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 proposed by Grant PUD in any license issued for this project:[95]

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

- Continue its reservoir management and maintenance operations, and adjust downstream fish passage spill flows to minimize ambient total dissolved gas (TDG) levels.
- Implement a water temperature monitoring plan for waters potentially affected by the project.
- Continue to monitor dissolved oxygen (DO), turbidity, and pH at four fixed site monitoring stations and the Rock Island tailrace.
- Continue to manage flow releases to protect fish habitat downstream of the Priest Rapids Dam in accordance with the Vernita Bar Agreement.
- Develop a plan for managing nuisance aquatic plants at key recreation sites within the project area and monitoring project waters for indicators of nuisance levels of aquatic plant growth.
- Continue monitoring project waters for the possible introduction of the non-native Zebra mussel, a nuisance mollusk species.
- Consult with agencies and implement standardized water quality protection measures prior to undertaking any planned construction, maintenance and emergency response actions.
- Continue the instrument calibration and water quality data collection program known as the fixed site quality assurance protection plan.

[95] In some instances Grant PUD has proposed funding for measures, whereas staff recommends the measure itself.

Aquatic Resources

- Provide 91 percent combined adult and juvenile salmon and steelhead passage survival through the project.
- Operate and maintain two adult fishways at each dam and implement improvements based on monitoring and evaluation.
- Operate sluiceways for fallback and kelt passage.
- Construct a new trapping facility at Priest Rapids dam.
- Provide daily adult fish passage counts for both Priest Rapids and Wanapum dams.
- Construct a downstream fish bypass sluiceway through future unit 11 at Wanapum dam.
- Modify spillway 22 at Priest Rapids dam to provide downstream passage.
- Develop and implement additional passage strategies if the future unit 11 or spillway 22 bypasses fail to achieve 95 percent dam passage survival.
- Provide spill for downstream passage at Priest Rapids dam until a downstream passage facility is constructed.
- Avoid turbine settings that have been shown to result in poor survival.
- Install gatewell exclusion screens at Priest Rapids and Wanapum dams.
- Implement a northern pikeminnow removal program to increase juvenile survival in the project reservoirs.
- Implement an avian hazing and control program to increase juvenile survival in the project tailraces.
- Develop hatchery facilities needed 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.
- Develop alternative programs if production of 1,143,000 sockeye salmon smolts is unattainable.
- Upgrade and renovate the Priest Rapids Hatchery and annually produce 6,000,000 fall Chinook salmon smolts and 1,000,000 fall Chinook salmon fry.
- Annually contribute $1,096,552 to the Priest Rapids Habitat Fund to mitigate for unavoidable losses at the project.
- Use radiotelemetry and other techniques to evaluate upstream and downstream route-specific survival at Priest Rapids and Wanapum dams.
- Use PIT-tag technology to obtain dam and project passage survival estimates.
- Continue to operate and maintain PIT-tag detectorion equipment in the Priest Rapids

fishways.

- Annually provide a minimum flow of 55 to 70 kcfs during the fall Chinook salmon spawning period. The specific flow would be selected based on monitoring redd locations and aerial surveys (this measure is part of the Hanford Reach Agreement).
- Annually establish and maintain a critical flow for protection of fall Chinook salmon during the pre-hatch, post-hatch, and emergence periods (this measure is part of the Hanford Reach Agreement).
- Annually limit flow fluctuations in the Hanford Reach during the fall Chinook salmon rearing period. Fluctuations would be limited from 20 to 60 kcfs depending on inflow to the project area (there would be no fluctuation limits when inflows exceed 170 kcfs) (this measure is part of the Hanford Reach Agreement).
- Investigate the feasibility of habitat modifications in the Wanapum tailrace to increase the amount of high quality fall Chinook salmon spawning habitat.
- Modify diffusion chambers on both Priest Rapids fishways 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.
- Examine the potential for improving upstream passage conditions for lamprey by reducing fishway flows at night.
- Develop and implement a Pacific lamprey management plan that identifies and addresses project effects on lamprey.
- Continue annual counts of adult lamprey passage through the project fishways.
- Implement a white sturgeon conservation aquaculture plan and construct a white sturgeon conservation facility at the Priest Rapids Hatchery to produce yearling white sturgeon for stocking in the project reservoirs.
- Monitor and evaluate the effectiveness of white sturgeon hatchery releases and develop optimal rearing and release strategies.
- Enhance and improve fishing opportunities in lower Crab Creek area.
- Implement and assess anadromous fish measures using an adaptive management process that would include establishment of a Priest Rapids Coordinating Committee (PRCC), formation of various technical committees, and a dispute resolution process.
- 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.

Terrestrial Resources

- Assess aquatic macrophyte density at eight transects within the Priest Rapids Project area every 4 years.
- Enhance riparian/wetland habitat within the lower five miles of Crab Creek and the Priest Rapids Wildlife Area.
- Enhance the Colockum, Whiskey Dick, and Quilomene Wildlife Areas.
- Develop and implement a transmission line avian collision protection plan.
- Develop and implement a habitat management plan.
- Continue current programs of installation and maintenance of wood duck nest boxes; raptor nesting, roosting, and perching structures; and waterfowl nesting platforms.

Threatened and Endangered Species

- Develop and implement a northern wormwood conservation plan to protect and monitor northern wormwood populations within the Priest Rapids Project area.
- Develop and implement a rare, threatened and endangered botanical species protection plan.
- Develop and implement a long-term plan to monitor rare, threatened and endangered plants within the project area.
- Develop and implement a bald eagle perching and roosting tree enhancement and protection program.

Cultural Resources

- Finalize a Historic Properties Management Plan, in consultation with the established Cultural Resources Working Group.[96]

[96] Grant PUD proposes to 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 and approved by the Commission. We recommend including provisions to address such commitments to the Wanapum Indians through the HPMP.

Recreation and Land Resources

- Develop and implement a final recreation resource management plan.
- Concentrate new recreation development in suitable areas that are compatible with the final shoreline management plan.
- Develop and implement a final shoreline management plan and manage lands accordingly; protect the scenic quality of the mid-Columbia River and its surrounding.

We recommend the following additions and/or modifications to Grant PUD's proposed environmental, protection, mitigation and enhancement measures:

Aquatic Resources

- Develop a detailed fishery operations plan.
- Investigate the gate seals at Wanapum dam as a source of mortality.
- Develop and implement a Habitat Mitigation Plan for upriver stocks.
- Develop and implement a performance evaluation plan for salmon and steelhead mitigation and enhancement measures.
- Conduct hatchery effectiveness monitoring.
- Report all occurrences of bull trout in the project area to Interior.
- Components of the Pacific Lamprey Management Plan.
- Develop and implement a white sturgeon management plan.

Terrestrial Resources

- Develop and implement a terrestrial and aquatic invasive species plan.
- Develop and implement a single habitat management plan per Grant PUD's revised proposal.

Recreation, Land Use and Aesthetic Resources

- 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.

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 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 NOAA Fisheries, the spillways at Wanapum dam are the most lethal route for downstream passage. NOAA Fisheries suggests that the poor survival associated with spillway passage at Wanapum dam is related to the spillway gate seals. Therefore, under section 18 of the FPA, NOAA Fisheries prescribes that Grant PUD investigate the effects of the seals on spillway survival. Under any license that would be issued, involuntary spills would continue at Wanapum dam and some smolts would continue to pass the project via this route even if a downstream bypass is constructed through future unit 11. Therefore, identifying and remedying the cause of poor spillway survival at Wanapum dam would improve passage conditions and increase juvenile downstream passage survival when involuntary spills would occur. We estimate that the cost of this 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 identified and implemented through consultation with NOAA Fisheries and the other agencies.

Modification of Spillway 22 at Priest Rapids Dam

At Priest Rapids dam, the ongoing spillway and sluiceway releases appear to provide safe and effective passage for downstream migrating smolts. However, these spilled flows reduce generation and can result in increased total dissolved gases. To increase power generation and decrease adverse effects on total dissolved gases, Grant PUD is proposing to construct a downstream bypass facility in spillway 22 of the Priest Rapids dam. This facility would be designed to minimize the possibility of fish impacting hard or abrasive surfaces or exposing fish to turbulent, high energy areas with high shear forces or other unfavorable hydraulic conditions that could cause fish injuries or disorientation. While no empirical data are available to quantify smolt survival through the proposed Priest Rapids facility, we anticipate that the proposed design should result in survival approaching 100 percent and could exceed existing spillway passage survival at the Priest Rapids dam.

The attraction of smolts to spillway 22 was tested by Grant PUD in 2003. Top-spill experiments at spillway 22 resulted in approximately 65 percent fish passage efficiency with the gate fully opened (i.e., approximately 60,000 cfs). Grant PUD has also tested top-spill at spillway 17 which resulted in fish passage efficiency of 77 percent. These data suggest that a substantial proportion of the outmigrating smolts would be attracted to Grant PUD's proposed downstream fish passage facility for Priest Rapids dam. This information on attraction and potential survival suggests that the proposed bypass would provide safe and effective downstream passage for migrating smolts at the Priest Rapids dam.

In comments filed on May 27, 2005, NOAA Fisheries indicates that at this time it is not convinced that Grant PUD's proposal to modify spillway 22 is the "right" design for providing fish passage at the Priest Rapids dam. NOAA Fisheries indicates that additional review and study of this proposal is needed. The recommendations of Interior and WDFW are consistent with NOAA Fisheries recommendation. None of the agencies provide any specific concerns about the proposed modification of spillway 22; however, they do indicate that they are reasonably satisfied by the effectiveness of the ongoing spill program.

In the license application, Grant PUD indicates that the proposed modifications to spillway 22 would cost approximately $18 million. Grant PUD estimates that the annual cost of spilling 40 kcfs through spillway 22 would be

approximately $16 million. In comparison, the annual cost of the existing spill program at Priest Rapids dam is $45.6 million per year based on a loss of about 1,366,000 MWh of energy in an average water year. Because the proposed facility should provide safe and effective passage, achieve the proposed downstream fish passage survival standards, decrease the dam's influence on total dissolved gases, increase power generation, and reduce project operating costs, we are recommending that any new license for the Priest Rapids Project include modification of spillway 22 for downstream fish passage.

Habitat Mitigation Plan

NOAA Fisheries, WDFW, and CRITFC recommend that Grant PUD develop a habitat plan to direct the Priest Rapids habitat program which would mitigate for project-related unavoidable losses to upriver stocks. A habitat plan would include identification of goals and objectives, description of a process for coordination, and description of a process to identify, prioritize, and implement habitat projects. Development and implementation of a habitat plan would provide structure for the implementation of the habitat program. The cost of developing such a plan would be approximately $5,000 dollars. Based on this information, we conclude that the plan would be worth the cost and we are recommending including a habitat plan in any license that is issued for the project.

Performance Evaluation Program

NOAA Fisheries recommends that Grant PUD develop a Performance Evaluation Program to assess improvements in passage survival, habitat mitigation, and the hatchery program. NOAA Fisheries recommends that Grant PUD summarize the Performance Evaluation Program in a Performance Evaluation Report every 3 years. NOAA Fisheries recommends that Grant PUD produce annual Progress and Implementation Plans describing the implementation of measures for anadromous fish. A Performance Evaluation Program would allow for measurement and evaluation of the effects of individual mitigation measures, assessment of the contribution of mitigation measures in meeting overall goals, and identification of new efforts or measures that would help to meet mitigation goals. The annual Progress and Implementation Plan would enable use of an adaptive management approach by describing the results of measures that have been implemented and defining the measures that would be implemented during the upcoming year. The annual plans would include updates to the operation, inspection, and maintenance of all juvenile and adult fishways.

Most of the data necessary for evaluating the ongoing programs would be

collected through other proposed measures; therefore, additional costs associated with implementation of this program would mostly entail evaluating, compiling, and summarizing the results of the various ongoing studies and monitoring efforts. We estimate that the cost of these evaluations would be approximately $50,000 per year. Development of a Performance Evaluation Program would help to ensure that progress is made towards salmon and steelhead goals and would allow effective implementation of an adaptive management approach at a reasonable cost; therefore, we recommend including this program in any license issued for the project.

Hatchery Effectiveness Monitoring

NOAA Fisheries and WDFW recommend that Grant PUD monitor the effectiveness of the hatchery programs for spring, summer, and fall Chinook salmon and steelhead. WDFW also recommends that Grant PUD monitor the success of the sockeye salmon hatchery program. As part of this program, Grant PUD would develop and implement a monitoring and evaluation plan soon after license issuance and update the plan every 5 years. Monitoring and evaluation would ensure that the hatchery programs are addressing project effects and meeting program goals. Sex, age, and coded wire tag sampling of hatchery returns would allow assessment of the contribution of hatchery fish to the natural population, the influence of hatchery strays, and population estimation. Additionally, this plan could serve as a component of the performance evaluation plan and provide information useful in determining the success of measures implemented for salmon and steelhead. We estimate that implementation of this program would cost $100,000 per year. Because the monitoring and evaluation plan would determine the success of the hatchery programs and allow for any necessary adjustments, we conclude it would be worth the cost and we are recommending including this measure in any license that is issued for the project.

Reporting Bull Trout Occurrences

Available information suggests that bull trout occur only incidentally within the Priest Rapids 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 report all occurrences of bull trout within the project area to Interior.

Components of the Pacific Lamprey Management Plan (PLMP)

In this section we discuss several measures that we recommend as components of the proposed PLMP.

Under section 18, Interior prescribed that Grant PUD conduct a hydraulic study of fish ladder entrance conditions, diffusion areas, and submerged orifices. Data collected by Nass et al. (2003) indicated that ladder entrances and submerged orifices in the fishways were associated with some adult lamprey delays. Studying the hydraulic conditions in these areas and other areas that may be challenging to lamprey would help to identify potential problems and may allow for quantification of modifications that are being considered (e.g., such as Grant PUD's proposal to reduce flows at night). We estimate that a hydraulic study would cost approximately $100,000. Based on the information above, we conclude that a hydraulic study would be worth the cost and we recommend that any license issued for the Priest Rapids Project should include a hydraulic study as part of the proposed PLMP.

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; 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). Additionally, it would be premature to implement any modifications to the fishways until after the results of the hydraulic study are available. We estimate that the cost of these fishway modifications would be approximately $700,000. Depending on the results of the hydraulic study, some of these measures may improve passage conditions for adult lamprey; however, based on the information above, we do not believe these measures would be worth the cost at this time. We do, however, recommend that an evaluation of the need for these measures be included in the PLMP as potential future options for improving passage conditions for adult lamprey.

Interior prescribes under section 18 and WDFW 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 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 PLMP to ensure the enhancements are achieving the desired results. Additionally, the PLMP should establish criteria that would trigger the need to conduct additional adult lamprey passage studies.

Interior prescribed and WDFW 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 salvage protocol would be worth the cost and we recommend including this measure in any license issued for the project.

White Sturgeon Management Plan

WDFW, Interior, and CRITFC recommend that Grant PUD develop and implement a white sturgeon management 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 management 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 management plan, WDFW and Interior indicate that Grant PUD should be responsible for increasing sturgeon abundance to levels commensurate with available habitat. Additionally, WDFW

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 WDFW, 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 Priest Rapids 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 management plan that are designed to identify and address project effects on the species. Development and implementation of a white sturgeon management plan would cost approximately $50,000 per year. We conclude that developing and implementing a white sturgeon management plan would be worth the cost and we recommend including this measure in any license issued for the project.

Invasive Species Plan

As a component of its draft RRMP, 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 WDFW and monitor for zebra mussels within the Priest Rapids Project area at an estimated annual cost including O&M of $2,000. Rather than separate programs for preventing, eradicating or controlling introductions of invasive species, we recommend that components of the programs be consolidated into a separate invasive species plan, which would be more effective in addressing both aquatic and terrestrial invasive species. We estimate compiling these programs into a single plan would cost $15,000. We recommend that Grant PUD develop an invasive species plan including measures specifically to protect species of special concern that would be implemented on project lands and project lands influenced by project reservoir fluctuations. Development and distribution of information on invasive species during the boating season (May 1-October 30) could be part of an invasive species plan in cooperation with Grant PUD, WDFW, and TNC. We conclude an invasive species plan would be worth the cost and we recommend including such a plan in any license that is issued for the project.

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

habitat management plan. A single habitat management plan would include identification of goals and objectives, description of a process for coordination, and the five separate programs, including monitoring, discussed in this DEIS. We find such a plan also should include the wildlife-related structures originally proposed by Grant PUD at an estimated annual cost including O&M of $15,500; a fire suppression program at an estimated annual cost of $60,000; measures to enhance the lower 5 miles of Crab Creek and the Priest Rapids Wildlife Area at an estimated annual cost including O&M of $70,000; measures to enhance the Colockum, Whiskey Dick, and Quilomene Wildlife Areas at an estimated annual cost including O&M of $30,000; and measures specifically to protect species of special concern.

Measures related to invasive species should be addressed in a separate invasive species plan. We recommend that Grant PUD develop a habitat management plan that would be implemented on project lands and project lands influenced by project reservoir fluctuations. We conclude such a plan would be worth the cost and we recommend including a habitat management plan in any license that is issued for the project.

Historic Properties Management Plan and Related Measures

In our analysis, we recommend that Grant PUD file a final HPMP within one year after license issuance. We recommend that Grant PUD include the following items in the HPMP: (1) a comprehensive program and schedule for prioritizing the resolution of adverse effects on known National Register-eligible sites, based on the severity of the effects, (2) a plan of action for the immediate treatment of the most-severely affected National Register eligible sites that would be executed upon implementation of the HPMP, (3) individual treatment plans for resolving the effects on the remaining high priority National Register eligible sites that would be implemented within one year of implementation of the HPMP, (4) a plan for determining the eligibility of the remaining sites that are being affected by the Project operations and maintenance within two years of implementation of the HPMP, and (5) a program to carry out treatment plans for other National Register-eligible sites that are, or could be, affected by Project-related effects, over the next three to five years after HPMP implementation.

Grant PUD proposes to continue its commitments to the Wanapum Indians made during the initial license period. We recommend those commitments be continued under a new license by incorporating provisions for their continuation in the HPMP. We also recommend that provisions be included in the HPMP for addressing impacts from recreation use of Quilomene Dune and Bay on cultural

resource sites.

The HPMP 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 (I&E) programs to educate the public on the cultural and scientific importance of Historic Properties. Grant PUD estimates the total estimated capital cost of its proposal is $20,000,000 with annual operating and maintenance costs estimated at $75,000 above the current level. We conclude that these measures would adequately protect the cultural resource within the Project's APE and believe the benefits to the rich cultural resources at the Project would be worth this 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 area. By allowing the number of boats in the Quilomene Dune 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. To minimize erosion of historic properties caused by project-related recreation use, we find 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 part of the HPMP, which is a stipulation of the PA, as well as Grant PUD's proposed Interpretation & Education Program, part of its draft RRMP. We expect the cost to be nominal based on a coordinated effort among Grant PUD and the interested stakeholders.

Recreational Use Monitoring on BLM Lands

In its draft RRMP 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 (equivalent to about $6,000 a year). We have included in our recommended alternative an additional measure proposed by Interior in its section

10(a) conditions, 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 $6,000 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.

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, NOAA Fisheries, Interior, and WDFW 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.

CRITFC also recommended that Grant PUD be required to achieve 80 percent fish passage efficiency by 2013 and 90 percent fish passage efficiency by 2020. Achieving these passage efficiencies would reduce the number of fish passing through the project turbines; however, because of low spillway survival at Wanapum dam, it is not clear that reduced turbine passage would increase overall survival. Additionally, if survival standards proposed by Grant PUD, the agencies, or CRITFC are achieved, there would be no practical benefit to achieving the recommended passage efficiency levels.

The costs of implementing measures to achieve these standards are

unknown; however, because there is no apparent justification or benefit to achieving CRITFC's alternative fish passage standard or fish passage efficiency goals in comparison to the proposed standards, we do not recommend adopting them.

PIT Tag Detection at Wanapum Dam

CRITFC recommends 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. 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. 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 operation and maintenance 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, which Grant PUD has addressed through modifications. 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.

Spill at Wanapum Dam for Downstream Fish Passage

Under section 18 of the FPA, NOAA Fisheries prescribes that until the Wanapum bypass facility is operational, Grant PUD should continue the ongoing spill program to provide downstream passage for smolts. NOAA Fisheries did not provide a basis for this recommendation and it appears to be inconsistent with available information. The best available survival data collected at the Wanapum dam suggests that passage survival through the turbines is higher than survival via the spillways. In general, spillway passage survival at Wanapum dam is approximately 85 to 88 percent while turbine passage survival is 88 to 98 percent.

In comments filed on May 27, 2005, NOAA Fisheries acknowledges that spillway survival is lower than turbine passage survival and states that "spill has been consistently the most lethal route to pass fish" at Wanapum dam. Based on this information, it is unclear why NOAA Fisheries would recommend continuation of this program, since it would seem more fish would survive during downstream passage if the spill program would be discontinued and all fish passed the dam via the turbines. Also, discontinuation of the spill program would reduce adverse effects on total dissolved gases and increase project generation. The current annual cost of the Wanapum spill program is about $18 million, assuming Wanapum spill represents about 40 percent of the total cost of fish spill at the Project. Based on the information presented above, we are not recommending continuation of the proposed spill program at Wanapum dam because it would result in lower smolt passage survival, higher total dissolved gases, lower project generation, and higher project operating costs than discontinuing unforced spills and passing all of the fish through the project turbines.

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 Priest Rapids Project.

Upgrade to State-of-the-art Hatchery Facilities

ADFG 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 and other hatcheries used to produce fish as mitigation for the Priest Rapids 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 and office building, an emergency power system to provide an uninterruptible water supply to the hatchery building, new early rearing raceways, an additional rearing pond, new adult trapping and holding facilities, a new weir on the return channel, predator control features, and a pollution abatement settling pond. 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 ADFG 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.

ADFG 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 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

NOAA Fisheries and WDFW indicate that the Priest Rapids 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. NOAA Fisheries and WDFW also indicate that the passage survival standards are currently not being achieved for certain stocks; therefore, the project is not achieving NNI for these stocks. Based on their calculations, NOAA Fisheries and WDFW recommend that Grant PUD annually contribute $2,562,206 to a NNI fund to compensate for failing to achieve the survival standards.

NOAA Fisheries and WDFW indicate that these funds would provide the agencies with additional financial capacity to undertake measures to improve survival of stocks failing to meet the survival standards, but they do not specifically state how the NNI funds would be used to make up for failure to achieve the survival standards. It is possible these funds would be used to supplement ongoing hatchery production, provide for additional habitat improvements, or some 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[97], we do

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

not recommend including this measure in any license that is issued for the Priest Rapids Project.

Future Populations

WDFW 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. If these reintroduction efforts are eventually successful in achieving some as-yet, unspecified threshold population or a long-term hatchery program is established, the effects of the Priest Rapids Project on these species could be addressed through a request to amend the license or by reopening 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 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 Priest Rapids Project. As a result, failure to achieve these goals would not necessarily indicate that the effects of the Priest Rapids 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.

Tributary Steelhead Surveys

WDFW recommends that Grant PUD annually conduct redd counts and carcass surveys of steelhead in 8 tributary streams that enter the project area and that Grant PUD monitor temperature and discharge in these 8 streams. They suggest that the information gathered through these surveys would contribute to understanding what role these fish play in maintaining the viability of the UCR steelhead population. They state that collection of the temperature and discharge data would not cost much but it would add a lot to the understanding of steelhead distribution within and among the tributaries.

There is no evidence that the project has any effects on the habitat within these tributary streams. Additionally, there is no evidence that the project is affecting steelhead in the tributaries any differently than other portions of the UCR steelhead population that migrate through the project area. We estimate that the cost of these surveys and collection of water quality data would be approximately $70,000 per year. Because other measures included in the recommended alternative would adequately address project effects on all UCR steelhead, we conclude that the proposed surveys are unnecessary and would not be worth the cost. We do not recommend including this measure in any license that is issued for the Priest Rapids Project.

Flows to Accommodate Fall Chinook Salmon Escapement

Interior, CRITFC, and ADFG 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 data for predicting the amount of fall Chinook salmon spawning habitat within the Hanford Reach as it relates to flow. Additionally, the existing 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 Priest Rapids Project vary dramatically on an hourly, daily, weekly, and seasonal basis and the useable storage within the Priest Rapids Project is generally not great enough to fully reregulate inflows from the upstream projects for much more than a few days. 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 northwest United States. Based on the information above, we are not recommending that this measure be included in any license issued for the Priest Rapids Project.

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

To protect incubating eggs, alevins, and emerging fry, Interior, CRITFC,

and ADFG 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 HRA. However, unlike the HRA, which provides specific operational requirements in response to monitoring results, Interior, CRITFC, and ADFG 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 HRA 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 ADFG in any license issued for the Priest Rapids Project.

Flows to Protect Rearing Fall Chinook Salmon

Interior, CRITFC, and ADFG 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 HRA (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 HRA. However, because of uncertainty associated with the Anglin et al. (2005) 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 Priest Rapids Project essentially helps to reduce or mitigate flow fluctuations occurring upstream before they enter the Hanford reach. Under the HRA, 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 HRA, the 10 kcfs fluctuation range proposed by Interior, CRITFC, and ADFG 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 Priest Rapids Project during the fall Chinook salmon rearing period. Reducing the operational flexibility of the project would essentially limit the Priest Rapids Project to the single function of re-regulating upstream flow fluctuations during this 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. 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 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, NOAA Fisheries, and WDFW would enhance conditions in the Hanford Reach for fall Chinook salmon. The flow restriction proposed by Interior, CRITFC, and ADFG would potentially provide greater enhancement than the HRA 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 Priest Rapids Project to serve other project purposes.

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

Spawning Behavior Studies

Interior, CRITFC, and ADFG 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 Priest Rapids Project in run-of-river mode, substantial flow fluctuations would still occur within the Hanford Reach). We assume that these studies would require direct observations or continuous radio—telemetry tracking of spawning fish and either would be extremely labor intensive. Therefore, we estimate that these studies would cost approximately $200,000 ($16,000 per year when annualized over the license term), not including any lost generation from intentionally manipulating project releases. Based on the information above, we conclude that these studies are not needed to mitigate project effects and we do not recommend including them in any license issued for the Priest Rapids 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. (2005) 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 Priest Rapids Project (i.e., if Grant PUD were required to operate the Priest Rapids 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 and 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

Interior, CRITFC, and ADFG 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. Monitoring during 2002 and 2003 demonstrated the benefits of the proposed flow program since Grant PUD voluntarily complied with the flow requirements during that time. Under the HRA, Grant PUD, NOAA Fisheries, and WDFW propose to conduct follow-up monitoring using similar methods in 2011, 2012, and 2013. Either annual monitoring or the monitoring proposed in the HRA 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, Interior, CRITFC, and ADFG provided no justification for annual monitoring. Over a license term, annual monitoring would cost substantially more than the follow-up monitoring proposed by the HRA signatories. Additionally, because Grant PUD already documented the benefits of the HRA 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.

Measures for Bull Trout

Under section 18 of the FPA, Interior prescribes that to provide for bull trout passage, Grant PUD should operate the Priest Rapids Project upstream and downstream fish passage facilities as prescribed for salmon and steelhead. Both Interior and WDFW recommend that Grant PUD develop and implement a Bull Trout Management Plan. The agencies recommend 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.

In regard to the bull trout management plan, many of these studies and monitoring measures recommended as part of the plan appear to be 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 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 record and report all observations of bull trout in the project area to Interior and WDFW. If the occurrence of bull trout in the project area increases in the future, Grant PUD or the agencies could request that the Commission consider amending the license to reduce any documented project effects on bull trout at that time.

Components of the Pacific Lamprey Management Plan

We are not recommending several measures that Interior, WDFW, and CRITFC suggested as components to the PLMP. We describe each measure and our reason for not recommending it below.

WDFW and CRITFC recommend that Grant PUD use radio-telemetry to track adult lamprey movements through the reservoir and into tributaries. 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. There is no evidence to suggest that the project adversely effects lamprey movements through the project reservoirs. We estimate that the cost of this study would be approximately $150,000. 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 PLMP.

WDFW 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. Previous efforts to use PIT tag technology on juvenile lamprey have been unsuccessful and no other reliable method has been developed for marking and tracking juvenile lamprey at this time. Additionally, aquaculture techniques for Pacific lamprey have not been developed; therefore, there is no source for hatchery-reared juvenile lamprey. We estimate that conducting a PIT tag study using fish obtained from the wild would cost approximately $400,000. However, because the PIT tags do not appear to be a reliable method for tracking juvenile lamprey, the study results would be unreliable and inconclusive. Based on this information, we conclude that the recommended study would not be worth the cost and we do not recommend including it as part of the proposed PLMP.

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 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 relatively 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 PLMP.

Interior recommends that Grant PUD identify the timing of juvenile lamprey outmigration through the project. WDFW 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 Priest Rapids 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. 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 PLMP.

WDFW recommends that Grant PUD conduct an assessment of the relative abundance of juvenile lamprey in the project reservoir and its tributaries. WDFW provides no information to indicate how this information would be used. We estimate that the cost of this study would be approximately $100,000. This information may be useful to WDFW in addressing its management responsibilities towards Pacific lamprey; however, it is not necessary to 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 PLMP.

Interior and WDFW 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. 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 PLMP.

Interior and WDFW 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 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 PLMP.

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 and could cost 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.

WDFW 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 WDFW 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 WDFW 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 actually suggests that juvenile lamprey survival during downstream passage may be relatively high and similar to or exceeding levels achieved for juvenile salmon. We are unable to estimate the cost of achieving 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 project in the Columbia River Basin.

A "best passage rates" standard is a subjective standard and it is not clear how the Commission or Interior would assess achievement of this standard. Additionally, Interior provided no biological basis to justify this standard. There is no evidence that the existing Priest Rapids 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 Priest Rapids 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 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 Interior's "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 Priest Rapids Project. Interior's prescription seems to rely on the optimistic assumption that a new, effective upstream passage facility, specific to adult lamprey will be discovered within the next 3-5 years. 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

WDFW, 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 Priest Rapids Project.

Funding for a WDFW Lamprey Biologist

We do not recommend adopting WDFW's recommendation for Grant PUD to make available $30,000 annually to fund a WDFW 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 WDFW, 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 management 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

WDFW, 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 Priest Rapids Project.

Funding for a WDFW White Sturgeon Biologist

We do not recommend adopting WDFW's recommendation for Grant PUD to make available $30,000 annually to fund a WDFW 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 WDFW, 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 white sturgeon management 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.

Columbia Basin Hatchery

Grant PUD proposes and WDFW recommends that Grant PUD 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 Priest Rapids 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 operation and maintenance. 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 in the local lakes. However, since resident fish reared in the hatchery would be stocked in lakes outside the project boundary, there would be no benefit to fish or recreational resources within the project area. Additionally, since the Columbia Basin Hatchery is outside the project boundary and it is not a project facility, there is no reason to include this measure in the project license. Based on this, 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.

Because there is no evidence that the pikeminnow removal program is affecting resident fish abundance or sturgeon egg survival and because the proposed study is unlikely to provide any conclusive information quantifying effects of the pikeminnow removal program, we conclude that it would not be worth the cost and we do not recommend including it in any license issued for the project.

WDFW Habitat Management and Monitoring Plan

WDFW recommends that Grant PUD develop, implement, and fund a habitat management and monitoring plan. The monitoring strategy, as recommended by WDFW, would entail Grant PUD establishing a fund to be used for implementation of the monitoring activities and remediation; however, WDFW provides no cost estimates for the fund. WDFW states that the purpose of the plan is to guide and facilitate the management of habitats and associated wildlife and botanical resources within the project boundary and on wildlife mitigation lands conveyed to WDFW as mitigation in the original license. As previously discussed, we note 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. Therefore, we do not recommend including a habitat management and monitoring plan in any license issued for the project.

WDFW Funding for Replacement of Habitat

To mitigate for original project impacts, WDFW recommends that Grant PUD provide to WDFW: (1) $2,160,000 for replacement of the lost wildlife

values at Crescent Bar, plus O&M cost of $36,000; (2) $6,500,000 for habitat restoration and enhancement projects; and (3) $15 per acre per year for O&M of WDFW lands within the project boundary, for lands conveyed by Grant PUD to WDFW in the original license, for WDFW wildlife area lands in the vicinity of the project, and for lands acquired for mitigation under the new license. In addition, WDFW recommends that Grant PUD provide to WDFW $4,500,000 for land acquisition to mitigate for original project impacts and to ensure the protection of the wildlife and recreation values.

As discussed above, we note 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. Regarding increased pressure from recreationists on terrestrial resources, 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. Therefore, we do not recommend including any of the above 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 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 a Memorandum of Understanding (MOU) with WDFW 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 find no basis to adopt Interior's recommendation as the MOU is between BLM and WDFW. Grant PUD's proposal to develop and implement a recreation resource management plan and a habitat management plan would provide benefits necessary to protect and enhance environmental resources. To address the ongoing effects of project operations on terrestrial resources, Grant PUD also proposes to acquire land that lies adjacent to Priest Rapids or Wanapum reservoir and/or tributary streams and includes a mixture or upland and riparian habitats. Therefore, we conclude that a coordinated recreation and wildlife management plan is unwarranted and we do not recommend including it in any license issued.

Funding for FTE Enforcement Officers

In its draft RRMP Grant PUD proposes to provide funding for 1.0 FTE to WDFW and 1.0 FTE to be divided equally between 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 the new license. WDFW recommends Grant PUD fully fund 2.0 FTE enforcement officers, including administrative costs, and additional funding to be made to Kittitas County and Grant County Sheriff's Offices to fund 1.0 FTE, including administrative costs. In addition, WDFW recommends that Grant PUD provide WDFW $73,500 for a reservoir patrol vessel and $2,200 for a boat trailer, and replace them on a 10-year cycle. CRITFC recommends Grant PUD contract with local law enforcement personnel to enforce laws that protect cultural resources. 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; therefore, we are not including such funding requirements in the staff alternative.

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: NOAA Fisheries (letter filed May 27, 2005), Interior (letter filed May 26, 2005), and WDFW (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 44 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.

ADFG 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. ADFG's recommendations were considered under section 10(a) of the FPA and are addressed elsewhere in this document.

The Commission staff makes a preliminary determination that three recommendations by Interior and three recommendations by WDFW may be inconsistent with the purpose and requirements of the FPA or other applicable law.

Table 44. Fish and wildlife agency recommendations for the Priest Rapids Project. (Source: Staff).

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
1. Non-passage related actions contained in NOAA Fisheries' Biological Opinion issued on May 3, 2004, should be included in the new license.	NOAA Fisheries (P-49)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Adopted
2. Establish a Priest Rapids Coordinating Committee (PRCC), including a Hatchery Subcommittee and a Habitat Subcommittee.	NOAA Fisheries (P-49); WDFW (P-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.	NOAA Fisheries (P-51); (WDFW P-22)	Yes	$50,000/yr	Adopted

[98] Page numbers from the filed recommendation letter.

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
4. Produce annual Progress Implementation Plans that describe the implementation activities for PME measures implemented for anadromous fish species.	NOAA Fisheries (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.	NOAA Fisheries (P-52)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Included in item 3.	Adopted
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.	NOAA Fisheries (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 Hatchery and Genetic Management Plans (HGMP).	NOAA Fisheries (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.	NOAA Fisheries (P-54)	Yes	$511,900	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
9. Complete a HGMP to rear up to 600,000 yearling UCR spring-run Chinook salmon for release in the UCR basin.	NOAA Fisheries (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.	NOAA Fisheries (P-56); WDFW (P-14)	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.	NOAA Fisheries (P-59)	Yes	$1,828,000	Adopted
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.	NOAA Fisheries (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.	NOAA Fisheries (P-59) WDFW (P-10)	Yes	Included in item 11 above	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
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.	NOAA Fisheries (P-60); WDFW (P-17)	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.	NOAA Fisheries (P-61); WDFW (P-19)	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.	NOAA Fisheries (P-63); WDFW (21)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
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).	NOAA Fisheries (P-65): WDFW (P-21 & 22)	Yes	$1,096,552	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
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.	NOAA Fisheries (P-66)	Yes	$5,000	Adopted
19. Establish, manage, and make annual contributions to a No Net Impact fund. The baseline annual contribution is $2,562,206 (2005 dollars).	NOAA Fisheries (P-69); WDFW (P-24)	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.	NOAA Fisheries (P-71)	Yes	$2,000,000	Adopted
21. Implement the flow regimes and river operations specified in the April 2004 Hanford Reach Fall Chinook Protection Agreement.	NOAA Fisheries (P-74); WDFW (P-4)	Yes	$4,346,607	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
22. Control flow releases below Priest Rapids Dam, using the physical capabilities of only the Priest Rapids and Wanapum developments, from March 1 through June 15 to limit the magnitude of daily flow fluctuations to no more than 10,000 cfs around the estimated weekly average outflow target.	Interior (P-51)	Yes	$116,223,000	Not adopted
23. Develop and implement: (1) a plan to conduct annual juvenile Chinook salmon entrapment loss assessments for the entire Hanford Reach and (2) a comprehensive investigation of juvenile Chinook stranding in the Hanford Reach.	Interior (P-53)	Yes	$150,000	Not adopted
24. Control flow releases, in consultation with the PRCC, from the Priest Rapids 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

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
25. Control flow releases for successful incubation, in consultation with the PRCC, from the Priest Rapids 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
26. 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
27. 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

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
28. 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
29. Develop and implement a Bull Trout Management Plan to address project-related impacts over the term of the new license.	Interior (P-60); WDFW (P-31)	Yes	$6,300	Not adopted
30. Develop and implement a Pacific Lamprey Management Plan.	Interior (P-61); WDFW (p-40)	Yes	$422,663	Adopted
31. Develop and implement a White Sturgeon Management Plan.	Interior (P-63): WDFW (P-32)	Yes	$303,547	Adopted
32. Develop and implement a White Sturgeon Conservation Aquaculture Plan.	Interior (P-63)	Yes	Included in 31 above	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
33. 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
34. Develop and implement a Northern Wormwood Conservation Plan to protect and monitor Northern wormwood populations.	Interior (P-66)	Yes	$40,000	Adopted
35. Develop and implement a plan to monitor rare, threatened, and endangered (RTE) plants.	Interior (P-67)	Yes	$35,000	Adopted
36. 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
37. Develop and implement a bald eagle perching and roosting tree protection and enhancement program.	Interior (P-68)	Yes	$17,500	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
38. 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.
39. Include all of the RPAs contained in NOAA Fisheries's BO as license conditions.	WDFW (2)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Adopted
40. Fund annual redd counts and carcass surveys for steelhead trout in listed tributaries to the Columbia River within the Project reservoirs.	WDFW (2)	No. No nexus to project effects.	$70,000	Not adopted
41. Fund monitoring of water temperature and stream discharge throughout the year for the listed tributaries to the Columbia River within the Project reservoirs.	WDFW (P-3)	No. No nexus to project effects.	Included in 40 above	Not adopted
42. Conduct annual redd surveys on Vernita Bar in the area specified on Exhibit A of the 2004 Hanford Reach Fall Chinook Protection Agreement.	WDFW (P-5)	Yes	Included in 21 above	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
43. Conduct aerial surveys of the Hanford Reach, concurrent with the Vernita Bar redd surveys required by the 2004 Hanford Reach Fall Chinook Protection Agreement, to aid in establishing the estimated start of spawning and to identify spawning at higher elevations than present at Vernita Bar.	WDFW (P-6)	Yes	Included in 21 above	Adopted
44. Conduct a follow-up monitoring program to estimate fry losses during 2011, 2012, and 2013 in the Hanford Reach, as a result of stranding, as prescribed in the Hanford Reach Fall Chinook Protection Agreement.	WDFW (P-7)	Yes	Included in 21 above	Adopted
45. Develop and implement a comprehensive Fall Chinook Protection Program to improve upstream and downstream survival and provide hatchery supplementation and habitat improvements.	WDFW (P-8)	Yes	Unknown	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
46. Until measures are implemented that achieve the downstream passage standards, provide interim summer spills up to TDG limits at Wanapum Dam and up to 39 percent at Priest Rapids Dam to pass 95 percent of the summer juvenile migrants.	WDFW (P-9)	Yes	$18,000,000	Not adopted
47. Provide facilities to produce at the Priest Rapids Hatchery an additional 1,000,000 fall Chinook salmon sub-yearling smolts to be reared.	WDFW (P-10)	Yes	$801,000	Adopted
48. Produce and release up to 1,000,000 fall Chinook salmon fry into Wanapum and Priest Rapids reservoirs.	WDFW (P-10)	Yes	Included in 11 above	Adopted
49. Develop and implement a HGMP to assess the effectiveness of the fall Chinook salmon propagation program.	WDFW (P-10)	Yes	Included in 11 above	Adopted
50. Conduct annual hatchery evaluation work for fall Chinook salmon in the Hanford Reach to evaluate the effect of the hatchery program in mitigating Project impacts.	WDFW (P-10)	Yes	Included in 11 above	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
51. Implement hatchery facility improvements at the Priest Rapids Hatchery necessary to carry out the recommended hatchery production schedules.	WDFW (P-10)	Yes	Included in 11 above	Adopted
52. Develop and implement a comprehensive Summer Chinook Protection Program to improve upstream and downstream survival and provide hatchery supplementation and habitat improvements.	WDFW (P-13)	Yes	Unknown	Adopted
53. Develop and implement a HGMP to assess the effectiveness of the summer Chinook salmon propagation program.	WDFW (P-15)	Yes	Included in 10 above	Adopted
54. Develop and implement a comprehensive sockeye Protection Program to improve upstream and downstream survival and provide hatchery supplementation and habitat improvements.	WDFW (P-16)	Yes	Unknown	Adopted
55. Develop and implement a HGMP to assess the effectiveness of these sockeye salmon propagation program.	WDFW (P-18)	Yes	Included in 14 above	Adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
56. Develop a Fish Habitat Plan for non-listed salmon species in a manner similar to the plan developed for listed species pursuant to RPA Action 33.	WDFW (P-23)	Yes	$403	Adopted
57. Establish a No Net Impact fund that would provide up to $548,300 annually for each percentage point of survival through the Project that falls below applicable juvenile survival standards.	WDFW (P-25)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$2,562,206	Not adopted
58. Provide annual funding for a sturgeon biologist to participate in the development a White Sturgeon Management Plan.	WDFW (P-39)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$30,000	Not adopted
59. Provide annual funding for a lamprey biologist to participate in the development a Pacific Lamprey Management Plan.	WDFW (P-43)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$30,000	Not adopted

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
60. Develop, fund, and implement a Columbia Basin Hatchery Management Plan to increase production from an annual average of 65,000 lbs to 132,000 lbs at the Columbia Basin Hatchery.	WDFW (P-44)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$180,000	Not adopted
61. Develop and fund an additional water supply to meet the goals of the Columbia Basin Hatchery Management Plan.	WDFW (P-45)	No. No nexus to project effects.	Included in 60 above	Not adopted
62. Fund the renovation and expansion of the Columbia Basin Hatchery.	WDFW (P-48)	No. No nexus to project effects.	Included in 60 above	Not adopted
63. Provide to WDFW $15 per acre per year for O&M of WDFW wildlife area mitigation lands.	WDFW (P-53)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$1,470,000	Not adopted.
64. Provide to WDFW $2,160,000 for replacement of the lost wildlife values at Crescent Bar, plus annual O&M cost of $36,000.	WDFW (P-55)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$210,000	Not adopted.

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
65. Provide to WDFW $6,500,000 to fund habitat restoration and enhancement projects as mitigation for Project-related impacts.	WDFW (P-58)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$523,800	Not adopted.
66. Provide to WDFW $4,500,000 for acquiring and protecting wildlife resource lands due to original mitigation lands and increased pressure from recreationists at the Project reservoirs.	WDFW (P-64)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$362,600	Not adopted.
67. Develop and fund a Priest Rapids Project Habitat Management and Monitoring Plan to guide and facilitate management of habitats on the Project's original mitigation lands.	WDFW (P-67)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
68. Provide to WDFW $120,000 annually for fire suppression services on WDFW lands.	WDFW (P-70)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources	$60,000	Adopted plan to address fire suppression

Recommendation	Agency[98]	Within the Scope of 10(j)?	Annualized Cost	Staff Recommendation[a]
69. Provide to WDFW funding for 2.0 full-time WDFW enforcement officers; and, provide to Kittitas and Grant Counties Sheriff's offices funding for 1.0 FTE.	WDFW (P-71)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$150,000	Not adopted
70. Provide to WDFW $73,500 for a reservoir patrol vessel, and $2,200 for a boat trailer, and replace on a 10-year cycle.	WDFW (P-71)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$10,000	Not adopted
71. Convene an annual law enforcement coordination meeting to discuss protection of project resources, including fish and wildlife law enforcement.	WDFW (P-73)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Unknown	Not adopted
72. Develop, fund, and implement an Aquatic Invasive Species (AIS) Prevention Program.	WDFW (P-75)	Yes	$7,000	Adopted, except for certain provisions
73. Fund an AIS Program Inspector at $6,000 per year, plus office space and storage area.	WDFW (P-76)	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$6,000	Not adopted.

[a] 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).

We do 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. Our analysis in section 3.5.2, suggests that Interior's 10 kcfs fluctuation limit would potentially result in less stranding and entrapment of fall Chinook salmon in the Hanford Reach than the operations proposed by Grant PUD, NOAA Fisheries, and WDFW in the HRA. 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 ability of the project to provide regional electrical system support and load following capability and would also reduce the ability of the project to serve other purposes such as flood control, navigation, agriculture, recreation, municipal and industrial use, or cultural resources. Lastly, implementation of the 10 kcfs limit would cost approximately $136 million per year, or 32 times more than the estimated cost of implementing the HRA (i.e., $4.3 million per year). Based on this information, we find that Interior's recommendation to reduce fall Chinook salmon stranding and entrapment in the Hanford Reach may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do 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. Grant PUD conducted stranding and entrapment surveys from 1997 to 2003 and demonstrated the benefits of the proposed HRA during two years (2002 and 2003) when Grant PUD voluntarily complied with the requirements HRA. Under the HRA, Grant PUD, NOAA Fisheries, and WDFW propose to conduct follow-up monitoring using similar methods in 2011, 2012, and 2013. Interior's recommendation to conduct annual surveys to estimate entrapment and stranding would provide information that could be used to track year-too-year conditions in the Hanford Reach; however, it is not apparent that this level of tracking would be necessary and each annual survey would cost at least $150,000. Over the term of a license, Interior's recommendation would cost substantially more than follow-up monitoring proposed by the HRA signatories. Based on this information, we find that Interior's recommendation to conduct annual fall Chinook salmon stranding and

entrapment surveys in the Hanford Reach may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting Interior's and WDFW's recommendation that Grant PUD develop and implement a bull trout management plan. Interior and WDFW indicate that the plan should include a monitoring program to assess the project effects 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. However, our analysis in section 3.5.2 suggests that the occurrence of bull trout in the project area is extremely rare and there is no evidence that the project affects the few bull trout that may infrequently occur within the project area. Additionally, because of the low occurrence of this species in the project area, it would be essentially impossible to conduct the recommended studies with any level of statistical validity. The rare occurrence of bull trout in the project area and the lack of evidence demonstrating any adverse project effects on bull trout suggest that the recommended studies are unwarranted and unnecessary. Based on this information, we find that Interior's and WDFW's recommendation to develop and implement a bull trout management plan may be inconsistent with the substantial evidence standard of section 313(b) of the FPA.

We do not recommend adopting WDFW'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. Our analysis in section 3.5.2 indicates that continuing the spill program at Priest Rapids dam would benefit salmon and steelhead passing downstream and in section 5.1 we recommend continuing this program. However, we do not recommend adopting this measure for Wanapum dam. As indicated in section 3.5.2, the best available information indicates that passage survival through the Wanapum dam turbines is higher than survival via the spillways. Additionally, the current annual cost of the Wanapum spill program is $18 million. Because the proposed spill program would provide lower survival than turbine passage and significantly increase project costs while reducing project generation, we conclude that the recommended spill program for Wanapum dam may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

WDFW recommends Grant PUD develop, fund, and implement an Aquatic Invasive Species (AIS) Prevention Program, a recommendation that we adopt 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 WDFW by March 1. The scope of WDFW's AIS Program is unclear, since the WDFW did not include any specific project-related effects, identification of specific aquatic invasive plant species, or costs associated with its recommendation. In section 3.6, Terrestrial Resources, we analyze both aquatic and terrestrial invasive species that occur within the Priest Rapids Project boundary and the Hanford Reach. Based on the best available information we recommend a separate invasive species plan for the Priest Rapids Project that would address both aquatic and terrestrial invasive species. A component of the plan would be an identification of measures to control invasive species that could be consistent with other licensees and entities within the mid-Columbia River Basin. Any meetings and subsequent reports should not be the sole responsibility of Grant PUD, but rather a coordinated effort among the interested parties.

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 **45** identifies those plans that address resources applicable to the Priest Rapids Project. We did not find any conflicts.

We also reviewed the following plans that are relevant to the Priest Rapids 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 Yakima Tribes, 1995; (2) Bureau of Reclamation, 1998, Columbia Basin Scattered tracts resource management plan; (3) Bureau of Reclamation Potholes Reservoir management plan; and (4) Port of Mattawa, Washington, 2003, Port of Mattawa comprehensive plan: A port built on hope (1958-2003).

Table 45. Comprehensive Plans considered for the Priest Rapids Hydroelectric Project.

Comprehensive Plan	Agency
Spokane resource area management plan. August 1985.	U.S. Bureau of Land Management, Spokane, Washington
Fisheries USA: The recreational fisheries policy of the U.S. Fish and Wildlife Service. Undated.	U.S. Fish and Wildlife Service, Washington, DC

Comprehensive Plan	Agency
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.[99] Without a 401

[99] 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.

certificate, the project cannot be licensed. On September 17, 2003, Grant PUD requested a section 401 water quality certificate from the WDOE in conjunction with its application for a new 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 WDOE, Grant PUD again withdrew its previous request and renewed its request for certification based on the same information filed with its initial request. WDOE's decision on water quality certification is pending.

5.4.2 Coastal Zone Consistency Certification

An August 5, 2002 letter from WDOE to Grant PUD 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, Shorelands and Environmental Assistance Program, 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 the U.S. Department of the Interior (Interior) may prescribe. In a letter filed on May 27, 2005, NOAA Fisheries provided preliminary fishway prescriptions for salmon and steelhead at the Priest Rapids Project. In a letter filed on May 26, 2005, Interior filed preliminary fishway prescriptions for salmon, steelhead, bull trout, and Pacific lamprey at the Priest Rapids 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 DEIS.

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, NOAA-Fisheries indicate that the endangered UCR spring-run Chinook salmon and UCR steelhead occur in the Priest Rapids 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 Priest Rapids 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 distinct population segment 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 Priest Rapids Project with our recommended measures: (1) would likely adversely affect UCR spring-run Chinook salmon; (2) would not likely adversely affect any designated critical habitat for UCR spring-run Chinook salmon; (3) would likely adversely affect UCR steelhead (4) would not likely adversely affect 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. This DEIS serves as our biological assessment and we will be seeking concurrence with our determinations from NOAA-Fisheries and FWS.