations, and monitoring that would ensure that the proposed measures would be successful. The cost of the regional studies proposed by CRITFC is unknown; however, because these studies would be unnecessary to address project effects, we conclude they would not be worth the cost and we are not recommending including them in any license for the project.

Flows to Accommodate Fall Chinook Salmon Escapement

Interior, CRITFC, and Alaska DFG recommend that Grant PUD provide flows that would maintain enough suitable spawning habitat to accommodate expected fall Chinook salmon escapement (i.e., returning spawners) in the Hanford Reach. They recommend that each year, fishery representatives from the agencies and tribes should use escapement and water availability predictions to establish a flow regime for the forthcoming spawning season.

Currently there is no reliable or verified model for predicting the amount of fall Chinook salmon spawning habitat within the Hanford Reach as it relates to flow. Anglin et al. (2006) described the relationship between flows and habitat in the Hanford Reach; however, they suggested that additional testing and development would be necessary before the model could be employed as a management tool to regulate flows during the spawning season. In addition to the lack of a reliable model for predicting spawning habitat, the ability to predict escapement and to a lesser extent, water availability is imprecise and often unreliable. Therefore, from a practical standpoint, it is not possible for fishery representatives to accurately and reliably select a flow regime that would accommodate all adult spawning fall Chinook salmon in the Hanford Reach.

From a biological standpoint, it is not clear that additional spawning habitat is needed. Interior speculated that redd superimposition during the fall Chinook salmon spawning season reduces redd survival and limits overall juvenile production. However, Interior did not provide any evidence that spawner success is related to available habitat and there is no information in our record to indicate

that available habitat is limiting production or that redd superimposition is a substantial factor influencing production. Some redd superimposition would likely occur regardless of amount of habitat available since late arriving spawners are likely to select the same preferred habitat areas that early spawners selected.

Lastly, the ability of Grant PUD to reregulate inflows from the upstream projects is limited. Inflows to the Project can vary dramatically on an hourly, daily, weekly, and seasonal basis and on occasion, the useable storage within the Project would not be great enough to fully reregulate inflows from the upstream projects. To release steady state flows from Priest Rapids dam throughout the entire spawning season, modifications to the operation of some or all of the seven mainstem mid-Columbia River dams would need to be considered and these changes would affect the ability of the system to provide load following energy generation and they would likely have indirect effects on reservoir fisheries, recreation, and other resource areas.

The cost of this measure is unknown, although it would likely be high and it would result in elimination of a substantial portion of the project's operational flexibility during the spawning period. Additionally, it appears that this measure could not be implemented due to: 1) the limited ability of the project to re-regulate inflows, 2) the lack of information describing the flow versus spawning habitat relationship, 3) the unreliability of escapement predictions, and 4) the imprecision of water availability predictions. Lastly, there is no evidence that the spawning habitat availability is limiting juvenile production or fall Chinook salmon abundance. In fact, the fall Chinook salmon population is the healthiest salmon population in the northwestern United States. Based on the information above, we are not recommending that this measure be included in any license issued for the Project.

Flows to Protect Fall Chinook Salmon Eggs, Alevins, and Emerging Fry

To protect incubating eggs, alevins, and emerging fry, Interior, CRITFC, and Alaska DFG recommend that Grant PUD maintain flow releases for the successful incubation of eggs in redds from November 30 through the end of emergence. They indicate that the specific operations and flows would be determined by the agencies, tribes, and dam operators, which is similar to the approach proposed in the Hanford Reach Agreement. However, unlike the Hanford Reach Agreement, which provides specific operational requirements in response to monitoring results, Interior, CRITFC, and Alaska DFG did not provide specific information on how the appropriate flows would be selected or how often they would be modified (i.e., once annually or multiple times per spawning season). Without additional information we are unable to evaluate the specific

benefits and cost of this measure. In any event, the Hanford Reach Agreement includes measures that would adequately protect incubating eggs, alevins, and emerging fry. We do not recommend including the incubation flows proposed by Interior, CRITFC, and Alaska DFG in any license issued for the Project.

Flows to Protect Rearing Fall Chinook Salmon

CRITFC and Alaska DFG recommend that Grant PUD maintain a daily flow fluctuation range of 10 kcfs in the Hanford Reach during the fall Chinook salmon rearing period. This range is lower than the fluctuation limits proposed in the Hanford Reach Agreement (*i.e.*, 20 – 60 kcfs). Intuitively, smaller and fewer fluctuations should reduce fall Chinook salmon fry stranding and entrapment; therefore, it is likely that 10 kcfs fluctuation limit would result in less stranding and entrapments than operations proposed in the Hanford Reach Agreement. However, because of uncertainty associated with the Anglin et al. (2006) model, the incremental benefit of limiting fluctuations to 10 kcfs is not clear.

Fluctuations in the Hanford Reach are the result of the cumulative effects of the seven upstream dams. As a result of Grand Coulee dam's significant physical capacity to store and release flows, fluctuations in the mid-Columbia River are often greatest immediately downstream of Grand Coulee dam; however, through coordination of the seven dam system, fluctuations generally decrease as they pass downstream. Under current operations, the Project helps to reduce flow fluctuations occurring upstream before they enter the Hanford Reach. Under the Hanford Reach Agreement, Grant PUD would implement additional operational modifications that would enhance conditions in the Hanford Reach by further restricting flow fluctuations from Priest Rapids dam. The annual cost of these enhancements for protecting rearing fall Chinook salmon would be about $4.3 million.

In comparison to the Hanford Reach Agreement, the 10 kcfs fluctuation range proposed by CRITFC and Alaska DFG would potentially provide additional enhancement of conditions within the Hanford Reach and further reduce stranding and entrapment of fall Chinook salmon. However, the 10 kcfs fluctuation limit would increase fluctuations within the project reservoirs which could have adverse environmental effects on reservoir fisheries, recreation, shoreline erosion, or cultural resources. Additionally, the 10 kcfs fluctuation limit would substantially reduce the operational flexibility of the Project during the fall Chinook salmon rearing period. While baseload generation would continue to occur, the ability of the project to provide regional electrical system support and load following capability would be substantially eliminated during the rearing period. Additionally, the ability of the project to serve other purposes such as flood

control, navigation, agriculture, recreation, municipal and industrial use, or cultural resources could be adversely affected. Grant PUD estimates that the annual cost of implementing the 10 kcfs fluctuation limit would be approximately $136 million based on the cost of building and operating the 1,320 MW of combustion turbine capacity that would be lost as a result of operating within the recommended constraint.

The fall Chinook salmon population inhabiting the Hanford Reach is the healthiest salmon population in the northwestern United States and there is no evidence that this population is unstable or declining. The operational restriction proposed by Grant PUD, Interior, NMFS, and Washington DFW would enhance conditions in the Hanford Reach for fall Chinook salmon. The flow restriction proposed by CRITFC and Alaska DFG would potentially provide greater enhancement than the Hanford Reach Agreement flows; however, the 10 kcfs fluctuation limit would greatly reduce the power benefits of the project and would require greater use of reservoir storage resulting in frequent and wide fluctuations in reservoir water surface levels. The resulting effects on reservoir resources would adversely reduce the ability of the Project to serve other project purposes.

Based on the above, we conclude that the flow restrictions recommended by CRITFC and Alaska DFG would not be worth the cost and we do not recommend including them in any license issued for the project.

In comments on the draft EIS, Alaska DFG suggested that Grant PUD should implement the 10 kcfs limit for several years to collect data that would be useful for defining tradeoffs between fluctuations and power generation. Experimentally implementing the 10 kcfs fluctuation limit would likely reduce stranding and entrapments below the levels of the Hanford Reach Agreement flows and it would allow for collection of stranding and entrapment data during actual 10 kcfs operation. Additionally, experimental implementation of this mode of operation would allow for quantification of Grant PUD's ability to comply with this flow restriction. However, as indicated above, experimentally implementing the 10 kcfs fluctuation limit would greatly reduce the power benefits of the project and would require greater use of reservoir storage resulting in frequent and wide fluctuations in reservoir water surface levels during the testing period. Additionally, replacing the lost power from conducting this experiment would cost approximately $136 million per year. Because the proposed Hanford Reach Agreement would improve conditions for fall Chinook salmon in the Hanford Reach and experimental implementation of the 10 kcfs fluctuation limit would result in lost power, high costs, and potential adverse affects on other Project purposes, we conclude that this measure would not be worth the cost and we do not recommend including it in any license issued for the project.

Orthophotographic Surveys of the Hanford Reach

Interior, CRITFC, and ADFG recommend that Grant PUD conduct aerial orthophotographic surveys at all known spawning areas within the Hanford Reach during the spawning season. They suggest these surveys should be conducted to help quantify the progression, extent, and geographic location of fall Chinook salmon redds within the Hanford Reach. Interior indicates that this information would provide managers with additional data regarding the physical conditions of the habitats selected by spawners and it could be used to fine-tune project operations.

As part of the Hanford Reach Agreement, Grant PUD is proposing to monitor spawning in the Hanford Reach by surveying portions of Vernita Bar and conducting aerial surveys. This information would be used to monitor the progression, extent, and location of redds and manage flows during the spawning season. Orthophotographic surveys would include the use of video or photographic equipment that is geo-referenced and provides sub-meter measurements. This information could also be used to monitor spawning locations and manage flows during the spawning season, although it is not clear why the sub-meter level locations of redds would be necessary. We estimate that the cost of conducting orthophotographic surveys would be approximately $8,060 per year. Because sub-meter, geo-referenced data would not be necessary to collect the information used to manage flows during the spawning season, we conclude that orthphotographic surveys would not be worth the cost. We do not recommend including a requirement for orthophotographic surveys in any license issued for the project.

White Bluffs Spawning Surveys

In comments on the draft EIS, Umatilla and Alaska DFG indicated that spawning surveys should focus on the White Bluffs area, since this is the primary fall Chinook salmon spawning area within the Hanford Reach. Under the Hanford Reach Agreement, three biologists would survey portions of Vernita Bar for the location and number of redds. Additionally, Grant PUD would conduct aerial surveys of the Hanford Reach to locate and count redds in other areas, including White Bluffs. The information from these two surveys would be used to select flow levels for the Hanford Reach. Umatilla and Alaska DFG recommend that White Bluffs be used in place of Vernita Bar for selecting Hanford Reach flows. We would expect that once the relationship between flows and spawning locations is worked out for the White Bluffs area, the use of this survey location in combination with aerial surveys would provide the same protection for fall Chinook salmon in the Hanford Reach as using Vernita Bar and conducting aerial surveys. There would be no additional cost to monitoring White Bluffs, other than the cost of establishing the relationship between flow releases at Priest Rapids dam and inundation of spawning locations at White Bluffs. We estimate that the cost

of defining this relationship would be approximately $20,000. Because there would be no additional benefit to using the White Bluffs spawning area in place of Vernita Bar, we conclude that developing the flow versus spawning location relationship for White Bluffs would not be worth the cost. We do not recommend including this measure in any license issued for the Project.

Spawning Behavior Studies

Interior, CRITFC, and Alaska DFG recommend that Grant PUD be required to monitor and study the effects of flow fluctuations on spawning behavior, redd placement, spawning time (within-day), and the extent of deep-watering spawning. Interior indicates that this information would be used to make management decisions regarding the specific hydrograph that would provide adequate amount of spawning habitat in the Hanford Reach. While this information would be useful to fisheries managers, there is no evidence that flow fluctuations adversely affect spawning behavior or site selection. Additionally, because flow fluctuations are the cumulative result of operations of the seven dam system, it is not apparent that the existing flow fluctuations are entirely related to project effects (i.e., if Grant PUD were required to operate the Project in run-of-river mode, substantial flow fluctuations would still occur within the Hanford Reach).

In comments on the draft EIS, Umatilla stated that Grant PUD already conducted a diel spawning behavior and redd site fidelity study at Vernita Bar in 2005. They suggest that this indicates that Grant PUD is concerned with this issue; therefore, Grant PUD should be required to conduct additional studies of spawning behavior. Umatilla provides no discussion of the results of the 2005 study or reasons why additional study would be necessary. In comments on the draft EIS, Alaska DFG suggested that Grant PUD should continue studies like Anglin et al. (2005) and the diel spawning behavior and redd site fidelity study until the questions of whether or not flow fluctuations effect spawning can be answered. Alaska DFG did not provide any evidence, including data from existing studies, which would indicate that flow fluctuations adversely affect spawning behavior.

We assume that studies of the effects of flow fluctuations on spawning would require direct observations or continuous radio-telemetry tracking of spawning fish. Both of these methods would be extremely labor intensive. We estimate that these studies would cost approximately $200,000 ($16,100 per year when annualized over the license term), not including any lost generation from intentionally manipulating project releases. While these studies would provide information describing the effects of flow fluctuations on fall Chinook salmon spawning in the Hanford Reach, they do not appear to be needed since Grant PUD

has already conducted a site fidelity study and there is no evidence that fluctuating flows adversely affect spawning behavior. Based on this, we conclude that these studies are not needed and would not be worth the cost. We do not recommend including a requirement for these studies in any license issued for the Project.

Primary and Secondary Production Studies

Interior and CRITFC recommend that Grant PUD monitor and evaluate the effects of project operations on primary and secondary production and resident fish in the Hanford Reach. Our analysis suggests that short-term flow fluctuations may influence productivity along the margins of the Hanford Reach. Additionally, McMichael et al. (2003) and Anglin et al. (2006) documented that resident fish can be entrapped by receding flows.

Low productivity in the Hanford Reach would influence food availability; however, there is no evidence that fall Chinook salmon fry or resident fish inhabiting the Hanford Reach are food limited, in poor condition, or exhibiting poor growth rates. Additionally, while entrapment and stranding of resident fish may result in some mortalities, there is no evidence that any of the resident fish populations inhabiting the Hanford Reach are unstable or declining. Lastly, flow fluctuations in the Hanford Reach are the cumulative result of operations of the seven dam system and not solely attributable to the operation of the Project (i.e., if Grant PUD were required to operate the Project in run-of-river mode, substantial flow fluctuations would still occur within the Hanford Reach). We estimate that the cost of three years of productivity studies and one year of resident fish stranding studies would be approximately $450,000 ($36,200 per year when annualized over the license term).

While project operations have some influence on flow fluctuations in the Hanford Reach that may influence productivity and resident fish stranding and entrapment, there is no evidence of long-term adverse impacts from these effects. Therefore, we conclude that the proposed studies are unwarranted, would not be worth the cost, and we do not recommend including them in any license issued for the project.

Annual Stranding and Entrapment Surveys

CRITFC and Alaska DFG recommend that Grant PUD conduct annual surveys to estimate fall Chinook salmon fry entrapment and stranding losses from flow fluctuations in the Hanford Reach. Grant PUD conducted stranding and entrapment surveys each year from 1997 to 2003. During 2002 and 2003, Grant PUD voluntarily complied with the flow requirements and monitoring

demonstrated the benefits of the proposed flow program. Under the Hanford Reach Agreement, Grant PUD, NMFS, Interior, and Washington DFW propose to conduct follow-up monitoring using similar methods in 2011, 2012, and 2013. Either annual monitoring or the monitoring proposed in the Hanford Reach Agreement would be useful to document the benefits of the flow program and would provide information that could be used to evaluate program effectiveness and consider modifications. We estimate that monitoring would cost approximately $150,000 per year.

While it is intuitive that more frequent collection of data would allow better tracking of ongoing conditions, CRITFC and Alaska DFG provided no substantive justification for annual monitoring. In comments filed on May 27, 2005, CRITFC indicated that additional monitoring is necessary for developing additional empirical and predictive tools to assist in resolving remaining uncertainties in reducing stranding and entrapment losses. While additional monitoring would certainly provide additional information useful for developing predictive tools, CRITFC failed to indicate why additional development of predictive tools would be necessary or why the data collected under the proposed Hanford Reach Agreement could not be used for this purpose.

Over a license term, annual monitoring would cost substantially more than the follow-up monitoring proposed by the Hanford Reach Agreement signatories. Additionally, because Grant PUD already documented the benefits of the Hanford Reach Agreement flows during 2002 and 2003, it is not clear that additional monitoring is justified in the near-term. Because annual monitoring does not appear to be justified and it would be significantly more costly than infrequent follow-up monitoring, we conclude that annual surveys would not be worth the cost and we do not recommend including them in any license issued for the project.

Yakama River Habitat Mitigation

In comments on the draft EIS, Yakima County indicated that due to conditions in the Hanford Reach and the cumulative effect of upstream storage projects on flow, the ability to increase the habitat area in the Hanford Reach and downstream of Wanapum dam is limited. Yakima County suggests that the lower Yakama River is the only feasible location for mitigating project effects on fall Chinook salmon habitat caused by construction and operation of the project. Yakama River fall Chinook salmon are a component of the upper Columbia River fall Chinook salmon stock that also occurs within the Hanford Reach and Project area. We have no information to indicate that available habitat within the lower Yakama River is limiting production, although it is possible that increasing habitat

for lower Yakama River fall Chinook salmon could increase juvenile production if the amount of spawning or rearing habitat is currently limiting reproductive success. However, because the SSA that we are recommending would essentially mitigate for all project effects on fall Chinook salmon[123], we do not recommend that Grant PUD implement any specific habitat improvement Projects in the Yakama River system.[124]

Measures for Bull Trout

Under section 18 of the FPA, Interior prescribes that to provide for bull trout passage, Grant PUD should operate the Project upstream and downstream fish passage facilities as prescribed for salmon and steelhead. Interior also recommends that Grant PUD develop and implement a Bull Trout Management Plan. Interior recommends that the plan include a monitoring program to assess the project affects on upstream and downstream bull trout passage, assessment of juvenile rearing in the reservoirs, implementation of modifications to correct any passage problems that are identified, assessment of off-season passage counts, PIT-tagging of incidentally collected sub-adult fish, and participation in information exchange and regional monitoring efforts.

There is evidence that bull trout may overwinter in the upstream end of Wanapum reservoir; however, there do not appear to be any adverse project effects on these fish or this habitat. Additionally, there is no evidence that bull trout are actively migrating either upstream or downstream past the project dams or that the project is adversely affecting the ability of bull trout to move through the project area. Interior prescribed that Grant PUD provide safe, timely, and effective passage for bull trout by implementing the measures prescribed for salmon and steelhead. We interpret this prescription to mean that no additional measures would be needed to provide safe and effective passage for bull trout. However, because bull trout appear to be a rare inhabitant of the project area and because bull trout passage needs are not well documented at any dam on the mid-Columbia River, it is unclear what benefit, if any, salmon and steelhead passage measures would have for bull trout.

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[123] In letters filed on May 27, 2005, both NMFS and Washington DFW indicated that the measures proposed by Grant PUD would result in the Project having no net impact on fall Chinook salmon.

[124] We are not recommending any specific habitat projects for the Yakama River; however, it is possible that the Priest Rapids Coordinating Committee could implement habitat projects in the Yakama River through implementation of the habitat fund included in the Salmon Settlement Agreement.

In regard to the Bull Trout Management Plan, many of the studies and monitoring measures that would be part of the plan are unachievable or unnecessary. For example, Interior recommends that Grant PUD monitor upstream and downstream passage effects on bull trout and assess juvenile rearing in the project reservoirs. However, because bull trout are virtually non-existent within the project area or at least extremely rare, it would be essentially impossible to conduct the recommended studies with any level of statistical validity. Additionally, the low occurrence of this species in the project area and the lack of evidence demonstrating any adverse project effects, suggests that the recommended studies are unnecessary.

There would be no cost for implementing the salmon and steelhead passage measures for bull trout since these measures would need to be implemented for salmon and steelhead anyway. However, because bull trout are uncommon within the project area, there is no evidence that the project adversely affects bull trout passage, and the benefit of the implementing salmon and steelhead passage measures for bull trout is unknown, we do not recommend including this measure in any license that is issued for the project.

We estimate that the cost of the recommended studies and monitoring proposed as part of the Bull Trout Management Plan would be approximately $575,000. Because bull trout occurrence in the project area appears to be mostly incidental and the project does not appear to adversely affect the few bull trout that are known to use the upstream end of Wanapum reservoir, we do not recommend including a Bull Trout Management Plan in any license that is issued for the project. Instead, we recommend that Grant PUD develop and implement the Bull Trout Monitoring Plan described above.

Components of the Pacific Lamprey Plan

We are not recommending several measures that Interior, Washington DFW, and CRITFC suggested as components to the Pacific Lamprey Plan. We describe each measure and our reason for not recommending it below.

Under section 18 of the FPA, Interior prescribed that Grant PUD conduct a hydraulic study of fish ladder entrance conditions, diffusion areas, and submerged orifices. Interior indicates that the study results would be used to identify problem areas and implement modifications to the fish ladders to improve upstream passage conditions. In comments on the draft EIS, Grant PUD indicated that they are already proposing to modify the ladders for adult lamprey and monitor adult lamprey passage using radio-telemetry. Grant PUD states that tracking actual adult lamprey migration and behavior within the fishways would be more

beneficial than conducting the hydraulic evaluation prescribed by Interior. Both evaluations would attempt to identify problem areas for adult lamprey within the fishways. Radio-telemetry tracking would provide direct observation of adult lamprey passage through the fishways while a hydraulic study would require linking hydraulic measurements with theoretical information regarding lamprey passage abilities. We would expect direct observation from radio-tracking to provide more reliable information for identifying problem areas than a hydraulic study. We estimate that the cost of a hydraulic study would be $100,000. Because we are recommending that Grant PUD monitor adult lamprey passage using radio-telemetry, which would provide a more direct and effective means for identifying lamprey passage problems, we conclude that a hydraulic study would be redundant and not worth the cost. We do not recommend including this measure in any license issued for the Project.

CRITFC recommends that Grant PUD use radio-telemetry to track adult lamprey movements through the reservoir and into tributaries. Washington DFW recommends that Grant PUD use long-lived radio tags to track adult lamprey movements within the project boundary. Nass et al. (2003) demonstrated that lamprey moved freely through the project reservoirs with migration speeds ranging from 1.9 to 6.6 miles per day. Washington DFW states that adult lamprey travel times through the project reservoirs is slower than at other Columbia River projects and they believe this may be an indication of a project effect. However, neither CRITFC nor Washington DFW provided any information to suggest a possible project-related mechanism that would influence migration rates or how the tracking data could be used to identify any potential project effects or develop measures to mitigate for any potential project effects. We estimate that the cost of this study would be approximately $150,000 (part of Pacific lamprey studies of $1.2M). Because there is no evidence that the recommended study is needed, we conclude it would not be worth the cost and we do not recommend including it as a component of the proposed Pacific Lamprey Plan.

Washington DFW recommends that Grant PUD evaluate lamprey downstream passage routes using PIT tags and hatchery-raised lamprey, if available. Interior also recommends that Grant PUD study passage routes, although they do not specify what techniques should be used. Currently, there is no proven technology for measuring juvenile lamprey survival at dams. Bleich and Moursund (2006) have developed a promising technique for PIT-tagging juvenile lamprey; however, until this methodology is tested under a variety of conditions and is more widely accepted, we are reluctant to recommend it for use at the Project. Additionally, aquaculture techniques for Pacific lamprey have not been developed; therefore, there is no source for hatchery-reared juvenile lamprey. Lastly, available information suggests that direct turbine passage survival of

juvenile lamprey is probably high (Bleich and Moursund, 2006).

We estimate that conducting a PIT tag study using fish obtained from the wild would cost approximately $400,000 (part of Pacific lamprey studies of $1.2M). Because lamprey turbine passage survival is likely high and there is no reliable source to obtain juvenile lamprey or proven method for testing juvenile lamprey survival, we conclude that the recommended study would not be worth the cost and we do not recommend including it as part of the proposed Pacific Lamprey Plan.

Interior recommends that Grant PUD develop techniques to estimate juvenile lamprey survival through the project dams. This recommendation acknowledges that currently no reliable technology exists for tracking individual juvenile lamprey through dams. However, while development of a method for assessing juvenile lamprey survival would be useful for assessing project effects; development of the technology would be extremely costly and could be unsuccessful. Additionally, the available information suggests that juvenile lamprey passage survival through the project dams is probably high. Based on the potential high costs of technology development, we conclude that this recommendation would not be worth the cost and we do not recommend including it as part of the proposed Pacific Lamprey Plan.

Interior recommends that Grant PUD identify the timing of juvenile lamprey outmigration through the project. Washington DFW recommends that Grant PUD develop a plan to assess juvenile lamprey out-migration timing characteristics through the project area, including the reservoirs, in relation to flows. There is no evidence suggesting that the timing of lamprey out-migration is related to stream flow or project effects. Additionally, flows in the project area are the result of cumulative effects of upstream storage dams and the coordinated operation of the seven dam system (i.e., Grand Coulee, Chief Joseph, Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids). The operation of the Project is only partly responsible for the magnitude and timing of flows in the project area. We estimate that this study would require several years of data collection and would cost approximately $300,000 (part of Pacific lamprey studies of $1.2M). Because there is no evidence of a relationship between flow and juvenile lamprey outmigration timing or any significant project effect on juvenile lamprey outmigration timing, we conclude that the recommended study is unwarranted and would not be worth the cost. We do not recommend including this study as part of the proposed Pacific Lamprey Plan.

Washington DFW recommends that Grant PUD conduct an assessment of the relative abundance of juvenile lamprey in the project reservoir and its

tributaries. Washington DFW indicated that annual abundance information would be useful for determining the relative effect of the Priest Rapids Project operations on juvenile lamprey rearing within the Project boundary. It is unclear how a 'relative' project effect could be determined from tracking the annual changes in abundance of juvenile lamprey within the Project reservoirs. We would expect that year-to-year variation in reservoir abundance of juvenile lamprey would be significant and potentially unrelated to Project effects. We would expect that juvenile lamprey abundance in the mid-Columbia River would be strongly influenced by factors unrelated to the project such as adult lamprey spawning population size and climatic conditions. We estimate that the cost of this study would be approximately $100,000 (part of Pacific lamprey studies of $1.2M). This information would be useful to Washington DFW in addressing its management responsibilities towards Pacific lamprey; however, it does not appear that annual abundance surveys would be useful or necessary to identify or address project effects or project purposes. Based on this information, we conclude that a juvenile lamprey abundance survey would not be worth the cost and we do not recommend including it as part of the proposed Pacific Lamprey Plan.

Interior and Washington DFW recommend that Grant PUD identify and map the extent of suitable juvenile lamprey habitat within the project reservoirs. The agencies do not indicate how this information would be used or why it is needed. Additionally, the agencies have not provided evidence that the project affects juvenile lamprey habitat or that available habitat is limiting lamprey production. We estimate that the cost of habitat mapping would be approximately $100,000 (part of Pacific lamprey studies of $1.2M). Because there is no apparent need for this information or any clear nexus to project effects, we do not recommend including the recommended habitat survey as part of the proposed Pacific Lamprey Plan.

Interior and Washington DFW recommend that Grant PUD evaluate the effects of reservoir fluctuations on lamprey rearing areas and evaluate options for avoiding or eliminating detrimental effects. There is no specific information or evidence to indicate that the reservoir contains substantial rearing habitat or that fluctuations affect this habitat. We estimate that the cost of this study would be approximately $150,000 (part of Pacific lamprey studies of $1.2M) and would require completion of the habitat mapping study described above. Because there is no evidence that project operations adversely affect juvenile lamprey habitat within the project reservoirs, we conclude that the recommended habitat studies would not be worth the cost and we do not recommend including them as part of the proposed Pacific Lamprey Plan.

Lamprey Passage Standards

Interior recommends that Grant PUD assist in regional efforts to establish upstream passage survival standards for adult lamprey. The development of regional passage standards would be useful for fisheries managers; however, developing a passage standard does not address project effects. We estimate that this measure would involve several years of consultation with the agencies and tribes. The cost of this consultation is unknown, but could be as much as $100,000. Because development of a passage standard would not identify or mitigate project effects, we conclude there is no nexus to project effects and it would not be worth the cost. We do not recommend including this measure in any license that is issued for the project.

Washington DFW and CRITFC recommend that Grant PUD pursue actions to achieve 80 percent dam passage effectiveness for adult lamprey by 2013 and 97 percent dam passage effectiveness by 2030. Neither Washington DFW nor CRTIFC provide any justification for these passage standards. Additionally, Interior's recommendation to assist in developing a standard indicates that there is no widely accepted standard for upstream lamprey passage at this time. In general, the importance of passing a significant portion of the adult lamprey run over each dam is unknown. Unlike salmon and steelhead, lamprey do not appear to have strong homing tendencies and will stray to other locations during their migration. Therefore, fish that fail to pass the project dams may move downstream into project tributaries or other areas to successfully spawn. Near 100 percent passage efficiencies may not be necessary to maintain a viable lamprey population. Because there is no justification for the standards presented by Washington DFW and CRITFC and the potential costs of achieving the 97 percent standard are likely high, we conclude that implementing these standards is not worth the cost and not warranted. We do not recommend including these standards in any license issued for the project.

CRITFC recommends that Grant PUD be required to meet downstream passage standards that are currently being developed by regional fisheries managers. CRITFC provided no evidence to indicate that current conditions for juvenile lamprey passage are inadequate. Available evidence suggests that direct turbine survival of juvenile lamprey is probably high (Bleich and Moursund, 2006). We are unable to estimate the cost of achieving a juvenile passage standard, since no standard is currently available. Additionally, because the recommended standards are in development and there is no evidence of adverse project effects on juvenile lamprey, we are unable to quantify the potential benefit to the lamprey population of achieving a downstream passage standard. We conclude that there would be no benefit to requiring Grant PUD to comply with

undetermined passage standards for juvenile lamprey and we do not recommend including this measure in any license that is issued for the project.

Alternative Lamprey Passage Methods

Under section 18, Interior prescribed that Grant PUD should evaluate the feasibility of an adult lamprey capture-and-haul program. Additionally, Interior prescribed that by year 5 of any new license, Grant PUD should complete preliminary design work and develop a plan to install the lamprey-specific upstream passage facilities at the dams. Interior prescribed that these upstream passage facilities should be constructed in year 8 of any new license. Interior indicates that these alternative passage measures would be necessary if modifications to the existing fish ladders do not provide adult lamprey passage rates similar to the "best passage rates" found at other hydroelectric projects in the Columbia River Basin. WDFW also recommended that Grant should be required to achieve the best passage rates found at other Columbia River hydroelectric projects.

"Best passage rates" found at other projects appears to be an arbitrary standard since the agencies did not provide any biological justification for this standard and they did not specify how it would be calculated. It is unclear if the standard would be based on a single year of data from a single fishway or if it would be an average of several years of data for all possible routes at a given dam. Additionally, the fact that the agencies did not provide a specific number representing the current best passage rate at other projects is an indication that currently available information is insufficient to calculate such a number. Lastly, "best passage rates" would be a moving standard that would increase as more information becomes available and improvements are made to other dams. This confirms the arbitrary nature of the standard since it would be based entirely on what can be achieved at another project rather than the biological requirements of the species.

There is no evidence that the existing Project passage facilities and ongoing level of lamprey passage success are inadequate to support mid-Columbia River lamprey population. Lamprey have an innate behavior to migrate upstream and they appear to occupy all accessible habitat; however, there is no evidence in our record to indicate that unsuccessful passage at the Project is limiting the reproductive success or population size of lamprey in the mid-Columbia River. Additionally, there is no evidence in our record that the existing habitat downstream of the project dams is either unsuitable or unavailable to support the current numbers of lamprey that fail to pass the Project's dams.

In addition to the lack of a biological justification for alternative lamprey passage measures, the prescribed measures appear to be unproven and may not provide any greater passage success than the existing facilities. At this time, we are not aware of any successful capture-and-haul programs for Pacific lamprey and there is no evidence to indicate that implementation of such a program would result in passage rates exceeding the existing facilities or achieving the "best passage rate" standard. We estimate that implementing a capture-and-haul program for adult lamprey at each dam would cost approximately $80,000 per year. Additionally, we are not aware of any lamprey-specific upstream passage facilities that have been constructed at dams comparable to the Project. Interior's prescription seems to rely on the assumption that a new, effective upstream passage facility, specific to adult lamprey will be developed within the next 3-5 years. At this time, there is no evidence that such a facility would outperform existing facilities or achieve Interior's "best passage rate" standard. We assume that a lamprey-specific fishway would be constructed from concrete and similar in design to a traditional fish ladder but with smaller dimensions and flow capacity. We estimate that the cost of constructing these facilities would exceed $1,000,000 per dam.

Based on the lack of biological information indicating a need for increased adult lamprey passage success at the Priest Rapids dams and the high costs associated with implementing the alternative passage designs, we conclude that the prescribed capture-and-haul program and lamprey-specific passage facilities would not be worth the cost. We do not recommend that these measures be included in any license issued for the project.

Regional Coordination and Funding of Lamprey Research

Washington DFW, Interior, and CRITFC recommend that Grant PUD coordinate Pacific lamprey mitigation efforts with regional experts and managers, including cost-sharing, matching funds, and integrating project efforts with regional lamprey programs. While some coordination of lamprey mitigation efforts would be inherent in the implementation of these activities, coordination with regional experts and managers, integrating project efforts with regional lamprey programs, and seeking cost-sharing and matching funds would not be necessary to address or mitigate for project effects on lamprey. Thus staff does not recommend inclusion of such provisions as a requirement in any license issued for the Project.

Funding for a Washington DFW Lamprey Biologist

We do not recommend adopting Washington DFW's recommendation for

Grant PUD to make available $30,000 annually to fund a Washington DFW fish and wildlife biologist specializing in Pacific lamprey. While funding such a position could support informed participation related to Pacific lamprey management on the part of Washington DFW, it is Grant PUD's responsibility to ensure that environmental measures that may be specified by a new license or that are specified in a Pacific Lamprey Plan and would require Commission approval are implemented in accordance with the requirements of a new license. Therefore, requiring Grant PUD to fund agency oversight of such matters is not warranted.

Regional Coordination and Funding of White Sturgeon Research

Washington DFW, Interior, and CRITFC recommend that Grant PUD coordinate white sturgeon mitigation efforts with regional experts and managers, including cost-sharing, matching funds, and integrating project efforts with regional white sturgeon programs. While some coordination of white sturgeon efforts would be inherent in the implementation of these activities, coordination with regional experts and managers, integrating project efforts with regional white sturgeon programs, and seeking cost-sharing and matching funds would not be necessary to address or mitigate for project effects on white sturgeon. Thus staff does not recommend inclusion of such provisions as a requirement in any license issued for the Project.

Funding for a Washington DFW White Sturgeon Biologist

We do not recommend adopting Washington DFW's recommendation for Grant PUD to make available $30,000 annually to fund a Washington DFW fish and wildlife biologist specializing in white sturgeon. While funding such a position could support informed participation related to white sturgeon management on the part of Washington DFW, it is Grant PUD's responsibility to ensure that environmental measures that may be specified by a new license, including a White Sturgeon Plan that would require Commission approval, are implemented in accordance with the requirements of a new license. Therefore, requiring Grant PUD to fund agency oversight of such matters is not warranted.

Columbia Basin Hatchery

Grant PUD proposes to fund improvements to the Columbia Basin Hatchery and develop and implement a Columbia Basin Hatchery Management Plan. The Columbia Basin Hatchery is located near Moses Lake, Washington, outside the project boundary. The hatchery was constructed as mitigation for the construction of the Project. Fish reared at the hatchery were initially stocked into the project area as mitigation for the effects of project construction and operation

on sport fisheries; however, initial efforts to re-create sport fisheries within the project reservoirs were unsuccessful. Subsequently, fish from the hatchery have been stocked in local lakes throughout Grant County.

Grant PUD proposes to fund $1.0 million for upgrading the Columbia Basin Hatchery and $100,000 per year for O&M. Upgrading the Columbia Basin Hatchery and developing and implementing a hatchery management plan would modernize the operation of the hatchery and increase the production of healthy fish for stocking. Fish raised at the hatchery would be stocked in waters outside the project boundary and would not serve project purposes and would have no benefit to resident fish or recreational resources in the Project area. In comments on the draft EIS, Washington DFW indicated that these resident fish would be stocked outside the project boundary because stocking in the project area could adversely affect threatened and endangered fish species. Under the staff-recommended alternative, Grant PUD would expend substantial effort and expense to benefit threatened and endangered fish species. Based on the potential conflict with efforts to recover threatened and endangered fish species and the likelihood of repeating earlier stocking failures, we conclude that stocking resident hatchery fish in the project area would be imprudent. Because the resident fish stocking proposal would not benefit resident fish or recreational resources in the project area and efforts to stock resident fish in the project area would likely be unsuccessful and conflict with ongoing fisheries management efforts, we conclude that this measure would not be worth the cost. We do not recommend including this measure in any license issued for the project.

Resident Fish Mitigation and Enhancement Plan

Washington DFW recommends that Grant PUD develop and implement a Resident Fish Mitigation and Enhancement Plan with a goal of producing 137,000 pounds of fish to support recreational fisheries. As part of their justification for the plan, Washington DFW indicates that the plan would provide resident fish enhancements that are currently provided by the Columbia Basin Hatchery for ongoing project effects on resident fish. Such a plan would provide some enhancement of recreational fishing opportunities; however, we are unable to identify the specific benefits of this measure since Washington DFW did not provide any information regarding stocking locations and size and species of fish to be stocked.

Washington DFW indicated that under the plan, fish would not be stocked within the project area since historically these efforts were unsuccessful. Additionally, Washington DFW indicated that because of potential interactions with federally-listed threatened and endangered fish species, getting approval for stocking resident fish within the project area would likely be difficult, if not

impossible. This information suggests that fish raised as part of the Resident Fish Mitigation and Enhancement Plan would be stocked in lakes outside the project boundary and would not serve project purposes. The specific cost of this program is unknown, although we anticipate that the costs would be similar to the Columbia Basin Hatchery measure described above. Because the resident fish stocking proposal would not benefit resident fish or recreational resources in the project area and efforts to stock resident fish in the project area would likely be unsuccessful and conflict with ongoing fisheries management efforts, we conclude that this measure would not be worth the cost. We do not recommend including this measure in any license issued for the project.

Pikeminnow Removal Program Effects on Resident Fish

CRITFC recommends that Grant PUD conduct a population analyses of resident fish stocks in the project reservoirs and determine what impact the northern pikeminnow removal program is having on resident fish. CRITFC suggests that because pikeminnow are the major predator of white sturgeon egg predators (i.e., resident fish), their removal indirectly results in increased predation of sturgeon eggs. CRITFC does not specify which species that are considered sturgeon egg predators might benefit from pikeminnow removal and we have no specific evidence to indicate that predation is a significant source of sturgeon egg mortality.

Our analysis suggests that the pikeminnow removal program may result in increased abundance of likely pikeminnow prey species such as resident salmonids and other soft-rayed fishes (e.g., minnows and suckers). Additionally, other predator species that may compete with pikeminnow for prey species, such as smallmouth bass and walleye, may also increase in numbers due to the removal of pikeminnow. However, we have no evidence that these potential changes in abundance of resident fish would result in increased predation on sturgeon eggs.

We estimate that the cost of estimating resident fish populations in the project area would be approximately $200,000 per year. However, even if these data were available, it is not clear how useful it would be for determining the effects of the northern pikeminnow removal program. Several factors would likely confound any conclusions that could be drawn for a multi-year study comparing pikeminnow harvest rates and resident fish populations. These include annual differences in pikeminnow harvest, river hydrology, and water temperatures. As a result, there would be no way to conclusively determine that any apparent changes in resident fish abundance are attributable to pikeminnow harvest.

Washington DFW indicates that the population analysis recommended by CRITFC would not be necessary for predation evaluations and that rigorous application of bioenergetics models to localized areas of the reservoir, such as a trophic dynamics study could be performed instead. Washington DFW indicates that a trophic dynamics study would remedy the lack of knowledge concerning current status and potential effects of future actions. A bioenergetics study or trophic dynamics study could provide some information useful for assessing the effects of the pikeminnow removal program on resident fish; however, similar to the population analysis, there would be a high risk of inconclusive results from this type of study. We estimate that conducting a 3 year trophic dynamics study would cost approximately $750,000.

Because there is no evidence that the pikeminnow removal program is affecting resident fish abundance or sturgeon egg survival and both studies (i.e., population analysis or bioenergetics/trophic dynamics) would be costly, labor intensive projects with potentially inconclusive results, we conclude that neither study would be worth the cost. We do not recommend including a requirement for either study in any license issued for the project.

Washington DFW Funding for Replacement of Habitat

Washington DFW recommends that Grant PUD: (1) provide Washington DFW with $2,160,000 for replacement of the lost wildlife values at Crescent Bar, plus O&M cost of $36,000; (2) implement the following habitat improvement projects: (a) Royal Lake Excavation Project (at an estimated cost of $181,000 plus $5,000 O&M), (b) Crab Creek Water Diversion Project ($230,000 plus $5,000 O&M), and (c) Lower Crab Creek Farmground Renovation Project ($126,000 plus $5,000 O&M) as mitigation for ongoing project impacts and project-related recreation impacts; and (3) provide Washington DFW $15 per acre per year for O&M of Washington DFW lands within the project boundary, for lands conveyed by Grant PUD to Washington DFW in the original license, for Washington DFW wildlife area lands in the vicinity of the project, and for lands acquired for mitigation under the new license—this represents a total of 98,000 acres and a total annual O&M cost of about $1.49 million. In addition, Washington DFW recommends that Grant PUD provide to Washington DFW $4,500,000 for land acquisition to protect recreation and wildlife values of lands purchased as mitigation for original construction impacts and to preserve habitats from increasing recreation development pressures.

Most of Washington DFW reasons for these measures are to mitigate for original project impacts and to supplement the state's budget which has been insufficient to undertake measures to fully develop the potential of the wildlife

areas. The baseline for a relicense is the existing environment, not as it existed 50 years ago. Grant PUD already satisfied its responsibilities for mitigation of environmental effects of the previous license. The lands for which Washington DFW seeks funding are not part of the project. While funding the state's O&M of these lands could result in habitat improvements, it is not Grant PUD's responsibility to supplement the state's budget. It is Grant PUD's responsibility to ensure that environmental measures that may be specified by a new license and would require Commission approval are implemented in accordance with the requirements of a new license. Therefore, requiring Grant PUD to fund agency oversight of such lands is not warranted.

Nonetheless, recognizing that project effects on wildlife resources can extend beyond a project boundary, we have considered the effects of project operation, project-related recreation, and maintenance activities on wildlife and wildlife habitats. We recommend measures that are forward-looking, including protecting remaining habitats on Crescent Bar from further development, and implementing an interpretation and education program to reduce impacts. We also recommend that Grant PUD work with resource agencies to identify specific habitat improvement projects that focus on shrub steppe, riparian and wetland habitats within and immediately adjacent to the project because these are the resources most directly connected to project effects and purposes. Therefore, we conclude that providing O&M funds for unspecified actions on state wildlife lands and for mitigating for lost habitat values at Crescent Bar is not warranted.

We also recognize that Washington DFW is also trying to address increasing pressures on its lands from recreation, some of which may be attributed to dispersed recreation from the project reservoirs and some of which might be attributed to demands created by its own public access policies. We discuss effects of recreational use on environmental resources and make recommendations to protect and enhance these resources, including species of special concern, while taking into account current and future recreation demand. We are also recommending that the Wildlife Plan, Recreation Plan, and Shoreline Management Plan be coordinated and incorporate provisions to control recreational access, monitor and identify recreation-related effects on wildlife and wildlife habitats, and identify corrective actions. These efforts would help ensure that identified management and recreation projects are consistent with designated land uses and limit potential indirect effects on adjoining lands.

The three parcels that Washington DFW identified for potential acquisition include those recommended by Grant PUD, but also include lands located many miles from the project. Parcels identified by Washington DFW would offer wildlife benefits through better coordination of their management actions on their

wildlife areas. However, most are upland habitats located some distance from the project and there is no evidence that the project, project-related recreation, or maintenance activities are affecting these areas. The lands that we recommend Grant PUD acquire are contiguous with the existing project boundary and could offer multiple benefits of recreation and wildlife enhancement, and would be adequate to serve project purposes.

We find that our recommend measures would be adequate to protect and enhance wildlife resources. Therefore, we do not recommend including any of the above Washington DFW measures in any license issued for the project.

Interior Coordinated Recreation and Wildlife Management Plan

Interior recommends, pursuant to section 10(a) of the FPA, that Grant PUD develop a coordinated recreation and wildlife management plan in consultation with Washington DFW, BLM, and BOR to provide for the maximum benefit to project and non-project lands and resources. The plan would also provide administrative costs to the coordinating agencies, including BLM for implementing actions. The lands include Quincy Creek Recreation Area, portions of Crab Creek Wildlife Area, and the Colockum/Quilomene Wildlife Recreation Area in which Interior notes an MOU with Washington DFW for managing the lands is in place. Interior states that the areas include approximately 3,000 acres that may be affected by unregulated recreation use of the lands. We are recommending that Grant PUD develop a coordinated recreation and wildlife management plan in consultation with the above agencies to ensure that proposed management actions are consistent with designated land uses. However, we do not recommend that the license require Grant PUD to compensate the agencies for administrative costs. We find that providing funds in the performance of an agency's duties is not the responsibility of the Grant PUD in the context of a Commission license and is not required to fulfill the project's purposes.

Other Measures/Funds

Law enforcement and associated items

In its draft Recreation Plan Grant PUD proposes to provide funding for 1.0 FTE for the Washington DFW enforcement program and 1.0 FTE to be divided equally between the Grant County and Kittitas County Sheriff's Offices. Grant PUD estimates $50,000 per year per FTE. Grant PUD currently provides a boat at Wanapum dam for use by local law enforcement officers and proposes to continue this measure during a new license.

Washington DFW recommends that Grant PUD provide funds to Washington DFW for 2.0 FTE enforcement officers, including administrative costs, and provide funds to the Kittitas County and Grant County Sheriff's Offices for 1.0 FTE, including administrative costs. In addition, Washington DFW recommends that Grant PUD provide Washington DFW $73,500 for a reservoir patrol vessel, $2,200 for a boat trailer, and replace them on a 10-year cycle. Kittitas County recommends that Grant PUD provide funds to the county for 1.0 FTE Sheriff Deputy, two staff members from May through October, and a vessel. CRITFC recommends Grant PUD contract with local law enforcement personnel to enforce laws that protect cultural resources. Yakama recommends Grant PUD provide funds for tribal recreational and cultural experts to protect the cultural and natural resource sites at undeveloped campsites.

We find that providing funds for agency personnel to perform an agency's duties is not the responsibility of Grant PUD in the context of a Commission license and is not required to fulfill the project's purposes. We, therefore, do not recommend including any of the above funds for law enforcement and associated items in any license issued for the project. Nevertheless, we do not object to Grant PUD entering into any off-license agreement with Washington DFW.

The Beverly Bridge and John Wayne Pioneer Trail

Washington DNR states that the Beverly Bridge is a link between the western and eastern part of the John Wayne Pioneer Trail; however, due to current bridge conditions and concerns for public safety, the bridge is currently closed. Washington SPRC manages the John Wayne Pioneer Trail, which is located adjacent to the existing Project boundary, while Washington DNR manages the Beverly Bridge and its components east of the Columbia River. Washington DNR, IAC, and Pat Kelleher recommend that Grant PUD fund 100 percent of the restoration and maintenance of the 0.5-mile-long Beverly Bridge (John Wayne Pioneer Trail crossing of the Columbia River). We estimate the cost of the parties' recommendation would be $890,000.

The parties did not provide any evidence, which would indicate any reason for Grant PUD to fully fund the rehabilitation efforts for the Beverly Bridge. Through stakeholder input and various project-related recreation studies conducted during the relicensing process, Grant PUD proposes to contribute an estimated $445,000 toward rehabilitating the bridge (*e.g.*, new decks, rails, and gates).

As discussed in section 3.9, *Recreation and Land Use*, we assessed the Beverly Bridge and John Wayne Pioneer Trail through our cumulative effects analysis for recreation within the mid-Columbia River Basin. We find Grant PUD's proposal toward rehabilitating the Beverly Bridge could contribute toward

the parties' effort to reconnect the 300-mile-long cross-state John Wayne Pioneer Trail. However, this trail is not associated with the project. Moreover, we find that there are sufficient trails at the project required in this license to satisfy project purposes. Therefore, we do not recommend including the Beverly Bridge and associated trail in any license issued for the project. Nevertheless, we do not object to Grant PUD entering into any off-license agreement with Washington SPRC and Washington DNR to provide enhancement to the Beverly Bridge.

Enhancement fund or research grants

Washington DAHP commented that the final HPMP should contain provisions for an enhancement fund or research grants in order to encourage innovative approaches to the protection, understanding, and education about the cultural resources at the project. Washington DAHP did not provide any justification or specific details for such a measure. The provisions in the final HPMP would provide for sufficient measures to protect, understand, and educate the public about cultural resources. We, therefore, do not recommend that Grant PUD include Washington DAHP's enhancement fund or research grant provisions in a final HPMP and do not recommend them as a separate requirement in any license issued for the project. Nevertheless, we do not object to Grant PUD entering into any off-license agreement with Washington DAHP.

5.2 FISH AND WILDLIFE RECOMMENDATIONS

Under the provisions of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

In response to our REA notice, the following fish and wildlife agencies submitted recommendations for the project: NMFS (letter filed May 27, 2005), Interior (letter filed May 26, 2005), and Washington DFW (letter filed May 26, 2005). Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

Table 42 lists the federal and state recommendations filed subject to section 10(j), and whether the recommendations are adopted under the Staff Alternative. Environmental recommendations that we consider outside the scope of section 10(j) have

been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document and the previous section.

Alaska DFG filed recommendations under section 10(j) of the FPA; however, only fish and wildlife agencies, as defined by CFR § 4.30(b)(9) can make recommendations under section 10(j) of the FPA. Alaska DFG's recommendations were considered under section 10(a) of the FPA and are addressed elsewhere in this document.

In the draft EIS, the Commission staff made a preliminary determination that three recommendations by Interior and three recommendations by Washington DFW may be inconsistent with the purpose and requirements of the FPA or other applicable law. On April 19, 2006, Commission staff conducted a meeting with Interior and Washington DFW to address these apparent inconsistencies. In a letter filed on April 17, 2006, Interior revised one recommendation and indicated that they no longer recommend the other two and instead they recommend the Salmon Settlement Agreement. In a letter filed on May 2, 2006, Washington DFW filed revised section 10(j) recommendations that included withdrawing 31 recommendations and adding five new recommendations. The modifications to Interior's and Washington DFW's recommendations resolved all of the inconsistencies.

Table 42. Fish and wildlife agency recommendations for the Priest Rapids Project (Source: Staff).

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
1. Non-passage related actions contained in NMFS' BO issued on May 3, 2004, should be included in the new license.	NMFS (P-49)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Adopted
2. Establish a PRCC, including a Hatchery Subcommittee and a Habitat Subcommittee.	NMFS (P-49) Washington DFW (P5-1)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$0	Adopted
3. Within 1 year of license issuance, Grant should produce an overall Performance Evaluation Program.	NMFS (P-51)	Yes	$50,000/yr	Adopted
4. Produce annual Progress Implementation Plans that describe the implementation activities for PME measures implemented for anadromous fish species.	NMFS (P-51)	Yes	Included in item 3.	Adopted
5. At 3-year intervals, or as otherwise provided in the approved PEP above, submit a Performance Evaluation Report to the PRCC.	NMFS (P-52)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Included in item 3.	Adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
6. Coordinate the design of the PEP with the development of relevant parallel monitoring or evaluation systems by other hydropower operators in the Columbia basin and the NPPC.	NMFS (P-52)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Included in item 3.	Adopted
7. Convene a Hatchery Subcommittee of the PRCC to undertake and oversee the planning and implementation of the HGMP.	NMFS (P-53)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$0	Adopted
8. Complete a HGMP to rear up to 100,000 yearling UCR steelhead for release in the UCR basin.	NMFS (P-54)	Yes	$511,900	Adopted
9. Complete a HGMP to rear up to 600,000 yearling UCR spring-run Chinook salmon for release in the UCR basin.	NMFS (P-55)	Yes	$1,564,000	Adopted
10. Complete a HGMP and develop the facilities to produce 833,000 yearling summer Chinook salmon smolts and implement a monitoring and evaluation program to assess the effectiveness of the hatchery program.	NMFS (P-56)	Yes	$1,505,000	Adopted
11. Update the existing HGMP to produce an additional 1,000,000 fall Chinook sub-yearling smolts at the Priest Rapids Hatchery.	NMFS (P-59)	Yes	$1,828,000	Adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
12. Update the existing HGMP to produce and release up to 1,000,000 fall Chinook fry annually into the project reservoirs and implement a monitoring and evaluation program to assess the effectiveness of the fall Chinook salmon hatchery program.	NMFS (P-59)	Yes	Included in item 11 above	Adopted
13. Evaluate the effect of the fall Chinook salmon hatchery program on mitigating project impacts to fall Chinook salmon.	NMFS (P-59)	Yes	Included in item 11 above	Adopted
14. Attempt to artificially propagate up to 1,143,000 sockeye salmon smolts using hatchery facilities and write a HGMP. If the artificial propagation isn't feasible, Grant PUD should attempt to improve sockeye salmon production through other means.	NMFS (P-60)	Yes	$1,195,000	Adopted
15. If coho salmon become reestablished in the mid-Columbia River, consult with the PRCC to provide hatchery compensation for project effects.	NMFS (P-61)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
16. If Okanogan spring Chinook salmon become reestablished in the mid-Columbia River, consult with the PRCC to provide hatchery compensation for project effects.	NMFS (P-63)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
17. Implement fish habitat projects to compensate for the 2 percent per development unavoidable losses of salmon and steelhead related to project operations (RPA Action 34).	NMFS (P-65)	Yes	$1,096,552	Adopted
18. Develop a habitat plan for listed and non-listed anadromous fish to identify and implement habitat projects designed to restore habitat functions in drainages affected by the project.	NMFS (P-66)	Yes	$5,000	Adopted
19. Establish, manage, and make annual contributions to a NNI fund. The baseline annual contribution is $2,562,206 (2005 dollars).	NMFS (P-69)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$2,562,206	Not adopted
20. Conduct studies to measure the progress toward meeting anadromous fish survival standards.	NMFS (P-71)	Yes	$2,000,000	Adopted
21. Implement the flow regimes and river operations specified in the April 2004 Hanford Reach Agreement.	NMFS (P-74)	Yes	$4,346,607	Adopted
22. Incorporate the Salmon Settlement Agreement, in its entirety, into the new license.	Interior[125] (P6-2) Washington DFW (P6-60)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted

[125] In making this recommendation, Interior only specifically withdrew two of its original salmon and steelhead

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
23. Control flow releases, in consultation with the PRCC, from the Project from October 15 through November 30 to provide and maintain suitable spawning habitat in the Hanford Reach sufficient to accommodate the annual expected escapement for fall Chinook salmon.	Interior (P-54)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
24. Control flow releases for successful incubation, in consultation with the PRCC, from the Project from November 30 through the end of the fall Chinook emergence at all spawning areas in the Hanford Reach.	Interior (P-54)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
25. Develop and implement a plan to conduct annual aerial surveys during the spawning season to help quantify the progression, extent, and location of fall Chinook salmon redds in the Hanford Reach.	Interior (P-57)	Yes	Included in 21 above	Adopted
26. Develop and implement a plan to determine the effect of fluctuating flows on spawning behavior and subsequent redd placement, the extent of day and night spawning at the major spawning areas, and the extent of deep-water spawning throughout the Hanford Reach.	Interior (P-58)	No. Study that could have been done during prefiling.	$16,100	Not adopted

recommendations. We have removed those two recommendations from this table; however, all other salmon and steelhead section 10(j) recommendations made by Interior in their letter filed on May 26, 2005, remain in this table, including measures contained in the settlement agreement and measures conflicting with the settlement agreement.

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
27. Develop and implement a plan to monitor and evaluate the effects of project operations on primary and secondary productivity and of fishes in the Hanford Reach, including the collection of water temperatures in entrapments from March 1 through October 31 and quantifying fish mortalities.	Interior (P-58)	No. Study that could have been done during prefiling.	$36,200	Not adopted
28. Develop and implement a Bull Trout Monitoring Plan to track the presence of bull trout in the Project area. Includes an annual report of monitoring results.	Interior (P6-2); Washington DFW (P-31)	Yes	$1,000	Adopted
29. Develop and implement a Pacific Lamprey Plan.	Interior (P-61); Washington DFW (p-40)	Yes	This cost should be $422,663 minus the annualized costs for the next 6 lamprey items	Adopted
30. Track adult lamprey movements within the Project boundary.	Washington DFW (P6-54)	No. Study that could have been done during prefiling.	$8,600	Not adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
31. Adult lamprey passage efficiency should achieve best passage rates at other Columbia River projects.	Washington DFW (P6-55)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
32. Develop techniques to measure juvenile lamprey survival through dams.	Interior (P5-61)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$12,090	Not adopted
33. Identify timing of juvenile lamprey outmigration	Interior (P5-61)	No. Study that could have been done during prefiling.	$24,180	Not adopted
34. Identify and map juvenile lamprey habitat in the Project reservoirs.	Interior (P5-61)	No. Study that could have been done during prefiling.	$8,060	Not adopted
35. Evaluate effects of reservoir fluctuations on lamprey rearing habitat.	Interior (P5-61)	No. Study that could have been done during prefiling.	$12,090	Not adopted
36. Develop and implement a White Sturgeon Plan.	Interior (P-63) Washington DFW (P-32)	Yes	$303,547	Adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
37. Develop and implement a White Sturgeon Conservation Aquaculture Plan.	Interior (P-63)	Yes	Included in 31 above	Adopted
38. Develop and implement an Avian Predator Control Effectiveness Monitoring Plan to minimize the take of migratory birds while maximizing the effectiveness of the avian predator control program.	Interior (P-64)	Yes	$166,520	Adopted
39. Develop and implement a Northern Wormwood Conservation Plan to protect and monitor Northern wormwood populations.	Interior (P-66)	Yes	$40,000	Adopted
40. Develop and implement a plan to monitor rare, threatened, and endangered (RTE) plants.	Interior (P-67)	Yes	$35,000	Adopted
41. Develop and implement an avian protection plan to protect waterfowl and raptors against collisions with the Project's transmission lines and structures.	Interior (P-67)	Yes	$40,300	Adopted
42. Develop and implement a bald eagle perching and roosting tree protection and enhancement program.	Interior (P-68)	Yes	$17,500	Adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
43. The Commission should retain by means of a specific ESA reopener, authority to ensure compliance with the requirements of the ESA.	Interior (P-68)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted.
44. Establish and convene a Fishery Forum.	Washington DFW (P6-65)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$0	Adopted
45. Provide annual funding for a sturgeon biologist to participate in the development a White Sturgeon Plan.	Washington DFW (P-39)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$30,000	Not adopted
46. Provide annual funding for a lamprey biologist to participate in the development a Pacific Lamprey Plan.	Washington DFW (P-43)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$30,000	Not adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
47. Develop and implement a Resident Fish Mitigation and Enhancement Plan to support a recreational fisheries program.	Washington DFW (P6-67)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
48. Provide to Washington DFW $15 per acre per year for O&M of Washington DFW wildlife area mitigation lands.	Washington DFW (P-53)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$1,470,000	Not adopted.
49. Provide to Washington DFW $2,160,000 for replacement of the lost wildlife values at Crescent Bar, plus annual O&M cost of $36,000.	Washington DFW (P-55)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$210,000	Not adopted.
50. Fund implementation of: a) Royal Lake Excavation Project; b) Crab Creek Water Diversion Project; and c) Lower Crab Creek Farm Ground Renovation Project	Washington DFW (P-58)	No. No nexus to project effects.	a) $15,000 b) $19,000 c) $10,000	Not adopted.

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
51. Provide to Washington DFW $4,500,000 for acquiring and protecting wildlife resource lands due to original mitigation lands and increased pressure from recreationists at the Project reservoirs.	Washington DFW (P-64)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$362,600	Not adopted.
52. Develop and fund a Project Habitat Management and Monitoring Plan	Washington DFW (P-67)	Yes	$1,000	Adopted
53. Provide to Washington DFW $120,000 annually for fire suppression services on Washington DFW lands.	Washington DFW (P-70)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources	$60,000	Adopted plan to address fire suppression
54. Provide to Washington DFW funding for 2.0 full-time Washington DFW enforcement officers; and, provide to Kittitas and Grant Counties Sheriff's offices funding for 1.0 FTE.	Washington DFW (P-71)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$150,000	Not adopted
55. Provide to Washington DFW $73,500 for a reservoir patrol vessel, and $2,200 for a boat trailer, and replace on a 10-year cycle.	Washington DFW (P-71)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$10,000	Not adopted

Recommendation	Agency[a]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[b]
56. Convene an annual law enforcement coordination meeting to discuss protection of project resources, including fish and wildlife law enforcement.	Washington DFW (P-73)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
57. Develop, fund, and implement an AIS Prevention Program.	Washington DFW (P-75)	Yes	$7,000	Adopted, except for provision below.
58. Fund an AIS Program Inspector to inspect boats at $6,000 per year, plus office space and storage area.	Washington DFW (P-76)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$6,000	Not adopted.

[a] Page numbers from the filed recommendation letter. P5 indicates letters filed by Interior and Washington DFW on May 26, 2005, and May 27, 2005, respectively. P6 indicates letters filed by Interior and Washington DFW on April 17, 2006, and May 2, 2006, respectively.

[b] Many of the measures recommended under section 10(j) of the FPA include specific dollar limitations. While we are recommending adopting several of these measures, the Commission has stated previously that it considers it the licensee's obligation to complete the measures required by a license and that dollar figures are not absolute limitations (that is, the Commission reserves the authority to require licensees to fulfill the requirements of the license notwithstanding any limitations on expenditures either proposed by the applicant or recommended by others.

In the draft EIS, we did not recommend adopting Interior's recommendation that Grant PUD maintain a daily flow fluctuation range of 10 kcfs in the Hanford Reach during the fall Chinook salmon rearing period. In a letter filed on April17, 2006, Interior indicated that it recommends the provisions included in the Salmon Settlement Agreement and they no longer recommend that Grant PUD maintain the 10 kcfs flow fluctuation limit in the Hanford Reach. This modification of Interior's recommendation resolved this issue.

In the draft EIS, we did not recommend adopting Interior's recommendation that Grant PUD conduct annual surveys to estimate fall Chinook salmon fry entrapment and stranding losses from flow fluctuations in the Hanford Reach. In a letter filed on April 17, 2006, Interior indicated that it recommends the provisions included in the Salmon Settlement Agreement and they no longer recommend that Grant PUD conduct annual stranding and entrapment surveys in the Hanford Reach. This modification of Interior's recommendation resolved this issue.

In the draft EIS, we did not recommend adopting Interior's and Washington DFW's recommendation that Grant PUD develop and implement a bull trout management plan. Based on Interior's letter filed on April 17, 2006, and Commission staff discussions with Interior and Washington DFW at the April 19, 2006, Interior and Washington DFW revised their recommendation so that they now recommend that Grant PUD develop and implement a bull trout monitoring plan. We recommend adopting this measure into any license issued for the Project, thereby resolving this issue.

In the draft EIS, we did not recommend adopting Washington DFW's recommendation that until the downstream passage standards are achieved, Grant PUD should continue the ongoing spill programs at Wanapum and Priest Rapids dams to provide downstream passage for smolts. In a letter filed on May 2, 2006, Washington DFW replaced this recommendation and approximately 27 other recommendations with a recommendation to implement the Salmon Settlement Agreement. The Salmon Settlement Agreement includes provisions for Grant PUD to continue the ongoing spill programs until a better downstream passage alternative is designed, tested, and implemented. Based on new information provided by Washington DFW and NMFS, we are recommending adoption of this part of the Salmon Settlement Agreement, thereby resolving this issue.

Washington DFW initially recommended that Grant PUD develop, fund, and implement an AIS Prevention Program, a recommendation that we adopted except for the following provisions: (1) convene meetings to facilitate the participation of Grant PUD, Chelan PUD, and Douglas PUD staff in the development of a regional Mid-Columbia AIS Prevention Plan; (2) a plan to intercept boaters at boat ramps to explain the requirements of the AIS program and

inspect boats for aquatic invasive weeds and zebra mussels; and (3) an annual report due to Washington DFW by March 1. We found that the project was inconsistent with comprehensive planning standards of section 10(a) and 4(e) of the FPA. We made our determination because the scope of Washington DFW's AIS Prevention Program was unclear, since the Washington DFW did not include any specific project-related effects, identification of specific aquatic invasive plant species, or costs associated with its recommendation. In addition, the recommendation extended beyond the scope of responsibility for the project. In response to the draft EIS and the section 10(j) meeting, Washington DFW revised its recommendation to focus on an information and education program that could be implemented at the project, would help control and prevent the spread of invasive species, and could be implemented at a reasonable cost to the project. We now recommend adopting the Washington DFW's recommended measure, but note for clarity that we do not recommend that Grant PUD be responsible for inspecting boats entering or leaving the project reservoirs for invasive aquatic species. The inconsistency is now resolved.

5.3 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C. section 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by a project. Under section 10(a)(2)(A) of the FPA, federal and state agencies filed comprehensive plans that address various resources in Washington. Table 43 identifies those plans that address resources applicable to the Project. No inconsistencies were found.

We also reviewed the following plans that are relevant to the Project: (1) Nez Perce Tribe, Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon, The Columbia River Anadromous Fish Plan of the Nez Perce, Umatilla, Warm Springs, and Yakama Tribes, 1995; (2) BOR, 1998, Columbia Basin Scattered tracts resource management plan; (3) BOR Potholes reservoir management plan; and (4) Port of Mattawa, Washington, 2003, Port of Mattawa comprehensive plan: A port built on hope (1958-2003).

Table 43. Comprehensive Plans considered for the Priest Rapids Hydroelectric Project (Source: Staff).

Comprehensive Plan	Agency
Spokane resource area management plan. August 1985.	U.S. Bureau of Land Management, Spokane, Washington

Comprehensive Plan	Agency
Fisheries USA: The recreational fisheries policy of the U.S. Fish and Wildlife Service. Undated.	U.S. Fish and Wildlife Service, Washington, DC
North American waterfowl management plan. May 1986.	U.S. Fish and Wildlife Service. Canadian Wildlife Service
An assessment of outdoor recreation in Washington State: A State Comprehensive Outdoor Recreation Planning (SCORP) Document 2002-2007. October 2002.	Washington State Interagency Committee for Outdoor Recreation, Olympia, Washington
Voices of Washington: Public opinion on outdoor recreation and habitat issues. November 1995.	Washington State Interagency Committee for Outdoor Recreation, Olympia, Washington
State of Washington outdoor recreation and habitat: Assessment and policy plan 1995-2001. November 1995.	Washington State Interagency Committee for Outdoor Recreation, Tumwater, Washington
Washington State trails plan: policy and action document. June 1991.	Washington State Interagency Committee for Outdoor Recreation, Tumwater, Washington
The fifth northwest electric power and conservation plan. Council Document 2005-07.	Northwest Power and Conservation Council, Portland, Oregon.
Columbia River Basin fish and wildlife program. Council Document 2000-19.	Northwest Power and Conservation Council, Portland, Oregon.
Mainstem amendments to the Columbia River Basin fish and wildlife program. Council Document 2003-11.	Northwest Power and Conservation Council, Portland, Oregon
Protected areas amendments and response to comments. Council Document 88-22.	Northwest Power and Conservation Council, Portland, Oregon
Statute establishing the State scenic river system, Chapter 79.72 RCW. 1977.	State of Washington, Olympia, Washington

Comprehensive Plan	Agency
Eighth amendment to the fishery management plan for commercial and recreational salmon fisheries off the coasts of Washington, Oregon, and California commencing in 1978. January 1978.	Pacific Fishery Management Council, Portland, Oregon
Settlement Agreement pursuant to the September 1, 1983, Order of the U.S. District Court for the District of Oregon in Case No. 68-513, Columbia River fish management plan. November 1987.	State of Washington. State of Oregon. State of Idaho. Confederated Tribes of the Warm Springs Reservation of Oregon. Confederated Tribes of the Umatilla Indian Reservation. Nez Perce Tribe. Confederated Tribes and Bands of the Yakama Indian Nation, Portland, Oregon
Resource protection planning process--Paleoindian study unit. 1987.	Washington State Department of Community Development. Office of Archaeology & Historic Preservation, Olympia, Washington
Resource protection planning process--Mid-Columbia study unit. 1987	Washington State Department of Community Development. Office of Archaeology & Historic Preservation, Olympia, Washington
Resource protection planning process identification component for the Eastern Washington protohistoric study unit. 1987.	Washington State Department of Community Development. Office of Archaeology & Historic Preservation, Olympia, Washington
Water resources management program-Columbia River-John Day and McNary pools. October 1978.	Washington State Department of Ecology, Olympia, Washington
Application of shoreline management to hydroelectric developments. September1986.	Washington State Department of Ecology, Olympia, Washington
Instream resource protection program for the mainstem Columbia River in Washington State. 1982.	Washington State Department of Ecology, Olympia, Washington

Comprehensive Plan	Agency
State wetlands integration strategy. December 1994.	Washington State Department of Ecology, Olympia, Washington
Hydroelectric project assessment guidelines. 1987.	Washington State Department of Fisheries, Olympia, Washington
Strategies for Washington's wildlife: 1987-1993. May 1987.	Washington State Department of Game, Olympia, Washington
State of Washington natural heritage plan. 1987.	Washington State Department of Natural Resources, Olympia, Washington
Final habitat conservation plan. September 1997.	Washington State Department of Natural Resources, Olympia, Washington
Washington State hydropower development/resource protection plan. December 1992.	Washington State Energy Office, Olympia, Washington
Washington State scenic river assessment. September 1988.	Washington State Parks & Recreation Commission, Olympia, Washington
Scenic rivers program-report. January 1988.	Washington State Parks & Recreation Commission, Olympia, Washington

5.4 RELATIONSHIP TO LAWS AND POLICIES

5.4.1 Water Quality Certification

Section 401 of the CWA (33 U.S.C. § 1341) requires a license applicant to obtain from the state a certification that project discharges will comply with applicable effluent limitations, or waiver of certification.[126] Without a 401 certificate, the project cannot be licensed. On September 17, 2003, Grant PUD requested a section 401 water quality certificate from the Washington DOE in conjunction with its application for a new

[126] Certification is deemed waived by the state, if an application for certification is not acted upon within one year of the date of receipt of the application by the state.

license. On August 30, 2004, Grant PUD withdrew its September 17, 2003 request and reapplied for a section 401 water quality certification. On October 4, 2005, at the request of Washington DOE, Grant PUD again withdrew its previous request and renewed its request for certification based on the same information filed with its initial request. Washington DOE's decision on water quality certification is pending.

5.4.2 Coastal Zone Consistency Certification

By letter dated August 5, 2002, Washington DOE states that the proposed action is located outside of Washington's coastal zone and is not subject to the Coastal Zone Management Program (letter from Gordon White, Program Manager, to Cliff Sears, Regulatory Compliance Coordinator, Grant PUD).

5.4.3 Section 18 Fishway Prescriptions

Section 18 of the FPA, 16 USC § 811, states that the Commission shall require construction, maintenance, and operation by a licensee of such fishways as the Secretaries of the U.S. Department of Commerce and Interior may prescribe. In a letter filed on May 27, 2005, NMFS provided preliminary fishway prescriptions for salmon and steelhead at the Project. In a letter filed on May 26, 2005, Interior filed preliminary fishway prescriptions for salmon, steelhead, bull trout, and Pacific lamprey at the Project. For a summary of these prescriptions, see section 2.3.1. Both agencies indicated that they would file any modifications to their preliminary prescriptions within 60 days of the close of the comment period for the draft EIS.

5.4.4 Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered and threatened species or cause the destruction or adverse modification of the critical habitat of such species. By letter filed April 26, 2005, NMFS indicate that the endangered UCR spring-run Chinook salmon and UCR steelhead occur in the Project area. Critical habitat was designated for both species on September 2, 2005.

By letter filed May 3, 2005, the FWS indicates the following species and critical habitat may occur in the vicinity of the Project and could be potentially affected by the project: (a) endangered: pygmy rabbit; (b) threatened: bald eagle; bull trout; and Ute ladies'-tresses; (c) designated: critical habitat for the Columbia River dps of the bull trout; and (d) candidate: Washington ground squirrel and northern wormwood. Our assessment of effects on listed species is discussed in section 3.7, *Threatened and Endangered Species*. We discuss the Washington

ground squirrel and northern wormwood in section 3.6, *Terrestrial Resources*. Our final recommendations are presented in section 5.2, *Comprehensive Development and Recommended Alternative*.

We conclude that relicensing the Project with our recommended measures: (1) would likely adversely affect UCR spring-run Chinook salmon; (2) would not adversely modify or destroy any designated critical habitat for UCR spring-run Chinook salmon; (3) would likely adversely affect UCR steelhead (4) would not adversely modify or destroy any designated critical habitat for UCR steelhead; (5) would not likely adversely affect bull trout; and (6) would not affect designated critical habitat for bull trout.

Further, we conclude that relicensing the project with our recommended measures: (7) would not affect the pygmy rabbit; (8) would not affect Ute ladies'-tresses; and, (9) would not likely adversely affect the bald eagle. The draft EIS served as our biological assessment and we sought concurrence with our determinations from NMFS and FWS.

In a letter issued on March 2, 2006, Commission staff initiated formal section 7 ESA consultation with NMFS for UCR spring-run Chinook salmon and UCR steelhead.

By letter filed October 5, 2006, the FWS indicated that it concurred with Commission staff's not likely to adversely affect determination for the bald eagle because potential impacts do not coincide with the timeframes in which bald eagles are present in the Project area. No further action pursuant to the ESA is required for this species.

In a letter filed on March 27, 2006, Interior indicated that they did not concur with the staff's determination for bull trout. In a letter issued on October 12, 2006, Commission staff requested initiation of formal section 7 ESA consultation for bull trout.