

# **COVER SHEET**

FEDERAL ENERGY REGULATORY COMMISSION

DRAFT ENVIRONMENTAL IMPACT STATEMENT  
FOR THE HELLS CANYON PROJECT

Docket No. P-1971-079

Section 5

Staff's Conclusions

Pages 533 through 654

DEIS

## 5.0 STAFF'S CONCLUSIONS

When the Commission considers license proposals, besides looking at power and other developmental purposes—irrigation, flood control, water supply—it must also give equal consideration to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. In this section, we examine the environmental effects and project costs and explain how we decided on the environmental measures we include in a staff alternative. In this draft EIS, we do not recommend a preferred alternative.

### 5.1 SUMMARY COMPARISON OF IDAHO POWER'S PROPOSAL AND STAFF ALTERNATIVE

In this section, we outline Idaho Power's Proposal and the Staff Alternative, and summarize the key differences of the potential effects between these two alternatives.

#### 5.1.1 Description of Alternatives

##### 5.1.1.1 Idaho Power's Proposal

Idaho Power's Proposal consists of a proposed operating regime and 81 environmental measures summarized previously in section 2.2, *Idaho Power's Proposal*.

##### 5.1.1.2 Staff Alternative

After evaluating Idaho Power's Proposal and recommendations from resource agencies, tribes and other interested parties, we compiled a set of environmental measures that we consider appropriate for addressing the resource issues raised in this proceeding. We call this the "Staff Alternative." The Staff Alternative includes some measures included in Idaho Power's Proposal, as described below, as well as some of the section 18 and alternative section 18 fishway prescriptions, section 4(e) and alternative section 4(e) conditions (see section 5.3.2), section 10(j) recommendations (see section 5.3.1), section 10(a) recommendations, and measures developed by the staff.

Under the Staff Alternative, the project would be operated as proposed by Idaho Power (see section 2.2.2), but with the following operational changes: (1) reservoir refill targets after the flood control season, (2) flow augmentation to enhance juvenile fall Chinook salmon migration conditions, (3) additional ramping restrictions during the fall Chinook salmon rearing period, and (4) warmwater fish spawning protection levels in Brownlee reservoir. The operational modifications included in the Staff Alternative are as follows:

1. Idaho Power would refill Brownlee reservoir to within 1 foot of the April 15 and April 30 minimum elevations necessary to meet the Corps' flood control requirements. After April 30, Idaho Power would coordinate the refill of Brownlee reservoir with the Corps and NMFS to ensure that the refill of Brownlee reservoir does not result in unnecessary reductions of spring flows at Lower Granite dam. This measure would not in any way diminish the Corps' discretion over the project's flood control operation.
2. Subject to reconfirmation in 2009, Idaho Power would refill Brownlee reservoir to full pool (elevation 2,077 feet msl) by June 20 of each year and, in order to enhance migration conditions for juvenile fall Chinook salmon, would release 237 kaf of stored water from Brownlee reservoir (draft to elevation 2,059 feet msl) between June 21 and July 31. Idaho Power would release at least 150 kaf (draft to elevation 2,066 feet msl) of this water no later than July 15 of each year, but would maintain Brownlee elevations through the Fourth

of July holiday to enhance recreational use of the reservoir. Idaho Power would not refill Brownlee reservoir at any time between June 21 and August 31.

3. The maximum variation in river stage would not exceed 1 foot per hour as measured at the Snake River at Johnson's Bar gaging station 13290460 (RM 230), except during the March 15 to June 15 fall Chinook rearing period when the maximum variation in river stage would not exceed 4 inches per hour.
4. Idaho Power would protect warmwater fish spawning locations in Brownlee reservoir from May 21 through July 4. For the initial 30-day period beginning May 21, Brownlee reservoir would not be drafted more than 1 foot from the highest elevation reached during the 30-day period. From the end of the 30-day period through July 4, the reservoir could be drafted more than 1 foot, but an elevation of at least 2,069 feet above mean sea level would be maintained.<sup>75</sup>

In the Staff Alternative, we also include the following environmental measures proposed by Idaho Power, based on our analyses included in sections 3 and 4. In some cases (*italicized*), we have deleted, modified, or supplemented Idaho Power's proposed measures.

### **Water Use and Quality**

1. Continue 100-cfs minimum flow in Oxbow bypass to help maintain water quality in the bypassed reach.
2. Continue recreation waste disposal to prevent waste from contaminating the river.
3. Continue preferential use of the upper spillgates at Brownlee dam during spill periods to minimize elevated total dissolved gas concentrations.
4. Improve dissolved oxygen conditions within the Hells Canyon Project by injecting an average of 1,125 tons of oxygen into the transition zone of Brownlee reservoir during the summer. *Idaho Power's proposed measure is modified to require the licensee to: (1) develop a plan to determine whether reservoir dissolved oxygen supplementation is the preferred method for meeting Idaho Power's TMDL dissolved oxygen allocation and to protect downstream beneficial uses, including fall Chinook salmon spawning; (2) implement the plan; and (3) monitor the effectiveness of the measures that are implemented.*
5. Install Hells Canyon dam spillway flow deflectors to reduce total dissolved gas concentrations in the tailrace of Hells Canyon dam and the Snake River downstream of the dam. *Idaho Power's proposed measure is supplemented to also require spillway deflectors at Brownlee dam.*

### **Fish and Snails**

6. Continue the fall Chinook plan.
  - 6a. Continue reservoir operations in the fall, winter, and early spring for protection of fall Chinook salmon spawning and salmon incubation.
  - 6b. Continue fall Chinook salmon redd and temperature monitoring to avoid the risk of dewatering developing salmon embryos, but discontinue deep-water redd monitoring

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<sup>75</sup> The requirement for warmwater fish spawning protection (item 5, above) would be secondary to any conflicting operational requirement.

until fall Chinook escapement increases significantly. Re-evaluate the use of deep-water habitat during the first year that escapement reaches increments of 10,000, 15,000, and 20,000 adults.

7. Implement the warmwater fish plan.
  - 7a. Implement centrarchid spawning protection.
  - 7b. Continue warmwater fish population monitoring to detect long-term effects on fish populations.
8. Implement the native salmonid plan.
  - 8a. Conduct pathogen survey in the Pine-Indian-Wildhorse core area to support development of a Pathogen Risk Assessment Plan. *This measure is incorporated in the description of Idaho Power measure 8b.*
  - 8b. Prepare and implement a plan to allow for the capture of resident salmonids and other species migrating upstream and for their transfer to areas upstream of Hells Canyon and Oxbow dams. The plan would include modification of the Hells Canyon fish trap to capture juvenile salmonids, construction of facilities for sorting and holding fish and for scanning PIT-tag returns, and potentially expansion of year-round operations. The plan also would include a provision to construct a fish trap at Oxbow dam a minimum of 5 years after the Hells Canyon trap has been modified. *This measure is modified to incorporate Idaho Power's alternative to the FWS preliminary fishway prescription in which Idaho Power would prepare a bull trout passage plan that would include: (1) final design plans for the Hells Canyon trap modifications; (2) final engineering design plans for the Pine Creek monitoring weir and trap fishway; (3) specific protocols for the period of operation, location of release point, and handling of all life-stages of bull trout and other fish captured at these two facilities; (4) provisions for transport of bull trout between Pine Creek and Hells Canyon dam; (5) an assessment of monitoring necessary to evaluate the potential and risk of introducing deleterious pathogens; and (6) a post-construction monitoring plan. Under this alternative condition, the plan would include a description of specific triggers related to the timeline of construction and implementation of the Oxbow upstream trap fishway, the Indian Creek permanent weir and trap fishway, and the Wildhorse River weir and trap fishway. The plan would also include the specific monitoring necessary to determine when established triggers have been satisfied. We also defer construction of the Pine Creek weir until 5 years after license issuance to allow the success of initial brook trout control efforts in Indian Creek to be evaluated for possible implementation in Pine Creek.*
  - 8c. Prepare and implement a tributary habitat enhancement plan within the Pine Creek, Indian Creek, and Wildhorse River basins and smaller tributaries to the Hells Canyon reservoirs. *This measure is incorporated in the description of Idaho Power measure 8b.*
  - 8d. Supplement marine-derived nutrients to enhance the forage base within bull trout rearing areas (Pine, Indian, and Wildhorse core area).
  - 8e. Conduct Eagle Creek presence/absence survey to determine, with statistical probability, the presence or absence of bull trout within the Eagle Creek Basin.

- 8f. Design, construct, and monitor a permanent weir at Pine Creek to establish a long-term monitoring program of fluvial fish migrating upstream and downstream in the Pine Creek System. *This measure is incorporated in the description of Idaho Power measure 8b.*
- 8g. Evaluate the feasibility of, and possibly implement, an experimental brook trout suppression program in Indian Creek. *Idaho Power's proposed measure is modified to include implementation of brook trout suppression in the Wildhorse River and possibly Pine Creek using techniques proven effective in Indian Creek.*
- 9. Continue anadromous fish production at hatchery facilities.
  - 9a. Continue to operate the Oxbow fish hatchery.
  - 9b. Continue to operate the Rapid River fish hatchery.
  - 9c. Continue to operate the Niagara Springs fish hatchery.
  - 9d. Continue to operate the Pahsimeroi fish hatchery.
- 10. Upgrade and enhance anadromous mitigation hatchery facilities *in keeping with a hatchery management plan for each hatchery that considers production goals, effects to federally listed stocks, and distribution of surplus fish.*
  - 10a. Make improvements to the Pahsimeroi fish hatchery to control pathogens, develop a locally adapted steelhead broodstock, and monitor and evaluate hatchery performance.
  - 10b. Make improvements to the Oxbow fish hatchery by constructing adult holding pond and spawning facilities, expanding the fall Chinook rearing program, distributing carcasses, generally upgrading the hatchery facilities, and monitoring and evaluating hatchery performance.
  - 10c. Make improvements to the Niagara Springs fish hatchery by expanding the hatchery building, acquiring an additional smolt tanker, acquiring a fish marking unit, upgrading employee housing, and monitoring and evaluating hatchery performance.
  - 10d. Make improvements to the Rapid River fish hatchery by constructing an adult holding pond and spawning facilities, distributing carcasses, upgrading employee housing, generally upgrading the hatchery facilities, constructing an offsite smolt acclimation/adult collection facility, and monitoring and evaluating hatchery performance.
- 11. Implement Snake River White Sturgeon Conservation Plan.
  - 11a. *Not included; instead, the Staff Alternative includes immediate implementation of the White Sturgeon Conservation Aquaculture Plan.*
  - 11b. *Not included; instead, the Staff Alternative includes immediate implementation of the White Sturgeon Conservation Aquaculture Plan.*
  - 11c. Develop an experimental conservation aquaculture plan to maintain adequate population size and genetic variability of white sturgeon in the Swan Falls-Brownlee

reach, if approved by IDFG and ODFW. *This Idaho Power measure is modified to indicate that the plan should also include stocking to rebuild sturgeon populations in project reservoirs.*

- 11d. Make periodic population assessments to monitor white sturgeon populations in the Swan Falls-Brownlee, Brownlee-Hells Canyon, and Hells Canyon-Lower Granite reaches of the Snake River.
- 11e. *Not included; instead, the Staff Alternative includes immediate implementation of the White Sturgeon Conservation Aquaculture Plan.*

## **Wildlife**

12. Acquire, enhance, and manage approximately 22,761 acres of upland and 821 acres of riparian habitat in the vicinity of the Hells Canyon Project reservoirs and downstream of Hells Canyon dam to mitigate for the estimated effects of project operations on wildlife.
13. In cooperation with ODFW and IDFG, enhance habitat on four Snake River islands (Gold, Hoffman, Patch, and Porter) for waterfowl and for threatened, endangered, candidate, and special status species. *This measure is modified to include consultation with ODFW and habitat enhancement on only the two islands that are inside the project boundary and are affected by the project. Idaho Power could contract with the agency to implement the improvement projects, but Idaho Power would retain ultimate responsibility for complying with the terms of the license*
14. Cooperate with state and federal wildlife management agencies to enhance low-elevation riparian habitat and reintroduce mountain quail in areas adjacent to the project reservoirs. *This measure is modified to include consultation with state and federal wildlife management agencies to develop and implement on-the-ground habitat improvements on lands within the project boundary. Idaho Power could contract with the agencies to implement the improvement projects, but Idaho Power would retain ultimate responsibility for complying with the terms of the license.*
15. Through an interdisciplinary team, develop and implement an integrated wildlife habitat program to manage wildlife resources on Idaho Power-owned lands associated with the project to ameliorate identified impacts and provide general land stewardship. *This measure is clarified to indicate that Idaho Power would establish a terrestrial resource work group to provide consultation in finalizing and implementing the management plan and to indicate that it would apply only to lands within the project boundary.*
16. Develop and implement an operation and maintenance plan for the Pine Creek-Hells Canyon transmission line to minimize effects on wildlife, protect wildlife resources, and enhance habitat conditions. *This measure is combined with Idaho Power measure 20 and included in staff measure 13, below.*

## **Botanical Resources**

17. Acquire, enhance, and manage upland and riparian habitat to mitigate for the estimated effects of project operations on botanical resources.
18. Formalize cooperative relationships to accomplish noxious weed control and non-native invasive weed management, site monitoring, and reseedling along the Snake River corridor from Weiser downstream to the confluence of the Salmon River. *This measure is supplemented to include agency consultation in the development and implementation of a*

*project-wide integrated weed management plan to cover National Forest System and BLM lands within the project boundary as well as Idaho Power's ownership. The plan would cover pesticide reporting to BLM.*

19. Formalize cooperative relationships, including establishment of a rare plant advisory board, to protect and monitor sensitive plant sites along the Snake River corridor from the headwaters of Brownlee reservoir downstream to the confluence of the Salmon River. *This measure is supplemented to include agency consultation in the development and implementation of a project-wide Threatened, Endangered, and Sensitive Species Management Plan for plants and animals to cover National Forest System and BLM lands within the project boundary, as well as Idaho Power's ownership, as described in staff measure 12, below.*
20. Develop and implement an operation and maintenance plan for the Pine Creek-Hells Canyon transmission line and service road and adaptively manage operation and maintenance activities to minimize adverse effects on botanical resources and to manage noxious weeds. *This measure is combined with Idaho Power measure 16 and included in staff measure 13, below.*
21. Implement cooperative projects recommended by agencies and included in the Transmission Line Operation and Management Plan. *This measure is clarified to indicate that it includes agency consultation in the development of the operation and maintenance plan.*

### **Historical and Archaeological Resources**

22. Monitor sites along transmission line 945 that are eligible for inclusion on the National Register.
23. Monitor the known burial site on Oxbow reservoir.
24. Monitor known eligible sites on Oxbow and Hells Canyon reservoirs. *This proposed measure is expanded to include all known eligible resources in the areas of potential effect of these reservoirs.*
25. Monitor known eligible sites on Brownlee reservoir. *This proposed measure is expanded to include all known eligible resources within the area of potential effect of the reservoir.*
26. Monitor known eligible sites below Hells Canyon dam. *This proposed measure is expanded to include all known eligible resources in the area of potential effect.*
27. Stabilize approximately 20 archaeological sites below Hells Canyon dam after identifying sites requiring stabilization.
28. Stabilize seven archaeological sites on Brownlee reservoir.
29. Recover archaeological data at four archaeological sites on Brownlee reservoir to prevent possible damage by reservoir operations.
30. Establish Native American interpretive sites on Brownlee reservoir to enhance visitors' awareness of Native American presence and land use in the project area.
31. Establish Native American interpretive sites on Oxbow and Hells Canyon reservoirs to enhance visitors' awareness of Native American presence and land use in the project area.
32. Establish Euro-American interpretive sites on Brownlee, Oxbow, and Hells Canyon reservoirs to enhance visitors' awareness of Euro-American presence and land use in the project area.

33. Establish Asian-American interpretive sites on Brownlee, Oxbow, and/or Hells Canyon reservoirs to enhance visitors' awareness of Asian-American presence and land use in the project area.
34. Provide financial assistance in the form of grants to local communities and organizations to support museum collections acquisition, display and curation, and for other public information and outreach projects focusing on Euro-American and Asian-American presence in the Hells Canyon area.
- 35-40. Provide support for Native American programs of the Burns Paiute Tribe, Confederated Tribes of the Warm Springs Indian Reservation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Shoshone-Paiute Tribes, and Shoshone-Bannock Tribes in its efforts to obtain funding for participating in and/or administering cultural resources environmental measures, educating their youth by providing scholarship/training funds, and providing funds to facilitate several cultural enhancement programs. *This measure is modified to delete the funding of scholarships and clarify that support for tribal programs is intended to support the tribes' participation in natural and cultural resource management.*
41. Fund additional section 106 projects to protect sites and mitigate for any unforeseen adverse effects attributed to Hells Canyon Project operations.

### **Recreational Resources**

42. Continue to operate and maintain monitors to provide flow information about river flows downstream of Hells Canyon dam.
43. Continue the Memorandum of Understanding between the Forest Service and Idaho Power with regard to staffing the Hells Canyon Visitor Center.
44. Continue existing general measures for all zones.
  - 44a. Continue litter and sanitation program.
  - 44b. Continue public safety programs.
  - 44c. Continue aid to local law enforcement in Adams County.
  - 44d. Continue road maintenance.
  - 44e. Continue operation and maintenance of Applicant-managed parks and recreation facilities.
45. Provide additional boat moorage on Hells Canyon Project reservoirs to improve angling access. *This measure is modified to include details of the boat moorage plan as part of the final Recreation Plan.*
46. Enhance the existing litter and sanitation plan to improve litter cleanup and access to portable and vault toilets at dispersed recreational sites. *This measure is modified to address the need for, location of, and maintenance standards for floating restrooms; to develop maintenance and service standards for trash receptacles; and to design, install, and maintain a graywater carryout system in the vicinity of the Hells Canyon Creek put-in/take-out area.*
47. Develop and implement an integrated I&E Plan to promote protection and preservation of cultural, natural, and historical resources through education. *This measure is modified to*

*have the I&E Plan specify the location and type of information materials to be provided and include information about anadromous fish, invasive species, and sensitive wildlife.*

48. Coordinate the prioritization of law enforcement resource use among appropriate law enforcement agencies to address public safety issues. *This measure is modified to have Idaho Power provide coordination by planning and hosting biannual meetings of the parties responsible for law enforcement in the project, but not funding law enforcement by third parties. In the Staff Alternative, we re-designate this as a “Land Management” measure.*
49. Develop and implement a Recreation Adaptive Management Plan to identify and address the adequacy of Idaho Power’s Recreation Plan over the life of a new license. *This proposed measure is supplemented to specify that the Recreation Adaptive Management Plan address dispersed site management and procedures for recreational use monitoring and reporting.*
50. Enhance road maintenance to improve public safety and further protect at-risk cultural and natural resources. *In the Staff Alternative, we re-designate this as a “Land Management” measure.*
51. Perform operation and maintenance at Applicant-enhanced BLM and Forest Service reservoir-related recreation sites to benefit recreation, provide public access, enhance visitor services and user satisfaction, and reduce the responsibilities of federal agencies to provide operations and maintenance services. *This measure is modified to bring into the project boundary dispersed recreation sites that are within 200 yards of project waters as well as Airstrip, Steck Park, Swedes Landing, and Westfall recreation sites (see staff measure 23 below).*
52. Enhance Eagle Bar dispersed recreation site and improve boat ramp access to Hells Canyon reservoir.
53. Develop site plan for Big Bar recreation site to accommodate recreational use and provide cultural and natural resource protection. *This measure is modified to include O&M for the site.*
54. Enhance boat ramp and associated facilities at Big Bar Section D recreational site to improve access to lower Hells Canyon reservoir and provide cultural and natural resource protection.
55. Develop site plan and enhance Eckels Creek dispersed recreation site to benefit recreation and provide cultural and natural resource protection.
56. Supplement the existing O&M budget to accommodate enhancements at Applicant-managed parks and recreational facilities.
57. Develop and implement a site plan for the Copper Creek dispersed recreation site to benefit recreation and provide cultural and natural resource protection.
58. Reconstruct Hells Canyon Park to benefit recreation, improve public access, and protect cultural and natural resources.
59. Develop Airstrip A&B dispersed recreational site to benefit recreation, improve public access, and protect cultural and natural resources. *This measure is modified to include O&M for the site.*
60. Develop and implement a site plan for Bob Creek Section A dispersed recreational site to benefit recreation, improve public access, and protect cultural and natural resources.

61. Develop and implement a site plan for Bob Creek Section B dispersed recreational site to benefit recreation, improve public access, and protect cultural and natural resources.
62. Develop and implement a site plan for Bob Creek Section C dispersed recreational site to benefit recreation, improve public access, and protect cultural and natural resources. *This measure is modified to include O&M for the site.*
63. Develop and implement a site plan for Westfall dispersed recreational site to benefit recreation, improve public access, and protect cultural and natural resources. *This measure is modified to include O&M for the site.*
64. Enhance Copperfield boat launch area to benefit day-use activities.
65. Implement a site plan for Oxbow boat launch to benefit recreation, improve public access, and protect cultural and natural resources. *This measure is modified to include O&M for the site.*
66. Implement a site plan for Carters Landing and Old Carters Landing recreational sites to benefit recreation, improve public access, and protect cultural and natural resources. *This measure is modified to include O&M for the sites.*
67. Reconstruct McCormick Park to meet current standards of services, benefit recreation, improve public access, and protect cultural and natural resources.
68. Develop and implement a site plan for Hewitt and Holcomb Parks to accommodate recreational use and provide cultural and natural resource protection.
69. Develop and implement a site plan for a low-water boat launch at or near Swedes Landing to improve boat access to Brownlee reservoir during seasonal reservoir drawdowns and periods of low reservoir levels.
70. Develop and implement a site plan for Swedes Landing to benefit recreation, improve public access, and protect cultural and natural resources. *This measure is modified to include O&M for the site.*
71. Develop and implement a site plan for Spring recreational site to enhance recreational facilities and improve boat ramp access to Brownlee reservoir. *This measure is modified to include O&M for the site.*

### **Land Management and Aesthetics**

72. Implement the Hells Canyon Resource Management Plan, creating virtual buffer zones between some otherwise incompatible uses, to establish or maintain compatibility between and among the various land and water uses in the vicinity of the Hells Canyon Project. *This measure is supplemented in the Staff Alternative to include: (1) clarifications regarding consultation, coordination, and reporting; (2) specificity regarding management plans to be developed; and (3) resource maps, maps depicting road maintenance responsibilities, and maps for public use.*
73. Incorporate aesthetic concerns when upgrading or repairing the existing transmission line 945. *This measure is supplemented to include a monitoring strategy, an estimated maintenance schedule, and schedule for implementing aesthetic improvements.*
74. Develop standards and guidelines for designing new physical structures and modifying existing structures to achieve aesthetic and other goals.

75. Establish standards and guidelines for the design of vegetation and hardscape elements and structures in developed areas to control noxious weeds and to achieve aesthetic and other goals.
76. Implement a general aesthetic clean-up plan to enhance the quality of the recreational experience in specific areas.
77. Replace guardrails and Jersey barriers with barriers of corten steel or other visually acceptable material, except where Jersey barriers function as barriers to slides and falling rocks along roads and developed areas.
78. Reduce the visual contrast of certain project facilities with their environment to improve aesthetics and enhance the recreational experience near those facilities.
79. Cooperate with the BLM and Forest Service to develop and assist them with implementing proposed design standards and guidelines at specific BLM and Forest Service facilities, including the Spring recreational site on Brownlee reservoir (BLM), Copper Creek trailhead on Hells Canyon reservoir (BLM), and Big Bar and Eagle Bar on Hells Canyon reservoir (Forest Service).
80. Provide signs and/or facilities that interpret some elements of the Hells Canyon Project that cannot be effectively modified to reduce their visual contrast.
81. Implement the Common Policies of the Hells Canyon Resource Management Plan to provide for the management, protection, and/or conservation of natural and cultural resources. *This measure is supplemented to address law enforcement, fire prevention, and road management in the Common Policies.*

Finally, the Staff Alternative also includes the following additional measures identified by staff based on agency, tribal, and NGO recommendations and our analysis:

### **Sediment Supply and Transport**

1. Develop and implement a program to monitor beach and terrace erosion, substrate, and gravel.

### **Water Use and Quality**

2. Develop and implement a temperature management plan.
3. Develop and implement a total dissolved gas-abatement plan to adaptively manage total dissolved gas and monitor the effectiveness of total dissolved gas-abatement measures.
4. Monitor Snake River water quality just upstream of and in Brownlee reservoir, at the Brownlee dam discharge, and downstream of Hells Canyon dam.
5. Monitor bioaccumulation of mercury, dieldrin, and DDT/DDE in Brownlee reservoir fish.

### **Aquatic Resources**

6. Every 5 years, file a report that summarizes water quality changes in response to TMDL implementation upstream of Brownlee dam to determine when habitat becomes suitable to support any future reintroduction efforts.
7. Develop and implement a gravel augmentation pilot program downstream of Hells Canyon dam.

8. Prepare a flow augmentation evaluation report in 2009 that evaluates trends in adult fall Chinook salmon returns in relation to augmentation water provided from Brownlee reservoir; considers and evaluates the effects of flow augmentation water contributed from the Snake River Basin upstream from Brownlee dam and from Dworshak reservoir; and includes any recommendations, for Commission approval, for continuing flow augmentation releases.
9. Develop and implement a stranding and entrapment monitoring plan to evaluate, and if needed develop, approaches to reduce losses of juvenile fall Chinook salmon downstream of Hells Canyon dam.
10. Develop and implement a fall Chinook spawning and incubation flow management plan to determine appropriate monitoring methods to assist with determining flow levels to be maintained downstream of Hells Canyon dam during the fall Chinook spawning and incubation season.

### **Wildlife and Botanical Resources**

11. Develop and implement a long-term stabilization/revegetation program to address erosion sites around project reservoirs and along the river downstream of Hells Canyon dam.
12. Develop and implement a project-wide Threatened, Endangered, and Sensitive Species Management Plan to address plants and animals, including bald eagles, southern Idaho ground squirrel, bats, amphibians, and reptiles.
13. Develop and implement a transmission line operation and maintenance plan for transmission line 945 to address protection and enhancement of wildlife and botanical resources, including monitoring electrocution and collision mortality and scheduling O&M to minimize disturbance to wintering mule deer.
14. In coordination with Idaho Power measure 14, above, enhance 13 acres of riparian habitat along the Snake River downstream of Hells Canyon dam to mitigate for the loss of riparian habitat predicted to occur as the result of implementing the staff's alternative flow measures.
15. Extend the wildlife mitigation and management plan to apply to all lands within the project boundary, including National Forest System and BLM-administered lands, as well as Idaho Power lands. As part of the Wildlife Mitigation and Management Plan, develop and implement an I&E program to minimize risk of wildlife disturbance. As part of the plan, schedule operation and maintenance to minimize disturbance on deer winter range.

### **Historical and Archaeological Resources**

16. Renew the licensee's offer to arrange for oral histories for the Shoshone-Bannock and Shoshone-Paiute Tribes.
17. Develop and implement a monitoring plan for archaeological sites, rock art, and traditional cultural properties.
18. Develop a plan to implement Idaho Power's deferred monitoring program concerning effects of reservoir water level fluctuations on cultural resources.
19. Within 1 year of license issuance, finalize the HPMP and file with the Commission.
20. Update the 1984 National Register nomination for the Hells Canyon Archeological District, and develop and implement a program to re-evaluate buildings and structures within the project boundary as they reach 50 years old.

## **Recreational Resources**

21. Finalize the proposed Recreation Plan to add specificity to implementation standards and expand the scope of the plan to address the following additional elements:
  - 21a. Oasis recreation site improvements;
  - 21b. Improved Brownlee reservoir communication system and, if recreational use demonstrates the need, expand Steck Park;
  - 21c. Sediment accumulation at Farewell Bend State Park;
  - 21d. Improvements at Jennifer's Alluvial Fan, including toilet facilities, vehicular barriers, signage, and regular maintenance;
  - 21e. Safety review and improvements at the Deep Creek Trail, and boundary modification to include the trail to Deep Creek in the project boundary;
  - 21f. Improvements at Hells Canyon Creek launch to enhance access and safety, provide potable water, and provide a portable human waste disposal system; and
  - 21g. Perform O&M at primary recreational sites within the project boundary and clarify O&M standards and responsibilities.

## **Land Management and Aesthetics**

22. Develop an aesthetics management plan within the Hells Canyon Resource Management Plan to be applied to all lands within the project boundary, including transmission line 945 and the right-of-way, and to include Idaho Power's proposed aesthetic measures (see items 73 through 80 above), a monitoring strategy using all viewpoints established in the Technical Report on Aesthetics, and an estimated maintenance schedule and schedule for implementing aesthetic improvements.
23. Include within Idaho Power's proposed boundary modification dispersed recreation sites that are within 200 yards of project waters; Airstrip, Steck Park, Swedes Landing, and Westfall recreation sites; Hells Canyon Creek launch area; Deep Creek trail; and all lands acquired for wildlife mitigation.
24. Provide the Forest Service with aerial photographs at a scale acceptable to the Forest Service showing the approximate location of the project boundary throughout Forest Service-managed lands.
25. Coordinate with BLM and the Forest Service concerning activities on lands managed by those agencies.
26. Develop and implement an aesthetic improvement plan for the upper deck, entrance, and egress areas of Hells Canyon dam.

## **Oversight and Adaptive Management**

27. Establish technical advisory subcommittees to facilitate consultation on the development and implementation of plans required by the new license and to provide consultation on the ongoing implementation of license requirements using adaptive management principles.

### **5.1.2 Summary of Effects**

We summarize distinguishable differences between Idaho Power's Proposal and the Staff Alternative in table 96. Idaho Power's proposed operation is similar to current operations. Therefore, unless otherwise noted, the ongoing effects of project operation under Idaho Power's Proposal are similar to current conditions.

## **5.2 DISCUSSION OF KEY ISSUES**

The measures proposed by Idaho Power and those included in the Staff Alternative would help protect and enhance water quality, fisheries, terrestrial, recreational, aesthetic, and cultural resources in the project area, but would reduce the net power benefits of the project. In this section, we discuss our rationale for including some measures in our Staff Alternative and not including others.

### **5.2.1 Sediment Augmentation and Monitoring**

The supply and movement of sediment in the free-flowing section of the Snake River downstream of Hells Canyon dam provide habitat for aquatic life, support recreational activities, and maintain important cultural resources. Sediment trapping within the project's reservoirs and flow fluctuations caused by project operations may contribute to the erosion of sandbars, beaches and terraces downstream of Hells Canyon dam. Beach erosion may adversely affect aquatic resources by reducing the availability of gently sloping shorelines favored by rearing juvenile fall Chinook salmon and reduce the extent of beaches available for recreation (beaches are used for boat landing, swimming, and camping). Beach and terrace erosion may also affect important archaeological sites.

In its license application, Idaho Power proposes to stabilize terraces containing culturally important sites but does not propose any measures to stabilize or restore sandbars. Forest Service condition FS-4 specifies that Idaho Power fund a sandbar maintenance and restoration program consisting of sand augmentation and monitoring. To fund the program, Idaho Power would establish and maintain an interest-bearing account, with the Forest Service as the beneficiary. Under this condition, the Forest Service would use the fund to restore 14 acres of sandbars on or adjacent to National Forest System lands, placing sand above the level of the average annual maximum flow at selected sites to minimize annual sand loss. Due to the remoteness of most sandbars, sand augmentation would most likely include stockpiling and loading sand to a river barge at the Pittsburg Landing and unloading and spreading sand using a small loader, which would be carried on the barge. Idaho Power has agreed to implement this measure even if the Commission does not include it as a condition of the license.

In section 3.4.2.2, we conclude that sand augmentation to restore sandbars could slightly increase rearing habitat for juvenile fall Chinook salmon, maintain beaches used for recreation, improve the aesthetic appearance of the riverscape, and potentially reduce losses to archaeological resources from beach erosion. However, the funding for condition FS-4 specified by the Forest Service, \$937,000 per year for 10 years (equal to an annualized cost of \$545,100 over 30 years) would provide only 2,500 cubic yards of sand per year, which is less than 1 percent of the total volume of sand retained annually in the three reservoirs. The number of barges needed to deliver sufficient sand to restore the Forest Service's target 14 acres of sandbar could interfere with recreational boating and disturb wildlife. For these reasons, we do not include the sand augmentation and beach restoration fund in the Staff Alternative.

Table 96. Summary of effects of Idaho Power’s Proposal and Staff Alternative. (Source: Staff)

Resource	Idaho Power’s Proposal	Staff Alternative
<b>Power Benefits</b>		
Annual generation (MWh)	6,562,244	6,548,812
Net annual benefits	\$304,747,000	\$288,790,000
<b>Sediment Supply and Transport</b>		
Effects of Operations	<ul style="list-style-type: none"> <li>• Beach and terrace erosion would continue downstream of Hells Canyon dam.</li> <li>• The quantity and quality of spawning gravels downstream of Hells Canyon dam would continue to be affected by project reservoirs trapping sand and gravel.</li> </ul>	<ul style="list-style-type: none"> <li>• Little or no change in beach and terrace erosion compared to Idaho Power’s Proposal.</li> <li>• Little or no change in spawning gravel quantity or quality compared to Idaho Power’s Proposal.</li> </ul>
Effects of Environmental Measures	No proposed measures.	<ul style="list-style-type: none"> <li>• Monitoring beach and terrace erosion would provide information about the effectiveness of mitigation strategies and support development of possible additional measures.</li> </ul> <p>Refer to Aquatic Resources measures for effects of pilot spawning gravel augmentation study.</p>
<b>Water Quality</b>		
Effects of Operations	<p>Compared to natural conditions:</p> <ul style="list-style-type: none"> <li>• Water temperatures would continue to be cooler in spring and summer and warmer in the fall and winter potentially resulting in reduced salmon and increased stress.</li> <li>• The project would continue to lower dissolved oxygen concentrations in and downstream of Brownlee reservoir affecting habitat suitability for fish.</li> <li>• Total dissolved gas levels downstream of Brownlee dam would continue to exceed the 110-percent of saturation criterion when spill exceeds 3,000 cfs.</li> </ul>	<p>Compared to Idaho Power’s Proposal:</p> <ul style="list-style-type: none"> <li>• The temperature of water released from Hells Canyon dam during the flow augmentation period would be slightly increased in extreme low flow years, but reduced warming would occur as flow passes through the reach due to higher flow volumes. These temperature changes would result in negligible effects on Chinook salmon and other fish downstream of Hells Canyon dam.</li> <li>• Dissolved oxygen concentrations would be slightly improved downstream of Hells Canyon dam in extremely low flow years.</li> <li>• Total dissolved gas exceedances and the likelihood</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative
<p>Effects of Environmental Measures</p>	<ul style="list-style-type: none"> <li>• Total dissolved gas levels downstream of Hells Canyon dam spillway would continue to exceed the 110-percent of saturation criterion during virtually all spill conditions increasing the likelihood of gas bubble trauma.</li> <li>• Project operation would continue to result in ammonia and trace metal concentration in the reservoirs and bioaccumulation in fish.</li> <li>• Dissolved oxygen supplementation could improve dissolved oxygen levels in the immediate vicinity of the proposed oxygen diffuser system in Brownlee reservoir.</li> <li>• Flow deflectors at Hells Canyon dam would reduce the frequency of total dissolved gas levels exceeding the 110 percent of saturation criterion.</li> </ul>	<p>of gas bubble trauma would increase slightly in early to mid-June in medium-high and extremely high flow years when spills result from maintaining higher pool levels prior to the summer flow augmentation release.</p> <ul style="list-style-type: none"> <li>• Ammonia and trace metals would be flushed from reservoirs more frequently, but bioaccumulation in fish would remain about the same.</li> <li>• Revision of the dissolved oxygen supplementation plan to address downstream effects should lead to improved dissolved oxygen levels downstream of Hells Canyon dam during the Chinook salmon spawning period.</li> <li>• Installation of spillway deflectors at Brownlee dam and total dissolved gas abatement monitoring program should lead to further reduction of total dissolved gas levels, less frequent exceedances of the 110-percent of saturation criterion, and reduced potential for gas bubble trauma compared to Idaho Power's Proposal.</li> <li>• Monitoring bioaccumulation could lead to better protection of bald eagles.</li> </ul>
<p><b>Aquatic Resources</b> Effects of Operations</p>	<ul style="list-style-type: none"> <li>• Daily flow fluctuations downstream of Hells Canyon dam would continue to reduce the abundance of aquatic invertebrates, the primary food base for fish, by about 10 percent.</li> <li>• The reduction in aquatic invertebrates would especially affect fall Chinook juveniles, which rear in shallow areas that are subject to frequent dewatering</li> <li>• Migration conditions for juvenile fall Chinook salmon would remain the same as years when flow augmentation water has not been provided from Brownlee reservoir, but would be less</li> </ul>	<ul style="list-style-type: none"> <li>• More restrictive ramping rates during rearing period could substantially reduce fall Chinook salmon mortalities due to stranding and entrapment and improve the food base during the fall Chinook salmon rearing season.</li> <li>• Most available information supports a conclusion that flow augmentation should enhance migration conditions for juvenile fall Chinook salmon, likely increasing adult returns.</li> <li>• A fall Chinook spawning flow management plan, flow augmentation evaluation report, and monitoring fall Chinook salmon entrapment and</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative
	<p>favorable than conditions in most of the past 14 years when flows were voluntarily augmented.</p>	<p>stranding should improve the flow management decision process and the overall survival of fall Chinook salmon in the Snake River downstream from Hells Canyon.</p>
Effects of Hatchery Measures	<ul style="list-style-type: none"> <li>• Improved hatchery facilities and a monitoring and evaluation program would maintain anadromous fish production at current levels.</li> </ul>	<ul style="list-style-type: none"> <li>• Same measures as Idaho Power's Proposal, plus preparation of a hatchery management plan for each hatchery, would maintain anadromous fish production, improve efficiency of operations, reduce adverse effects on federally listed species by minimizing interaction between wild and hatchery fish, and enhance the beneficial use of surplus hatchery fish for restoration and fisheries enhancement activities.</li> </ul>
Effects of Other Environmental Measures	<ul style="list-style-type: none"> <li>• Dissolved oxygen supplementation would improve fish habitat in the vicinity of the oxygen diffuser system in the upper end of Brownlee reservoir.</li> <li>• Reductions in total dissolved gas exceedances at low and moderate spill rates would benefit aquatic resources by reducing gas bubble trauma.</li> <li>• Improvement of Hells Canyon dam fish trap would reduce stress and injury to fish by allowing onsite sorting and allow fish tagging activities.</li> <li>• Implementation of upstream passage for native resident salmonids could improve gene flow to some populations, but downstream populations may be reduced due to upstream migration.</li> <li>• Construction of a monitoring weir on Pine Creek would allow further monitoring of bull trout migration and enable downstream transfer of outmigrants past Hells Canyon dam.</li> <li>• Pathogen risk assessment would help manage increased risk of pathogen transfer associated</li> </ul>	<ul style="list-style-type: none"> <li>• Increased dissolved oxygen downstream of Hells Canyon dam could improve spawning success of fall Chinook salmon.</li> <li>• Potentially greater total dissolved gas reductions would increase benefits to aquatic resources by further reducing the likelihood of gas bubble trauma.</li> <li>• Implementation of upstream and downstream passage for native resident salmonids would increase connectivity and gene flow among populations in Pine Creek, Indian Creek, and the Wildhorse River.</li> <li>• Construction of weir and trap fishways on Pine Creek, Indian Creek and the Wildhorse River would allow tracking of bull trout population trends and effectiveness monitoring of brook trout control and tributary enhancement efforts.</li> <li>• Benefits of Hells Canyon trap modifications, pathogen risk assessment, tributary enhancement efforts, and nutrient supplementation would be the same as Idaho Power's Proposal.</li> <li>• Brook trout suppression efforts, if successful, would</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative
<b>Terrestrial Resources</b>	<p>with the proposal.</p> <ul style="list-style-type: none"> <li>• Tributary enhancements and carcass outplants or other nutrient supplementation would benefit bull trout and redband trout within the Pine Creek, Indian Creek, and Wildhorse River basins and smaller tributaries to the project.</li> <li>• Brook trout suppression efforts could reduce competition and hybridization with bull trout in Indian Creek.</li> <li>• The proposed White Sturgeon Conservation Plan and related measures would help rebuild the white sturgeon population in the Swan Falls to Brownlee reach.</li> </ul>	<p>be expanded to include the Wildhorse River and Pine Creek using methods proven to be successful in Indian Creek.</p> <ul style="list-style-type: none"> <li>• Implementing a white sturgeon conservation hatchery program would be a more assured path to rebuilding and increasing the genetic diversity of white sturgeon populations in the Swan Falls to Brownlee reach, in project reservoirs, and in upstream river segments associated with other Idaho Power projects encompassed in Idaho Power's White Sturgeon Conservation Plan.</li> <li>• Gravel augmentation pilot program could lead to improvements in fall Chinook salmon spawning and rearing habitat.</li> </ul>
Effects of Operations	<ul style="list-style-type: none"> <li>• Slightly increased potential for negative effects on special status plants.</li> <li>• Slightly increased occurrence and expansion of puncture vine at Brownlee reservoir.</li> <li>• Daily flow fluctuations would reduce riparian habitat at Hells Canyon and Oxbow reservoirs by &lt;1 acre and by about 15 acres downstream of Hells Canyon dam.</li> <li>• Conditions would remain about the same for fish-eating wildlife such as river otters, black bears, and bald eagles.</li> <li>• Brownlee reservoir would continue to pose a small risk to mule deer trying to cross it.</li> <li>• Continued erosion would be likely to affect about 70 additional acres over the term of the license.</li> </ul>	<ul style="list-style-type: none"> <li>• Effects on special status plants essentially the same as Idaho Power's Proposal.</li> <li>• Effects on noxious weeds similar to Idaho Power's Proposal, but slightly more weed occurrence at Brownlee reservoir and slightly less occurrence downstream of Hells Canyon dam.</li> <li>• Daily flow fluctuations would reduce riparian habitat by &lt;1 acre at Hells Canyon reservoir, about 1.5 acres at Oxbow reservoir, and about 13 acres downstream of Hells Canyon dam.</li> <li>• More stable flows benefiting fish would improve conditions for fish-eating wildlife, such as river otters, black bears, and bald eagles.</li> <li>• Risks to mule deer crossing Brownlee reservoir would be the same as Idaho Power's Proposal.</li> <li>• Continued erosion would be similar to Idaho Power's Proposal.</li> </ul>
Effects of Environmental Measures	<ul style="list-style-type: none"> <li>• Coordination and planning would improve protection of rare plants and control of noxious</li> </ul>	<ul style="list-style-type: none"> <li>• Rare plant protection and noxious weed control would be essentially the same as Idaho Power's</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative
	<p>weeds.</p> <ul style="list-style-type: none"> <li>• Transmission line operation and maintenance plans for wildlife and botanical resources would reduce potential adverse operation and maintenance effects on terrestrial resources.</li> <li>• Management of 20,592 acquired acres and 2,990 Idaho Power acres for wildlife habitat would benefit terrestrial resources affected by operation of the project based on a 1:1 replacement ratio.</li> <li>• Habitat enhancement at four Snake River islands would improve habitat for waterfowl, nesting waterbirds, raptors, neotropical migrant songbirds, and aquatic furbearers.</li> <li>• Mountain quail enhancement program would improve habitat for mountain quail.</li> <li>• Implementation of the Integrated Wildlife Habitat Program and Wildlife Mitigation and Management Plan would improve coordination and management of wildlife habitat in Idaho Power's ownership.</li> <li>• Threatened, endangered, and sensitive species would continue to be managed on a case-by-case basis.</li> </ul>	<p>Proposal, with some additional measures to improve efficiency and coordination.</p> <ul style="list-style-type: none"> <li>• Transmission line operation and maintenance plan for terrestrial resources would be essentially the same as Idaho Power's Proposal, with some improved efficiency and coordination and increased raptor protection.</li> <li>• Acquisition and management of wildlife habitat would have essentially the same effects as Idaho Power's Proposal, but would also include measures to address erosion anticipated to occur during new license period, and to address loss of riparian habitat resulting from implementation of staff flow alternative.</li> <li>• Limitation of habitat enhancements to two Snake River islands within the project boundary would yield less habitat improvement than Idaho Power's Proposal.</li> <li>• Improvements to mountain quail habitat would be same as Idaho Power's Proposal.</li> <li>• Application of project-wide wildlife habitat planning would improve coordination of habitat management for lands within the project boundary compared to Idaho Power's Proposal.</li> <li>• Development of project-wide Threatened, Endangered, and Sensitive Species Management Plan would improve efficiency and coordination of protective measures for those species covered by the plan, compared to Idaho Power's Proposal.</li> </ul>
<b>Cultural Resources</b>	<ul style="list-style-type: none"> <li>• Beach and terrace erosion would continue to put some cultural sites at risk.</li> </ul>	<ul style="list-style-type: none"> <li>• More restrictive ramping rates during the spring would afford more cultural resource protection than Idaho Power's Proposal.</li> </ul>
Effects of Environmental	<ul style="list-style-type: none"> <li>• Site monitoring would improve protection of</li> </ul>	<ul style="list-style-type: none"> <li>• Development of site monitoring plan would</li> </ul>

<b>Resource</b>	<b>Idaho Power's Proposal</b>	<b>Staff Alternative</b>
Measures	<p>monitored sites.</p> <ul style="list-style-type: none"> <li>• Site stabilization would protect 7 sites on Brownlee reservoir and 20 sites downstream of Hells Canyon dam, and data recovery at 4 sites would prevent possible future damage.</li> <li>• Establishment of Native American, Euro-American, and Asian-American interpretive sites could contribute to resource protection through visitor education.</li> <li>• Support for local museums would enhance cultural resources protection and education in the local area.</li> <li>• Support for Native American programs would enhance the tribes' informed participation in the management and protection of project resources.</li> </ul>	<p>improve efficiency and consistency of monitoring efforts.</p> <ul style="list-style-type: none"> <li>• Site stabilization, data recovery, and establishment of interpretive sites would achieve the same benefits as Idaho Power's Proposal.</li> <li>• Support for local museums would not be provided.</li> <li>• Support for Native American programs would provide fewer benefits than Idaho Power's Proposal because scholarships would not be provided.</li> <li>• Renewed offer to prepare oral histories for Shoshone-Bannock and Shoshone-Paiute Tribes would potentially enhance cultural understanding.</li> <li>• Development of a plan to implement the deferred study of reservoir water level fluctuation effects on cultural resources would enhance understanding of those effects and form the basis for further protective measures, if needed.</li> </ul>
<b>Recreation</b>		
Effects of Operations	<ul style="list-style-type: none"> <li>• Brownlee reservoir level would continue to support flat-water boating and crappie fishing in the late summer and early fall.</li> <li>• Similar to current conditions, flows downstream of Hells Canyon dam would routinely fall below the Corps' recommended 8,500-cfs safe navigation flow.</li> <li>• Flow fluctuations downstream of Hells Canyon dam would continue to adversely affect boaters and campers.</li> </ul>	<ul style="list-style-type: none"> <li>• Flow augmentation would adversely affect flat-water boating opportunities and crappie fishing compared to current conditions and Idaho Power's Proposal.</li> <li>• Flow augmentation would improve early summer boating opportunities downstream of Hells Canyon dam.</li> <li>• More stabilized flows during the spring downstream of Hells Canyon dam would enhance the quality of the boating experience.</li> </ul>
Effects of Environmental Measures	<ul style="list-style-type: none"> <li>• Preparation and implementation of a recreation plan would benefit recreational visitors by providing improved management of recreational programs.</li> <li>• Numerous proposed improvements would benefit recreational visitors by improving boat</li> </ul>	<ul style="list-style-type: none"> <li>• Adding specificity to the implementation standards of the recreation plan would clarify plans and improve delivery of the intended benefits.</li> <li>• Expansion of recreation plan to include site improvements at Oasis, Steck recreation site, Farewell Bend State Park, Jennifer's Alluvial Fan,</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative
	<p>moorage, road maintenance, developed and dispersed recreation sites, and boat access in low water years, and would benefit cultural and natural resources by providing additional protection near recreation uses.</p> <ul style="list-style-type: none"> <li>• Proposed changes in the litter and sanitation management program would substantially improve upon existing conditions.</li> <li>• The I&amp;E Plan would promote protection and preservation of cultural, natural, and historic resources.</li> <li>• Funding O&amp;M at its recreation sites and those of BLM and the Forest Service that Idaho Power upgrades would benefit recreational visitors and resource protection by improving maintenance and management at most of the primary recreation sites in the project boundary.</li> <li>• Continuing to provide flow information for flows downstream of Hells Canyon dam would continue to benefit recreational visitors by providing timely information to be used in trip planning.</li> <li>• Continuance of the Memorandum of Understanding for staffing the Hells Canyon Visitor Center would continue to benefit visitors at the center.</li> <li>• Preparation of a Recreation Adaptive Management Plan would provide a framework for responding to changes in recreational needs.</li> </ul>	<p>Deep Creek, and the Hells Canyon launch would provide additional recreation benefits compared to Idaho Power's Proposal.</p> <ul style="list-style-type: none"> <li>• Expansion of the litter and sanitation management program to include a gray water and sanitary cleaning system at the Hells Canyon Creek put-in/take-out would improve the sanitation system and disposal of human waste for boaters.</li> <li>• Increasing the specificity of the I&amp;E Plan and including information on aquatic invasive species and anadromous fish would promote additional understanding of and protection for project resources.</li> <li>• Clarifying O&amp;M funding and responsibilities at Forest Service and BLM recreational sites at the project through consultation as part of the final recreation plan would improve delivery of the intended plan benefits.</li> <li>• Benefits of the flow information system and Hells Canyon Visitor Center staffing would be the same as under Idaho Power's Proposal.</li> <li>• Adding details to the Recreation Adaptive Management Plan concerning the minimum level of recreational use monitoring and consultation every 6 years related to Form 80 filing would improve the responsiveness of the Plan to changing recreational conditions.</li> </ul>
<b>Land Management and Aesthetics</b>		
Effects of Operations	<ul style="list-style-type: none"> <li>• The adverse visual effects of Brownlee reservoir drawdown would continue to occur from about July through October.</li> </ul>	<ul style="list-style-type: none"> <li>• Flow augmentation would lead to earlier and more rapid drafting of Brownlee reservoir starting in late June, exacerbating the negative visual effect of</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative
Effects of Environmental Measures	<ul style="list-style-type: none"> <li>• Visual effects on the shoreline downstream of Hells Canyon dam would continue due to periodic dewatering of the shoreline, beach and terrace erosion, and loss of riparian habitat.</li> <li>• Implementation of the Hells Canyon Resource Management Plan on project lands would enhance the management, conservation, and protection of natural and cultural resources.</li> <li>• Continuation of the project's law enforcement and fire protection programs and sponsorship of biannual law enforcement coordination meetings would help maintain and improve public safety and resource protection at the project.</li> <li>• Proposed boundary modifications to exclude 3,800 acres of federal lands from the project boundary would exclude some lands used for project-related purposes.</li> <li>• Development of a road management plan, application of the Common Policies of the Hells Canyon Resource Management Plan, and continued maintenance of 40 miles of road would lead to improved access, public safety, and resource protection related to those roads</li> <li>• Application of the aesthetic resource elements of the Hells Canyon Resource Management Plan would improve the aesthetic appearance of the project.</li> <li>• Reducing the visual contrast of transmission line 945 would enhance the visual experience of visitors.</li> </ul>	<p>Brownlee reservoir drawdowns.</p> <ul style="list-style-type: none"> <li>• Negative visual effects downstream of Hells Canyon dam would be reduced somewhat compared to Idaho Power's Proposal due to more stable water levels during the spring.</li> <li>• Adding specific details to the Hells Canyon Resource Management Plan to identify which policies need specific management plans and implementation programs would improve delivery of the intended benefits of the plan.</li> <li>• Adding specific agency coordination measures to the Hells Canyon Resource Management Plan would improve protection of resources on BLM and Forest Service lands in the project boundary.</li> <li>• Adding specific components of the law enforcement and fire protection programs to the Hells Canyon Resource Management Plan would improve delivery of the intended benefits of those programs.</li> <li>• Amending the project boundary to include lands acquired for wildlife mitigation, dispersed recreation areas within 200 yards of the shoreline, and the Airstrip, Steck Park, Swedes Landing, and Westfall recreation sites would improve resource protection at those sites; other federally managed lands could be removed from the boundary without adversely affecting resources on those lands. Providing the Forest Service with appropriately marked aerial photographs would enhance coordination of resource protection on Forest Service lands.</li> <li>• Including additional consultation in the road management planning process and integrating that process with the Hells Canyon Resource Management Plan would help ensure that all project-related roads are appropriately maintained.</li> <li>• Adding specificity to the aesthetic resources portion</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative
<b>Socioeconomics</b>		<p>of the Hells Canyon Resource Management Plan, based on previously developed, project-wide standards and guidelines, and formalizing it into an aesthetic improvement management plan would improve delivery of the intended benefits.</p> <ul style="list-style-type: none"> <li>• Adding aesthetic improvements to Hells Canyon dam would enhance the visual experience for visitors.</li> <li>• Including transmission line aesthetic improvements in the aesthetic elements of the Hells Canyon Resource Management Plan would help ensure consistency in the approach to visual resource management.</li> </ul>
Effects of Operations	<ul style="list-style-type: none"> <li>• Potential increase in electricity rates to pay increased cost of producing project power.</li> </ul>	<ul style="list-style-type: none"> <li>• Potentially greater increase in electricity rates to pay increased cost of producing project power.</li> <li>• Flow augmentation could lead to a shift in recreational spending away from warmwater fishing at Brownlee reservoir, affecting related businesses accordingly.</li> </ul>
Effects of Environmental Measures	<ul style="list-style-type: none"> <li>• Spending on environmental measures and increased visitor use could increase local business income, but also increase cost to counties to provide services in the project area.</li> <li>• Wildlife habitat restoration and improved conditions for some aquatic resources would benefit tribal cultures compared to current conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Greater spending on environmental measures could lead to greater increase in local business income.</li> <li>• Additional measures to benefit downstream anadromous fish populations and resident fish populations upstream of the project could lead to greater benefits to tribal cultures compared to Idaho Power's Proposal.</li> </ul>

Notes: BLM – U.S. Bureau of Land Management  
 Forest Service – U.S. Forest Service  
 I&E – information and education  
 MWh – megawatt hour  
 O&M – operation and maintenance  
 TMDL – total maximum daily load  
 WMMP – Wildlife Mitigation and Management Plan

The Forest Service (FS-31) also recommends that Idaho Power prepare a gravel monitoring plan. The plan would include: (1) weekly aerial redd surveys; (2) mapping of reach-scale spawning substrate; (3) identification of representative reaches for intensive annual substrate monitoring (riverbed elevations, bed scour and deposition, and bedload sampling); and (4) a requirement for Idaho Power to provide an annual report of results to the Forest Service.

Under Interior-68 and Interior-69, Interior recommends that Idaho Power monitor selected beaches and gravel bars to determine rates of sediment depletion on exposed and submerged sediment deposits and the quantity and quality of gravel material used by aquatic species in the Snake River downstream of Hells Canyon dam.

NMFS-6 recommends that Idaho Power, in cooperation with various resource agencies, design and carry out monitoring of fall Chinook salmon spawning gravel between Hells Canyon dam and its confluence with the Salmon River. The recommendation calls for the study to be repeated every 5 years and to employ high-resolution, multi-beam bathymetry, reach-scale substrate mapping using Idaho Power's GIS database, and substrate monitoring using scour chains or sliding bead monitors.

The Nez Perce Tribe (NPT-20) recommends that Idaho Power be required to monitor the movement of sand, silt, and gravel to accurately quantify the composition and rate of movement of sediment. The tribe (NPT-21) also recommends that Idaho Power be required to restore sandbars to their pre-project number and size, through the use of sand augmentation practices developed in consultation with resource agencies, to protect tribal cultural sites at risk of degradation from the erosion of sand bars and terraces.

ODFW-53 recommends that Idaho Power implement a gravel monitoring program to assess spawning gravel for fall Chinook salmon downstream of Hells Canyon dam. ODFW also recommends that Idaho Power develop a bedload augmentation program if monitoring indicates project operations are adversely affecting the quantity and quality of spawning gravel.

Finally, AR/IRU-21 recommends that Idaho Power develop a plan to replenish an appropriate portion of sand and gravel to the Snake River downstream of Hells Canyon dam that have been diminished due to project operations and base the quantity and composition of the sediment on specific habitat needs of anadromous and resident fish species and benthic organisms. Additionally, AR/IRU-21 would require Idaho Power to estimate sediment volumes and water energy available for sediment transport, address monitoring and reporting, and develop an adaptive management protocol for sediment augmentation.

In the case of gravel augmentation, our analysis in section 3.6.2.14 indicates that ongoing project-related effects on sediment transport may affect fall Chinook salmon habitat by reducing the availability of suitable gravel for spawning. The number of fall Chinook salmon spawning in the Hells Canyon reach has increased four- to five-fold since 1999, and the population may be approaching the capacity of available spawning and rearing habitat. Because the habitat appears to be nearing its capacity, conducting a detailed survey of the quantity of spawning habitat that is available, in conjunction with continued redd surveys, would establish the need for and potential benefits of measures to increase the availability of spawning gravels through gravel augmentation.

One method for assessing the potential benefits of gravel augmentation would be to conduct a pilot gravel augmentation program, similar in concept to the recommendations included in NMFS-6, Interior-68, FS-4, ODFW-53, and AR/IRU-21. The program would include a detailed baseline survey of the abundance and distribution of potential spawning gravel in the upper Hells Canyon reach under any altered project operational scenario required by a new license, followed by limited gravel augmentation and follow-up monitoring of effects on the amount of available spawning substrate and the spawning usage of new gravel deposits by spawning fall Chinook salmon. The results of the pilot program would be used to evaluate the costs and benefits of continued gravel augmentation efforts. The scale and

duration of a gravel augmentation pilot program could be determined in consultation with state and federal resource agencies and tribes.

Given that the operation of Brownlee reservoir for flood control reduces the incidence and magnitude of peak flood events, it is possible that the addition of as little as 10 percent of the amount of gravel trapped in the project reservoirs each year could provide a substantial increase in the amount of spawning gravel available to spawning fall Chinook salmon in the upper Hells Canyon reach. Using the lower end of our estimate of gravel trapped in the project reservoirs, this would amount to 140, 16-ton truck-loads of gravel, or 10 truckloads a day over a 14-day period. We estimate the annualized cost of using unwashed gravel in a pilot program to be \$49,000.

A pilot gravel augmentation program would also provide an opportunity to evaluate the effects of turbidity on predation losses of outmigrating juvenile fall Chinook salmon. In low flow years, substantial mortality of fall Chinook smolts may occur during passage through the Hells Canyon reach, especially late in the season when flows and turbidity are reduced and water temperatures rise. Scheduling the placement of gravel to occur during the outmigration season could provide an opportunity to evaluate the effects of turbidity caused by gravel addition on migration survival rates. The use of unwashed gravel would reduce the cost of the program and increase the level of turbidity that could be achieved, which would enhance juvenile fall Chinook salmon survival rates by reducing losses to predators.

A pilot program conducted over a period of about 10 years with reasonable hydrologic variability would likely provide sufficient information to determine the need for and appropriate scale of any ongoing gravel augmentation program. For that reason, we include a pilot gravel augmentation program in the Staff Alternative.

## **5.2.2 Water Supply—Operational Measures**

### **5.2.2.1 Flood Storage**

Starting in January and continuing through the spring, the Corps directs operation of Brownlee reservoir to provide storage space for springtime flood waters. Under the current license, Brownlee reservoir is drawn down to elevation 2,034 feet msl or below to provide 500,000 acre-feet of storage space for flood control. By March 31, up to an additional 500,000 acre-feet may be required by the Corps, if necessary. Following a period of analysis and revision to flood control rule curves in the 1980s, the Corps implemented a modified rule curve procedure in 1998. Flood storage requirements for Brownlee reservoir can extend through June, and Idaho Power may have to spill at any or all three project developments to achieve flood control storage objectives.

The Corps recommends that Brownlee reservoir continue to be operated in accordance with the Corps' November 1998 Procedure for Determining Flood Control Draft at Brownlee reservoir, which requires a drawdown sufficient to provide up to 1 million acre-feet of flood storage. Because this recommendation is the same as current operation, there is no incremental cost associated with it. In addition, the Corps recommends handling winter flood control operations on a case-by-case basis, subject to certain specified maximum draft rates. As we point out in section 3.3.2.3, *Flood Storage*, the Corps' recommendation specifies that the request for winter flood storage would occur only during the months of December and January, and that Idaho Power would not be required to spill to meet the Corps request. Because of these limitations, and because any such request would occur only occasionally, the potential impact on power benefits would be inconsequential. Idaho Power's proposed operations incorporate these two recommendations from the Corps, and we have also included them in the Staff Alternative.

NMFS recommends that Idaho Power control the level of Brownlee reservoir so as to be within 1 foot of the Corps' April 15 and April 30 target flood control elevations and then, after April 30, coordinate the refill of Brownlee reservoir with NMFS to ensure that the refill does not result in any drastic reductions of spring flows as measured at Lower Granite dam. Similarly, the Umatilla Tribes and

the Nez Perce Tribe recommend that Idaho Power maintain Brownlee reservoir at its upper flood control rule curve elevation from February 28 through April 15 each year so as to accrue additional storage to assist in meeting spring target flows for anadromous fish.

Recommendations pertaining to closely tracking the Corps flood control elevation targets and refilling Brownlee reservoir as early as possible are directed toward avoiding excessive reductions in outflows from the project during the spring migration season for yearling steelhead and Chinook salmon smolts. Preventing such flow reductions would help to maintain suitable migration flows for spring-migrating yearling Chinook salmon and steelhead produced in the Salmon River, other Snake River tributaries, and to a lesser extent, spring migrants passing through the lower Columbia River. These flows would also benefit yearling fall Chinook salmon that are produced in the Clearwater River and the portion of the fall Chinook migrants that overwinter in the Snake River before migrating as yearlings. While closely tracking, and not exceeding, the Corps' Brownlee reservoir drawdown requirement would be beneficial in support of outmigration, Idaho Power operators require a certain degree of operational flexibility to ensure that the Corps' target flood control elevations are met. Further, during medium to high flow years, Brownlee reservoir is typically filling after April 30, capturing inflows as part of the springtime flood control operation. Under these circumstances, the Corps directs the rate of Brownlee reservoir's refill. In the Staff Alternative, we include an operational scenario consistent with the NMFS and tribal recommendations but indicate that the Brownlee reservoir refill during the flood storage season would continue to be accomplished under the direction of the Corps to ensure that the flood control purpose is not compromised. We do not have an estimate of the cost of this measure but conclude that it is likely to be inconsequential.

The Umatilla Tribes and the Nez Perce Tribe also recommend that Idaho Power, in consultation with the Corps, affected tribes, and other appropriate agencies, revise flood control operations to shift a minimum of 110,000 acre-feet of flood storage space from Brownlee reservoir to Lake Roosevelt reservoir on the Columbia River in the March-through-May period during low to average flow. NMFS makes a similar recommendation but specifies that the Corps determine the timing and amount of the flood storage shift.

Any long-term modification of the project's flood control operation involving transfer of storage capacity from Brownlee reservoir to other storage reservoirs in the Columbia River Basin would be under the purview of the Corps. The Corps has neither recommended any changes to flood control at the project nor undertaken any basin-wide review of its flood control rule curves. Such an effort would require a separate environmental evaluation conducted by the Corps. Accordingly, we do not include this measure in the Staff Alternative. However, the Corps regularly evaluates short-term opportunities to shift flood control from Brownlee reservoir, and nothing in the Staff Alternative would affect that activity.

### **5.2.2.2 Navigation Target Flow Levels**

Safe navigation of the Snake River downstream of Hells Canyon dam requires minimum flows sufficient to effectively cover rocks and create navigable channels through important rapids. Of particular importance for navigation are flows measured at the Hells Canyon dam gage (0.6 mile downstream of the dam at RM 247) and China Gardens Rapids gage (also known as the Snake River below McDuff Rapids gage) at RM 175.5. The latter gage is downstream of the confluence of the Snake and Salmon rivers.

Under Proposed Operations, Idaho Power would continue to operate the project for navigation purposes by maintaining 13,000 cfs in the Snake River at Lime Point (RM 172, 2.5 miles downstream of the China Gardens Rapids gage) at least 95 percent of the time. Flows of less than 13,000 cfs would be permitted during July, August, and September, and Idaho Power would not be required to use reservoir storage to meet the 13,000-cfs requirement.

To meet safe navigational flow targets during the new license term, the Corps recommends that Idaho Power operate the project to maintain a year-round instantaneous minimum flow of 8,500 cfs as

measured at the Hells Canyon dam gage and 11,500 cfs as measured at the Snake River below McDuff Rapids (China Gardens Rapids) gage. If daily inflows to Brownlee reservoir fell below 8,500 cfs; however, Idaho Power would not have to meet these minimum flows. Instead, Idaho Power would be required to release from Hells Canyon dam a flow equal to the previous 3-day moving average Brownlee reservoir inflow. NPPVA, representing power vessel owners that provide recreational trips on the river, concurs with the Corps' recommendation. The Forest Service (FS-29) provides a similar recommendation for a year-round minimum flow downstream of Hells Canyon dam of 8,500 cfs or project inflow (whichever is less).

The Umatilla and Nez Perce Tribes recommend that Idaho Power maintain a minimum flow of 6,500 cfs immediately downstream of Hells Canyon dam and 13,000 cfs at Lime Point. These tribes state that higher minimum flows would use limited water resources and jeopardize fish flows during low water years. The tribes' recommended flow levels are consistent with the current, and Idaho Power's proposed, Hells Canyon dam release regime.

In section 3.10.1.6, *Boating Use Downstream of the Project*, we point out that minimum safe boating flows vary by type of boat. For float boaters, the key rapids (Granite Creek and Wild Sheep rapids) are navigable at 5,000 cfs. Experienced operators can take 24-foot power boats through these rapids at flows as low as 5,500 cfs. It is the larger (40-foot) power boats, in a fully loaded condition, that require flows in the 8,500-cfs range.

Flows under Idaho Power's proposed operations would routinely fall below the Corps' 8,500-cfs navigation target downstream of Hells Canyon dam in extremely low and medium-low water years. Compared to Idaho Power's proposed operations, including the Corps' target flow recommendation as an operational requirement would improve navigability by reducing the number of days when flows would fall below target levels, as measured at the Hells Canyon dam gage. In our analysis in section 3.3.2.7, *Downstream Flows Important to Navigation*, we find that implementing the Corps' target flow recommendation would reduce the number of days with simulated flows below target levels for the larger commercial power boats (from June 1 through September 30) by approximately 18 days under extremely low water conditions, 75 days under medium-low conditions, and 45 days under medium water conditions. These improved boating conditions, however, would come with substantial costs. We estimate the cost of this operational requirement, in terms of foregone power benefits, at \$12.5 million annually.<sup>76</sup>

We conclude that the potential improvement to boating conditions would be limited to larger commercial power boats and that improving conditions for this single category of boats is not worth the substantial reduction in power benefits associated with this operational measure. Therefore, we do not include this navigation flow recommendation in the Staff Alternative.

### **5.2.2.3 Flow Augmentation for Anadromous Fish Juvenile Migration**

Juvenile fall Chinook salmon historically migrated from the Snake River in May and June, but impoundment of the river and blocked access to historical habitats has led to delayed migration in late June, July, and early August. Current spawning locations are generally cooler compared to the historical production area, because they are farther removed from the Thousand Springs reach near Upper Salmon

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<sup>76</sup> In section 4.2.1, table 93, we point out that the incremental cost of this measure would be negligible when the measure is incorporated into an operational scenario that includes flow augmentation. As discussed in the following section, we include flow augmentation in the Staff Alternative but call for reconfirmation of the flow augmentation measure in 2009. In the absence of assurance that flow augmentation would continue beyond 2009, we evaluate the navigation flow target on a stand-alone basis.

Falls, where spring-inflows provided a warmer incubation and early rearing environment. Loss of access to these spring-influenced production areas resulted in reduced growth potential and delayed emigration of juvenile fall Chinook salmon; this is associated with reduced survival. These adverse effects have been compounded by the construction of additional dams on the lower Snake and Columbia rivers through increased water temperatures, increased predation, and slower migration.

From 1989 to 2000, as part of a comprehensive Snake River flow augmentation effort, Idaho Power released an average of 224 kaf from Brownlee reservoir to enhance migration of juvenile fall Chinook salmon. These augmentation flows were terminated, however, from 2001 through 2004 but were resumed in 2005 as part of an interim agreement to protect federally listed fall Chinook salmon (see figure 51).

In its license application, however, Idaho Power does not propose any measures to enhance migration conditions for juvenile fall Chinook salmon, but several resource agencies, tribes, and other interested parties recommend flow augmentation, or flow shaping, as a method to enhance migration by increasing flow through the lower Snake and Columbia River projects (NMFS-8, 9, and 18; CTUIR-6, 7, 8, and 9; NPT-2, 5, 6, and 7; AR/IRU-22; ODFW-32; and Interior-22). Most notably, NMFS recommended release of 237 kaf of flow augmentation water from Brownlee reservoir during the summer subyearling fall Chinook outmigration season.

Increasing flows during the fall Chinook subyearling smolt outmigration may increase migration speed and improve survival (refer to our analysis in section 3.6.2.1, *Effects of Project Operations on Aquatic Resources*). In section 3.6.2.1, we identified no fewer than four studies indicating that summer flow augmentation downstream of the project would benefit outmigrating fall Chinook salmon by increasing flow volume and reducing travel time. Further, a review of trends in adult fall Chinook returns indicates that there is a generally positive relationship between flow and survival for outmigrating fall Chinook salmon. Our analysis in section 3.6.2.1 indicates that there has been a substantial increase in adult fall Chinook returns past Lower Granite dam that tracks closely with both the total flow augmentation provided from the Snake River Basin and the volume of flow augmentation provided from Brownlee reservoir during the year of outmigration (see figure 57).

In its April 11, 2006, reply comments on recommended terms and conditions, Idaho Power cites recent testimony from NMFS and other scientists indicating that there is considerable disagreement on the benefits of flow augmentation for Snake River fall Chinook salmon. Part of this uncertainty relates to a recent analysis of the scales taken from adult fall Chinook in 2004, which indicates that a small proportion of the fall Chinook juveniles that overwinter in the river/reservoir environment before completing their migration may contribute more than half of the adult returns. The effects of summer flow augmentation on this portion of the population are poorly understood, because these yearling fish typically migrate before flow augmentation water is released from Brownlee reservoir.

In 2003, the Independent Scientific Advisory Board (ISAB) completed a review of flow augmentation at the request of the Northwest Power Planning Council. ISAB (2003) concluded “*that there is a range of flow over which survival of PIT-tagged smolts increase with increasing flow and a range of higher flows in which fish survival appears to be independent of incremental changes in flow.*” ISAB further concluded that several parameters that may affect survival are correlated with flow, and that deliberately designed experiments may be needed to determine the effects of these variables. Variables identified by the ISAB include water temperature, water clarity, fluctuations in dam discharges, gas supersaturation, the timing of entry to the estuary and the ocean, and ocean conditions.

Based on the available information in the record, we conclude that continuation of the Snake River flow augmentation from Brownlee reservoir would continue to enhance migration of juvenile fall Chinook. We acknowledge, however, that there remains much to learn about the effects of flow augmentation of juvenile fall Chinook migration and that there are other factors that contribute to the observed increase in adult returns, including increased supplementation with hatchery fish, favorable

flows provided by Idaho Power during the fall Chinook spawning and incubation season, and favorable ocean conditions. The discontinuation of flow augmentation from Brownlee reservoir from 2001 through 2004 provides an opportunity to assess the effects of flow augmentation on adult fall Chinook returns. Fish that emigrated during the 2001 to 2004 period would return predominantly as 4-year old fish between 2005 and 2008. Review of adult return trends during this time period should improve our understanding of the effects of providing flow augmentation water from Brownlee reservoir.

We conclude that the benefits of releasing water from Brownlee reservoir as part of the summer flow augmentation program should be re-evaluated in 2009, after data from adult returns through 2008 are available. Therefore, we include in the Staff Alternative a measure whereby Idaho Power would prepare a report that evaluates the relationship between the returns of adult fall Chinook past Lower Granite dam and flow augmentation water provided from Brownlee reservoir since it was initiated in 1989. The report would also: (1) consider and evaluate the effects of flow augmentation water contributed from the Snake River Basin upstream from Brownlee dam and from Dworshak reservoir; and (2) include any recommendations, for Commission approval, for continuing flow augmentation releases. In the interim, we conclude that Idaho Power should continue to release 237 kaf from Brownlee reservoir as it has done voluntarily in 2005 and 2006. Continuation of this release would be consistent with the average volume that has been released from Brownlee reservoir between 1989 and 2000, during which time the number of adult fall Chinook returning past lower Granite dam substantially improved. We conclude that continuation of the 237 kaf flow augmentation release is warranted to avoid adverse effects on this federally listed ESU. It also would provide additional information on the effects of flow augmentation should additional information on this relationship be required after 2009.

We estimate the annualized cost of the continued release of 237 kaf of flow augmentation water from Brownlee reservoir, in terms of foregone power benefits, would be about \$6.6 million, and the annualized cost of preparing the 2009 flow augmentation evaluation report to be \$2,700. We consider these to be incremental costs, not part of the economic baseline, because Idaho Power was reimbursed by BPA for its participation in the program from 1995 through 2001, and its participation in 2005 and 2006 was voluntary. In addition to the developmental cost, flow augmentation would result in an earlier and more rapid drafting of Brownlee reservoir than under Idaho Power's proposed operation. In the medium water year, for example, the 2,050-foot-msl reservoir elevation (27 feet below full pool) would be reached by the end of July under flow augmentation, in contrast to reaching the same point in mid-October under Proposed Operations (section 3.3.2.4, *Brownlee Reservoir Levels*). This earlier drawdown would adversely affect the aesthetic appearance of Brownlee reservoir during peak-use summer months (section 3.11.2.1, *Effects of Project Operations on Aesthetic Resources*) and adversely affect flat-water boating, reservoir access, and crappie fishing opportunities (section 3.10.2.1, *Effects of Project Operations on Recreation Resources*). Despite the cost and these anticipated adverse effects, we include flow augmentation as an operational provision of the Staff Alternative. We do so because flow augmentation is an inextricable part, along with spawning/incubation flow management and supplementation, of an overall management program that has recently shown a substantial increase in adult returns of fall Chinook salmon, a federally listed threatened species (ESU).

Interior-26 recommends that Idaho Power maximize use of the recreation access by holding Brownlee reservoir at or near full elevation through June 20. Interior also recommends that the flow augmentation draft from Brownlee stop during the Fourth of July holiday or begin after the holiday. Similarly, the Forest Service (FS-19) recommends that Idaho Power manage reservoir levels to minimize impacts on recreation during the summer. The Staff Alternative flow augmentation measure accommodates both Interior recommendations. With regard to the Forest Service, we conclude that establishing Brownlee summer reservoir levels on the basis of recreation potential alone would conflict with aquatic resource protection measures that we have included in the Staff Alternative. Therefore, we do not include the Forest Service's recommendation. However, the Staff Alternative includes many new

recreational enhancements that would expand the number of public access sites, improve the condition of existing recreational sites, and provide additional boat launch opportunities when the reservoir is low.

Finally, as part of our analysis, we also assessed the effects of a 350 kaf flow augmentation release from Brownlee reservoir. This scenario is roughly equivalent to recommendations AR/IRU-22 and ODFW-32, which would require 100 kaf of flow shaping<sup>77</sup> in addition to 237 kaf of flow augmentation water to be released from Brownlee reservoir.

Modeling conducted by Idaho Power shows that 350 kaf of storage from Brownlee reservoir during the summer would increase water temperatures directly downstream of Hells Canyon dam, especially in low water years. While this effect would likely be balanced by reduced warming as the larger flow volume moved downstream through the reach between Hells Canyon dam and lower Granite reservoir, and could be compensated for by the release of cool water from Dworshak dam, we did not include that level of flow augmentation in the Staff Alternative based on the relatively high cost of the 350-kaf release (\$9.7 million) versus the cost of the 237-kcfs release (\$6.6 million).

#### **5.2.2.4 Water Rights**

Lower Valley Electric recommends that Idaho Power compensate the state of Wyoming and the Wyoming public in the upper Snake River watershed in Wyoming, as represented by Lower Valley Electric, for the use of Wyoming's unused allocation under the Snake River Compact. However, the Wyoming State Engineer's Office is responsible for administering water resources in the state of Wyoming and would normally be the party expected to deal with water right issues between Wyoming and neighboring states. This agency has not made any comments on water rights in this proceeding. We note that there is extensive water storage and diversion between the Wyoming state line and the Hells Canyon Project. The Snake River Basin is substantially allocated; therefore, it seems unlikely that surplus water would be available as far downstream as the Hells Canyon Project. In any event, this issue is outside the scope of the Commission's jurisdiction, and the relicensing, and we do not address it further.

### **5.2.3 Water Quality**

#### **5.2.3.1 Dissolved Oxygen Supplementation**

Currently, low dissolved oxygen levels regularly occur in the transition zone and much of the lacustrine zone of Brownlee reservoir during late spring and summer, and downstream of Hells Canyon dam in spring through fall. These dissolved oxygen conditions are primarily a result of the high nutrient (phosphorus) loads to the project and the reduction in assimilative capacity caused by converting the riverine system into a reservoir system.

Low dissolved oxygen levels greatly reduce habitat suitability for both cold and warmwater species in the project reservoirs during the summer months, and dissolved oxygen levels in the first 6 to 7 river miles downstream of Hells Canyon dam are below optimal during the first month of the fall Chinook spawning season. Increasing dissolved oxygen levels in project reservoirs and downstream of Hells Canyon dam could greatly increase the usable fish habitat in the project reservoirs, reduce the incidence of fish kills, and improve conditions for fall Chinook spawning downstream of Hells Canyon dam.

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<sup>77</sup> Flow shaping involves the pre-release of BOR augmentation water that cannot be delivered to Brownlee reservoir and then refilling Brownlee Reservoir with an equivalent amount of BOR water when that water reaches Brownlee reservoir.

To improve dissolved oxygen conditions within the Hells Canyon Project, Idaho Power proposed to supplement dissolved oxygen in Brownlee reservoir at a rate consistent with the draft TMDL (average annualized rate of 1,450 tons of oxygen per year). Idaho Power subsequently revised this proposed supplementation rate consistent with the final TMDL (1,125 tons oxygen per year). In its license application, Idaho Power also proposed to install and operate turbine-venting systems in Brownlee powerhouse units 1 through 4 and to investigate, and install and operate if practical, a turbine-venting system in Brownlee powerhouse unit 5 to enhance oxygen concentrations in the waters downstream of Hells Canyon dam. In its February 2005 response to AIR WQ-1, Idaho Power withdrew its proposals to vent the Brownlee turbines.

Several recommendations were made to address increasing dissolved oxygen levels in the Snake River downstream of Hells Canyon dam and in the project area. Interior-61 recommends that Idaho Power install and operate a turbine-venting system on Brownlee units 1 through 4, and potentially on Brownlee unit 5 and the units at Hells Canyon dam. NMFS-12 recommends that Idaho Power, in cooperation with NMFS, IDEQ, ODEQ, and other interested agencies and tribes, evaluate and design the most effective means (blowers, aerating runners, or other technologies) of increasing late summer and fall dissolved oxygen levels in outflows of the Hells Canyon Project developments with the goal of increasing dissolved oxygen levels downstream of Hells Canyon dam to exceed 6 mg/L (an increase of roughly 2 mg/L over typical conditions at present) to the extent that current technologies allow. The Umatilla Tribes (CTUIR-21) and Nez Perce Tribe (NPT-16) recommend that Idaho Power construct structures on Hells Canyon dam to add dissolved oxygen to the Snake River downstream of the project, and include provisions for Idaho Power to further consult with the agencies if the modifications do not result in dissolved oxygen levels that satisfy the water quality standards. In addition, NPT-16 includes injecting oxygen in Brownlee reservoir to meet the 6.5-mg/L dissolved oxygen criterion, as designated by the load allocation in the Snake River-Hells Canyon TMDL (IDEQ and ODEQ, 2004). AR/IRU-17 recommends an adaptive management approach using real-time monitoring results to trigger aeration/oxygenation of reservoir outflows. They recommend that these efforts start at the Brownlee development, with sequential evaluation at the other two dams, and that there be oversight by a Technical Advisory Committee.

ODFW-55 recommends that Idaho Power consult with ODEQ to develop and implement a plan, approved by ODEQ in a WQC, to ensure that the project does not contribute to violation of Oregon's dissolved oxygen standard within or downstream of the project. This plan would include appropriate implementation measures, a timeframe, and an effectiveness monitoring plan. In addition, ODFW-58 recommends that Idaho Power consult with ODEQ and ODFW to develop appropriate water quality monitoring, including dissolved oxygen, and that the monitoring measures be approved by ODEQ in a WQC. Interior also recommends that Idaho Power be required to meet water quality standards in Oxbow and Hells Canyon reservoirs (Interior-42) and that they monitor water quality twice per month at six locations downstream of Hells Canyon dam (Interior-67). NMFS-14 recommends that Idaho Power fund and maintain six permanent water quality monitoring stations at locations in the mainstem Snake River between Bliss dam and just downstream of Hells Canyon dam to document trends in water quality and collect additional water quality samples twice each month to assess progress in reducing nutrient and fine sediment loads in the Snake River. Interior-66 and the Forest Service (FS-30) also recommend that Idaho Power conduct a multi-phase study that would evaluate the effects of dissolved oxygen augmentation and flow fluctuations on aquatic species downstream of Hells Canyon dam.

AR/IRU-16 recommends that the Commission require Idaho Power to locate, fund, construct, and oversee operations of projects to reduce nutrient and suspended particle delivery from on-land sources to the Snake River and its tributaries above and within the project. These entities state that the purpose of this program would be to address unmitigated project effects on dissolved oxygen, as well as improve tributary habitats and upstream mainstem habitat sufficiently to support white sturgeon and fall Chinook salmon under a future reintroduction program. They recommend that this program be implemented in lieu of Idaho Power's dissolved oxygen supplementation proposal for Brownlee reservoir.

Idaho Power's latest proposal to provide Brownlee reservoir supplementation at an average annualized rate of 1,125 tons oxygen per year would be consistent with the allocation in the final TMDL. Idaho Power's conceptual design of the reservoir aeration system includes an on-shore oxygen supply facility, supply piping from the facility to the reservoir, and two porous hose line diffusers. The oxygen supply facility would include a storage tank for liquid oxygen, vaporizers, a pressure-regulating assembly, control valves, distribution piping, and truck access. We estimate the annualized cost of this measure would be \$447,800. Constructing the proposed reservoir aeration system would require clearing and grading the upland site for the oxygen supply facility, trenching for the supply lines, placing anchors for the diffuser system, and assembling the diffuser system at a site along the reservoir. However, while simulations of dissolved oxygen concentrations (refer to section 3.5.2.2, *Dissolved Oxygen Supplementation*) indicate that reservoir aeration at 1,125 tons of oxygen per year would increase dissolved oxygen near the diffusers, they also show that it would have little effect down-reservoir and negligible effects farther downstream.

At the time that Idaho Power filed its license application, there was little evidence concerning the extent to which the project contributes to the low dissolved oxygen concentrations downstream of Hells Canyon dam, other than the reduction in assimilative capacity caused by the project reservoirs. Nonetheless, Idaho Power proposed to install and operate turbine venting systems in Brownlee units 1 through 4 and to evaluate the feasibility of implementing turbine-venting technology at Brownlee unit 5, which we estimate would have an annualized cost of \$17,000. Idaho Power subsequently withdrew this proposal. Recently, Idaho Power estimated that the project's contribution to downstream depressed dissolved oxygen levels is 125 tons of oxygen per year, and, in section 401 consultations, Idaho Power has indicated an intent to use a forced-air system at the Hells Canyon powerhouse to inject 125 tons of oxygen annually to offset the project's contribution to low dissolved oxygen downstream of Hells Canyon dam. We estimate the annualized cost of this measure would be \$171,900.

Given the continued uncertainty surrounding the cost effectiveness of both reservoir dissolved oxygen supplementation and turbine venting or forced-air injection, which we describe in more detail in section 3.5.2.2, *Dissolved Oxygen Supplementation*, we have not included immediate implementation of either measure in the Staff Alternative. Instead, in keeping with the recommendations of ODFW-55, NMFS-12, the Umatilla Tribes (CTUIR-21), the Nez Perce Tribe (NPT-16), and AR/IRU-17, we include a measure whereby Idaho Power would develop and implement a dissolved oxygen supplementation plan that provides greater certainty than the various studies we summarized in section 3.5.2.2. The existing study results provide a basis for Idaho Power to develop a plan, in consultation with IDEQ, ODEQ, tribes, and federal and state agencies responsible for managing fish and wildlife, that would both refine the proposed reservoir dissolved oxygen supplementation measure and evaluate the need for additional aeration measures. The plan would help confirm whether reservoir supplementation is cost effective, and be used as a tool to evaluate whether alternative measures, such as reducing nutrient and organic matter loadings from tributaries and/or injecting oxygen into forebay waters, would provide a greater overall benefit.

During development of the plan, Idaho Power would consult with IDEQ and ODEQ on the estimate of project effects beyond the reduction of assimilative capacity caused by the reservoirs that contribute to low dissolved oxygen levels in the Snake River downstream of Hells Canyon dam. Once the appropriate dissolved oxygen load allocation was set for the project, the feasibility of implementing Idaho Power's intended Hells Canyon forced-air system or other measures to meet this load allocation could be confirmed. A monitoring plan would be used to evaluate the quality of inflows to the project, confirm that Idaho Power is meeting its obligations for aeration, evaluate the effectiveness of the measures implemented, and evaluate any adverse effects of the aeration on total dissolved gas downstream of Hells Canyon dam. As part of developing the plan, Idaho Power would consult with the appropriate federal and state agencies and the tribes to determine an appropriate level of monitoring downstream of Hells Canyon dam.

We estimate the annualized cost of developing and implementing this plan through the evaluation phase at \$15,100, and we include it as part of the Staff Alternative. The cost of implementing the measures identified in the plan and approved by the Commission would be determined as part of the plan. We estimate that the annualized cost of potential measures likely would range between \$447,800 and \$1,978,700.

We include in the Staff Alternative ODFW-58, which is ODFW's recommended approach to developing an appropriate level of water quality monitoring to document the effects of project operations and the effectiveness of water quality measures in consultation with ODEQ and IDEQ, as well as other appropriate fish and wildlife and water quality management entities. If reservoir supplementation were selected for implementation, the plan could determine when (both which years and the timing within selected years) supplementation would occur and the rate at which it would occur. Monitoring water quality just upstream and in Brownlee reservoir along with the Brownlee discharges would provide data to select the appropriate time in the season to begin reservoir supplementation and document the effectiveness of the supplementation. Monitoring the quality of water downstream of Hells Canyon dam would provide a means to determine the effectiveness of measures to improve dissolved oxygen levels in the lower river. We estimate annualized costs of \$4,400 to prepare the plan recommended by ODFW-58 and \$100,000 for monitoring at all these sites.

A long-term assessment of inflowing water quality could aid in determining if upstream conditions have sufficiently improved to warrant relocating the diffuser system to a down-reservoir location. Although monitoring water quality at other sites that are a considerable distance upstream of Brownlee reservoir (e.g., the three sites recommended by NMFS-14 that are about 120 to 220 miles upstream) could provide data to determine long-term reduction of nutrients and suspended sediment loads from upstream tributary restoration efforts conducted as the TMDL is implemented, it would not provide data relevant to Idaho Power's management of the Hells Canyon Project. For this reason, we do not include in the Staff Alternative NMFS' recommendation for monitoring water quality, which we estimate would have an annualized cost of \$150,000.

We also do not include in the Staff Alternative Interior-67, the recommendation that Idaho Power monitor water quality at six or more sites downstream of Hells Canyon dam twice per month, and more frequently during low dissolved oxygen periods and when dissolved oxygen enhancement is being done. We conclude that monitoring at the level of intensity recommended by Interior, at an estimated annualized cost of \$200,000, would not be warranted because it would provide little additional information compared to routine monitoring at a single site downstream of Hells Canyon dam.

We do not include in the Staff Alternative Interior-61, the recommendation that Idaho Power implement turbine venting at Brownlee units 1, 2, 3, 4, and possibly Brownlee unit 5 and the three Hells Canyon units, since Idaho Power's evaluation of increases in dissolved oxygen show that baffles cannot induce additional airflow and thus would be ineffective at increasing dissolved oxygen levels. We estimate the annualized cost of this measure would be \$17,000.

We do not include in the Staff Alternative Interior-42, the recommendation that Idaho Power be required to satisfy existing water quality standards in Oxbow and Hells Canyon reservoirs. Idaho Power and many other parties currently contribute to water quality degradation in Oxbow and Hells Canyon reservoirs. We conclude that Idaho Power is responsible for addressing the project's contribution to degraded water quality, but not adverse effects caused by contributions of other parties.

We do not include in the Staff Alternative the Interior and the Forest Service recommendations (Interior-66 and FS-30) to study the effect of dissolved oxygen additions below Hells Canyon dam on bull trout, invertebrates, macrophytes, and algae. We conclude that Idaho Power has conducted sufficient studies to evaluate the benefits of increasing dissolved oxygen levels downstream of the project. We cannot estimate the full costs of Interior's recommended measures because Interior has not described the scope of the measures to increase dissolved oxygen levels.

### 5.2.3.2 Water Temperature Control

Brownlee reservoir, which has an average hydraulic retention time of about one month, substantially alters Snake River temperatures. Storage of water in the reservoir and the depth of the powerhouse intake result in cooler downstream water temperatures in spring and summer and warmer temperatures in the fall than would be the case in the absence of the project.

Idaho Power's proposed operations would be the same as the current operations, and would, therefore, result in similar thermal regimes within and downstream of the project as now occur (refer to section 3.5.1.2, *Temperature*). In its license application, Idaho Power does not propose any measures to modify the existing temperature regime.

ODFW-56 recommends that Idaho Power consult with ODEQ to develop and implement a Temperature Management Plan approved by ODEQ in a WQC. This plan would include implementation measures, a timeframe for implementing measures, and an Effectiveness Monitoring Plan. In addition, ODFW recommends that Idaho Power consult with ODEQ and ODFW to develop appropriate monitoring of water temperature and other water quality parameters.

The Nez Perce and Umatilla Tribes (NPT-13 and CTUIR-22) and AR/IRU-19 recommend that Idaho Power, in consultation with appropriate state and federal agencies and affected tribes, investigate installation of a temperature control structure at Brownlee reservoir to meet CWA numeric and narrative criteria to support the beneficial use of fisheries. Under this recommendation, Idaho Power would install the structure in a timely manner if the study indicates it is warranted. AR/IRU-19 also recommends investigating installation of a temperature control structure to meet CWA standards, and adds a recommendation that Idaho Power work with a Technical Advisory Committee to identify and implement other possible remedies for achieving temperature control of outflows at Brownlee, Oxbow, and Hells Canyon dams.

Although Interior does not make any recommendations specifically associated with a temperature control structure, it recommends in Interior-42 that Idaho Power implement measures to improve water quality conditions in Oxbow and Hells Canyon reservoirs to the point that they meet all water quality standards for designated beneficial uses for the states of Idaho and Oregon.

Because of the important role that temperature plays in the life history of fall Chinook salmon, the Commission requested that Idaho Power model the effect of installing a temperature control structure at Brownlee dam to reduce fall water temperatures to benefit their spawning and increase spring water temperatures to accelerate their emergence downstream of the project (AIR WQ-2(c)). Idaho Power's analysis led it to conclude that operating a temperature control structure to lower water temperatures in the fall would adversely affect fall Chinook salmon by delaying the timing of emergence, and that focusing its operation on promoting spring warming would advance emergence by only 2 or 3 days. Based on the results of their analysis, Idaho Power concluded that a temperature control structure at Brownlee dam was not warranted. Instead, in its March 31, 2006, submittal to ODEQ, Idaho Power (2006c) indicates that it intends to implement an adaptive management approach to implement appropriate measures to demonstrate compliance with the existing water temperature standards.

The general concept of using a temperature control structure at the Brownlee intake is to draft warmer water from Brownlee reservoir's surface in spring and early summer and then draft cooler water from deeper reservoir depths in the fall. A temperature control structure would be biologically beneficial if it could improve spawning success by: (1) providing cooler water temperatures in the fall that would stimulate earlier spawning and subsequent fry emergence; or (2) provide warmer water temperatures during the spring incubation period to accelerate fry growth after emergence from the gravel.

Our analysis leads us to conclude that the magnitude of spring water temperature increases would be quite limited and that the volume of cool water stored in Brownlee reservoir would not be sufficient to reduce both late summer and fall temperatures to provide optimal thermal conditions for fall Chinook

rearing and spawning (refer to sections 3.5.2.4, *Temperature Control*, and 3.6.2.4, *Temperature Control*, in the Water Quality and Aquatic Resources sections, respectively). To have a sufficient volume of cold water in the late summer and fall, warmer water would have to be released during the summer months, which would slightly increase temperatures at Lower Granite and could adversely affect the growth and survival of juvenile fall Chinook salmon. In addition, the colder water released from the deeper reservoir depths at Brownlee dam, through the use of a temperature control structure, could reduce dissolved oxygen levels downstream of the dam, and potentially adversely affect white sturgeon populations downstream of the Hells Canyon dam.

Based on the limited potential for advancing the emergence timing of fall Chinook salmon, potential adverse effects on water temperatures during the summer outmigration season, and the substantial cost of a temperature control structure (estimated annualized costs ranging from about \$3.9 million to about \$28.3 million<sup>78</sup>) we conclude that the potential benefits of installing a temperature control structure at Brownlee dam would not be worth the cost. Accordingly, we do not include a temperature control structure in the Staff Alternative.

As an alternative, we include in the Staff Alternative a provision whereby Idaho Power would develop and implement a Temperature Management Plan in consultation with IDEQ and ODEQ. The plan would reflect recommendations of ODFW-56, the tribes (NPT-13; CTUIR-22), AR/IRU-19, and Interior-42, and it would incorporate the adaptive management approach recently put forth by Idaho Power. Idaho Power (2006c) indicates that it intends to participate in a cooperative effort with IDEQ and ODEQ to determine whether the fall Chinook salmon are being supported by the current temperature regime and identify the project's contribution to temperature degradation. Under the proposed approach, Idaho Power would evaluate, select, and implement appropriate temperature control measures after the project's contribution to downstream water temperatures has been determined (local allocation). Idaho Power identifies potential temperature control measures as a temperature control structure, an upwelling system, watershed measures, or other approaches to meet the load allocation. With the exception of the temperature control systems, which are discussed above, the scope of potential control measures has not been defined to a level that enables us to accurately estimate their costs. We estimate the annualized cost of plan development to be \$5,500.

### **5.2.3.3 Total Dissolved Gas Abatement**

Water flowing through dam spillways and plunging into the pools below increases the hydrostatic pressure, causing air to be driven into solution and resulting in supersaturation of gases in the water. total dissolved gas levels above 110 percent of saturation can be injurious to fish by causing gas bubble trauma disease.

Spills of greater than 3,000 cfs at Brownlee dam currently result in total dissolved gas levels exceeding the 110 percent of saturation criterion downstream of the Brownlee dam spillway and have substantial effects on total dissolved gas levels in the Oxbow and Hells Canyon reservoirs. Nearly all spills at Hells Canyon dam result in exceedance of the 110 percent criterion, and at spills of 19,000 cfs and greater, the entire Hells Canyon reach down to the Salmon River confluence exceeds the criterion. With continued project operation, spills that cause exceedance of the 110 percent criterion would occur for prolonged periods in medium high to extreme high flow years, less frequently in medium flow years, and seldom if ever in low flow years.

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<sup>78</sup> The estimated annualized costs for construction and operation of temperature control structures are \$3.9 million for a stop log weir, \$6.1 million for a construction and operation of a gated weir and tunnel, and \$28.3 million for a 35,000-cfs tower. These estimates do not include the cost of lost energy production caused by the structures

Idaho Power proposes to continue preferential use of crest (upper spillway) gates for passing spills at Brownlee dam. It also proposes to install flow deflectors on the Hells Canyon dam spillway that would alter the flow characteristics from the spillway to reduce air entrainment deep in the tailrace during spill episodes of up to approximately 30,000 cfs.

ODFW-54 recommends that Idaho Power develop and implement a plan, in consultation with and as approved by ODEQ, for satisfying Idaho Power's total dissolved gas allocation of less than 110 percent of saturation at the edge of the aerated zone below each project dam for all flows not exceeding the 10-year, 7-day average flood flow of 72,500 cfs. Under this plan, Idaho Power would develop measures to assure compliance with Oregon's 110 percent of saturation standard below all three dams as required by the TMDL, Oregon water quality standards, and the Clean Water Act, and the plan would include a schedule and a monitoring component.

NMFS (NMFS-10 and NMFS-11), Interior-62, the Umatilla Tribes (CTUIR-20), and Nez Perce Tribe (NPT-15) recommend that Idaho Power design and install a gas abatement structure at the spillways of both Hells Canyon and Brownlee dams. Their specific recommendations for consultation vary somewhat, but in general include consultation with appropriate federal, state, and tribal water quality and fish and wildlife agencies. Interior's recommendation also includes an effectiveness monitoring plan. In the event that the resulting structures do not meet total dissolved gas standards, the Umatilla and Nez Perce Tribes recommend that Idaho Power re-consult with the agencies to develop and implement other structural approaches to meet water quality standards within 5 years of the issuance of a new license. Each of these measures would reduce total dissolved gas levels in Oxbow and Hells Canyon reservoirs and the free-flowing Snake River downstream of Hells Canyon dam.

AR/IRU-18 recommends that the Commission require Idaho Power to use a 6-step adaptive management approach to eliminate or minimize total dissolved gas levels in excess of 110 percent of saturation. Idaho Power would conduct real-time total dissolved gas monitoring, either during periods of high spill or consistent with Idaho Power's WQC once it is issued (whichever is more rigorous), to detect total dissolved gas violations and quantify the affected reaches below Hells Canyon Project dams.

In its March 31, 2006, submittal to ODEQ, Idaho Power (2006b) indicates that it intends to install flow deflectors at the Brownlee dam spillway (in addition to Hells Canyon spillway, as proposed in the license application); adaptively manage uncertainties associated with its proposed total dissolved gas-abatement measures; and work with ODEQ and IDEQ to develop a total dissolved gas monitoring plan that would include monitoring during spill to determine compliance with the TMDL load allocation assigned to Idaho Power.

In section 3.5.2.3, *Total Dissolved Gas Abatement*, we conclude that Idaho Power's proposed sequenced use of the Brownlee spillway, along with proposed installation of deflectors at Hells Canyon dam and intended installation of deflectors at Brownlee dam, would reduce the frequency of spill events that exceed the total dissolved gas standard. The 110-percent criterion would be exceeded less frequently, and the magnitude of exceedances would be reduced at flows up to at least 74,000 cfs at Brownlee dam<sup>79</sup> and 60,500 cfs at Hells Canyon dam. This would reduce the potential for fish to be exposed to high total dissolved gas levels downstream of Hells Canyon dam, and in Oxbow and Hells Canyon reservoirs. We estimate the annualized cost of Idaho Power's proposed total dissolved gas abatement measures at Hells Canyon at \$407,600 and the additional annualized cost of deflector installation at Brownlee at \$354,700, and we include them in the Staff Alternative, since the reduced frequency of elevated total dissolved gas would reduce the risk of gas bubble trauma in fish, especially federally listed fall Chinook salmon.

Since the effects of the deflectors cannot be accurately quantified, it is not known to what extent the combination of Idaho Power's proposed operational changes and the installation of Brownlee and

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<sup>79</sup> This flow is higher than the 10-year, 7-day average flood flow of 72,500 cfs.

Hells Canyon spillway deflectors would satisfy the applicable total dissolved gas standards at those dams or Oxbow dam. Therefore, additional total dissolved gas abatement measures may be warranted. Development of a total dissolved gas abatement monitoring program such as recommended by ODFW-54, the Nez Perce Tribe (NPT-15), and the Umatilla Tribes (CTUIR-20) would provide an effective way of proceeding toward compliance with applicable total dissolved gas standards in an adaptive fashion. We estimate the annualized cost of a total dissolved gas abatement monitoring program at \$18,300, and we include a monitoring program in the Staff Alternative.

The monitoring program would provide a means of documenting the effectiveness of total dissolved gas abatement measures and the need for any additional measures to satisfy applicable total dissolved gas standards within a 10-year period. If additional total dissolved gas abatement measures are deemed necessary for any of the project dams, Idaho Power would evaluate the potential for additional operational and/or structural measures and the feasibility of implementing these measures. Based on the results of these investigations, feasible measures needed to further reduce air entrainment would be implemented following Commission approval. In the Staff Alternative, we include an estimated annualized cost of installing deflectors at Oxbow dam, \$287,900, to conservatively estimate the cost of any additional total dissolved gas abatement measures that could be required. The program also would provide an effective means to schedule the design and implementation of total dissolved gas-abatement measures, monitor the effectiveness of these measures, document compliance with TMDL allocations and applicable total dissolved gas standards, and report these activities. If it is determined that reasonable and feasible technologies do not exist to ensure compliance with the applicable total dissolved gas standard, then Idaho Power would prepare the necessary background studies to support changing the applicable total dissolved gas standard through a Use Attainability Analysis or development of a site specific total dissolved gas criterion.

We anticipate that achieving applicable total dissolved gas standards would take several years to accomplish even with implementation of the foregoing measures. AR/IRU recommends that a compensation program be developed to address losses of aquatic biota in years when attaining the total dissolved gas standards is not feasible. Without more information on the nature of the compensation being recommended, we cannot assess either its effect on aquatic resources in project waters or its developmental costs, and do not include this compensation program in the Staff Alternative.

## **5.2.4 Aquatic Resources**

### **5.2.4.1 Fall Chinook Spawning and Incubation Flows**

Flows released from Hells Canyon dam affect the quality and quantity of spawning habitat available to fall Chinook salmon in the Snake River between Hells Canyon dam and Lower Granite reservoir, a reach that contains most of the spawning habitat that is currently accessible to fall Chinook salmon in the Snake River System. The reach is not known to be a major spawning area for any other anadromous fish species.

Since 1991, Idaho Power has voluntarily implemented a flow program to enhance spawning and incubation conditions for fall Chinook salmon in the Hells Canyon reach. To prevent redds from becoming dewatered during the spawning season, Idaho Power maintains steady flow conditions from mid-October through early December to keep spawning activity below a water level that can be maintained throughout the incubation and fry emergence stages. The spawning flow, which has typically been between 9,000 and 13,000 cfs, is determined each year before spawning begins based on forecasted inflows to Brownlee reservoir, predicted hydrologic-year type (low, medium, or high), and availability of habitat. After spawning has ended, Idaho Power maintains a minimum flow that protects the shallowest redd from being dewatered until fry have emerged from the gravel. Idaho Power proposes to continue the fall Chinook spawning flow program, although with the suggestion that some degree of flow fluctuation

be allowed during the spawning period without reducing the availability of spawning habitat or hindering spawning behavior.

NMFS, the Nez Perce Tribe, ODFW, IDFG, and the Umatilla Tribes provided recommendations relating to the fall Chinook spawning flow program. We summarize these in section 3.6.2.1, *Effects of Project Operations on Aquatic Resources*.

The spawning flow program benefits fall Chinook salmon by maintaining near-optimal flow levels during the spawning period and by preventing dewatering of redds during the incubation period. Since the flow program was first implemented in 1991, the number of adult fall Chinook salmon returning to the Snake River has increased substantially. While other factors such as hatchery supplementation, improved migration survival, and favorable ocean conditions have contributed to this trend, there is little doubt that protecting redds from dewatering has improved incubation survival. NMFS, ODFW, IDFG, the Nez Perce Tribe and the Umatilla Tribes all recommend that the fall Chinook flow program be continued, and we include it as an operational provision in the Staff Alternative. Since the flow program is part of the current operation, we do not attribute any incremental cost to its continuation.

In its description of this proposed measure, Idaho Power states that modifications of the flow program are being evaluated and explored in cooperation with interested agencies, including discussion of the potential for allowing some flow variation during the spawning season. Any flow variation that occurs during the spawning period could result in redds being constructed at higher elevations, which would require higher flows to be maintained during the egg incubation season to avoid dewatering redds. Redds that are constructed at higher elevations would be more vulnerable to exposure (and exposure-related mortality of eggs and fry), especially when inflows to Brownlee reservoir are lower than was forecast at the start of the spawning season. We conclude in section 3.6.2.1 that maintaining a stable flow during the spawning season is more protective than a variable flow regime would be, and, in the Staff Alternative, we do not amend the current program to allow variation during the season.

The spawning flow that is selected each year affects the quantity of habitat that will have suitable depths and velocities for spawning. Idaho Power proposes that a spawning flow between 8,000 and 13,000 cfs be determined each year based on forecasted inflows to Brownlee reservoir, predicted hydrologic-year type (low, medium, or high), and availability of habitat. NMFS (NMFS-1) recommends that the stable spawning flow be between 8,500 and 13,500 cfs, the Nez Perce Tribe (NPT-14) recommends a flow between 8,500 and 13,000 cfs, ODFW (ODFW-34) recommends that the spawning flow be at least 8,000 cfs, and the Umatilla Tribes (CTUIR-9) recommend a spawning flow of at least 9,000 cfs.

Our analysis indicates that flows between 8,000 and 15,000 cfs should provide near-optimal conditions for spawning fall Chinook salmon, and providing stable flows anywhere in this range should minimize the potential for redd superimposition, especially in years when large numbers of fall Chinook spawn in the Hells Canyon reach. In the Staff Alternative, we include NMFS's recommended flow range of 8,500 to 13,500 cfs as the range from which to select spawning flows for any given year. However, there is not likely to be any difference in the cost or benefit from specifying an upper limit of 13,000 or 13,500 cfs, since Idaho Power would not be precluded from selecting a spawning flow less than 13,000 cfs in any given year and the amount of habitat that would be provided is essentially unchanged over this range of flows.

Based on the high apparent quality of spawning habitat in the Hells Canyon reach, we conclude that evaluating egg-to-fry survival at two sites every 5 years as recommended by NMFS (NMFS-7) would provide little benefit. Metrics of spawning gravel quality indicate that the spawning and incubation environment in the Hells Canyon reach is of very high quality, especially in the upper reach upstream of the Salmon River. We see no reason to expect that the quality of spawning habitat would diminish in the future, and if this were to occur it would be reflected by changes in adult returns and in the usage of any affected areas by spawning salmon, which would be detected in Idaho Power's proposed redd surveys.

Other recommendations made by the agencies and tribes relate to consultation and monitoring requirements for establishing spawning flow levels, in-season consultation on adjustments to flow levels due to changes in flow forecasts, establishing the flow level that is required to protect redds until fry have emerged from the gravel, determining the number and location of temperature monitors that are needed to track water temperatures and estimate the timing of fry emergence, determining the frequency of both shallow and deep-water redd surveys, and reporting requirements. Consultation with the resource agencies and tribes to determine appropriate monitoring efforts and to improve the efficiency of the flow management decision process would help to maximize resource benefits and avoid imposing any unnecessary constraints on project operations. This consultation could be accomplished through the development of a fall Chinook spawning and incubation flow management plan. We estimate the annualized cost of developing and implementing a fall Chinook flow management plan at \$2,700, and we include it in the Staff Alternative.

#### **5.2.4.2 Flow Fluctuations Outside of the Fall Chinook Spawning and Incubation Period**

Flow fluctuations and changes in the seasonal flow regime caused by project operations can affect the quality and quantity of rearing habitat and the food supply that is available to rearing juvenile fall Chinook salmon and has the potential to cause juvenile fall Chinook salmon to become stranded on bars or trapped in pools that become isolated from the stream channel. Losses of fry that are trapped in pools may occur due to high water temperatures, increased vulnerability to predation, or stranding if the pools drain before they are reconnected to the river. The Hells Canyon reach is not known to provide important rearing habitat for other anadromous species, but it is the most important production area in the Snake River Basin that is still accessible to fall Chinook salmon.

While the fall Chinook flow program (which we discuss immediately above) provides stable flows during the fall Chinook spawning season and maintains flows sufficient to keep redds watered until emergence is complete, Idaho Power's proposed operations would allow substantial flow fluctuations to occur during the fall Chinook rearing period (approximately March 15 through June 15). Idaho Power proposes to continue its current maximum up- and down-ramping rate of 12 inches per hour as measured at Johnson's Bar, 17.6 miles downstream of Hells Canyon dam. Under typical operating conditions, Idaho Power would limit the maximum daily change in flow to 10,000 cfs and maintain a minimum flow of 6,500 cfs.

NMFS, Interior, the Forest Service, ODFW, IDFG, the Nez Perce Tribe, the Umatilla Tribes, and AR/IRU provide recommendations related to ramping rates and minimum flows outside of the fall Chinook spawning period. We describe these recommendations in section 3.6.2.1, *Effects of Project Operations on Aquatic Resources*. These include a recommendation by NMFS (NMFS-4) that sufficient flow be released to ensure that the largest juvenile entrapment areas are reconnected to the Snake River for at least 2 hours on a daily basis; ODFW's recommendation (ODFW-33) that Idaho Power be required to meet a specified seasonal schedule of ramping rates, minimum flows, and maximum daily flow change restrictions; Interior's recommendation (Interior-54) that Idaho Power implement seasonal run-of-river operations downstream of Hells Canyon dam during the white sturgeon spawning, incubation, and early life history stages; and recommendations by Interior (Interior-65) and NMFS (NMFS-15) that river flow and ramping rates be monitored within 1 mile downstream of Hells Canyon dam.

Based on our analysis in section 3.6.2.1 of habitat area, food supply, and the potential for entrapment and stranding, we conclude that reducing ramping rates during the fall Chinook rearing season would provide several benefits to juvenile fall Chinook salmon. Based on our analysis of Idaho Power's habitat modeling studies, restricting ramping rates would increase habitat stability, which would reduce energy expenditures from fish having to repeatedly move to find optimal rearing habitats or reduce food intake from residing in sub-optimal habitat. From our analysis of effects on invertebrate production, we conclude that Idaho Power's proposed ramping rate could result in complete dewatering of favored

rearing habitats (<1.5 meters deep), which would substantially reduce macroinvertebrate abundance and the food base that is available to fall Chinook salmon in their preferred rearing habitat. From our analysis of Idaho Power's entrapment monitoring work, we conclude that implementing more restrictive ramping rates could substantially reduce the number of fish entrapped, improve invertebrate production, and reduce mortalities due to stranding and from entrapment. Based on Idaho Power's 2005 entrapment surveys, implementing a 6-, 4-, or 2-inch-per-hour ramping rate in 2005 would have reduced the estimated stranding mortality of 2,643 fall Chinook salmon juveniles by 8.9, 92.9, and 95.4 percent, respectively (see table 47). We conclude that the 2- and 4-inch-per-hour ramping rate would provide a high level of protection, compared to less restrictive rates, in conjunction with annual monitoring to determine whether additional operational adjustments or fish salvage operations are warranted to account for differences in seasonal flows or in channel topography between years. While the estimated number of juvenile fall Chinook salmon that were killed as a result of stranding and entrapment in 2005 was a very small proportion (certainly well under 1 percent) of the total Chinook salmon that were produced in the Hells Canyon reach in that year, this species is federally listed and a precautionary approach toward limiting incidental take is warranted.

Idaho Power identifies the primary fall Chinook rearing season to be from March 15 to June 15, while ramping rate restrictions recommended by other stakeholders to protect rearing fall Chinook salmon include March 1 to May 31 (AR/IRU-23b), April and May (NPT-3), and March 21 to June 21 (ODFW-33). We conclude in section 3.6.2.1 that implementing restrictive ramping rates as early as March 15 would benefit rearing fall Chinook salmon by allowing macroinvertebrates time to start colonizing shoreline rearing habitats before fall Chinook fry emerge from the gravel and take up residence in these areas. We also conclude that maintaining a ramping rate restriction until June 15 would protect the great majority of fall Chinook salmon from the risk of entrapment and stranding losses associated with load following operations.

Idaho Power estimates that the annualized costs of ramping restrictions over a 3-month period, in terms of facility modifications and constraints on power generation, would range from \$6.6 million for a 6-inches-per-hour limit to \$6.9 million for a 2-inches-per-hour limit. In the Staff Alternative, we include a provision that the maximum variation in river stage, as measured at the Snake River at Johnson's Bar gaging station, not exceed 4 inches per hour during the March 15 to June 15 fall Chinook rearing period. With an annualized cost of roughly \$6.8 million, we conclude that a 4-inches-per-hour ramping rate limitation, in conjunction with ongoing monitoring and adaptive management, should reduce the current mortality rate of juvenile fall Chinook salmon from stranding and entrapment by more than 90 percent. The cost would be \$100,000 less than imposing a ramping rate of 2-inches-per-hour but would provide a similar reduction in fish mortality.

Idaho Power intends to continue to monitor entrapment sites in 2006 and annually thereafter. Idaho Power also agrees to develop a long-term entrapment pool monitoring and operational plan within 1 year of license issuance. Idaho Power would include in this plan: (1) identification of significant entrapment pool areas and their connection flows in the upper Hells Canyon Reach; (2) a use assessment (including any mortalities) of entrapment areas by juvenile Chinook and steelhead that would include expanded estimates for the entire rearing period; (3) documentation of thermal characteristics of pools during the rearing period; and (4) establishment of adaptive in-season operational protocols developed to protect and minimize (to the extent practicable) negative effects to juvenile Chinook while rearing in entrapment pool areas. Idaho Power also would continue to mark/recapture studies of juvenile Chinook in selected pools to gather information on behavior and how fish distribute after pools are reconnected with the mainstem. Daily changes in operations, such as connecting entrapment pools before daily temperatures elevate, could help protect fish from negative temperature effects.

The agencies, tribes, and NGOs (for example, NMFS-5) recommend ongoing monitoring and adaptive flow management to protect juvenile fall Chinook salmon from stranding and entrapment losses during the rearing and outmigration period. Because the level of protection that is provided by a specific

ramping rate or minimum flow would vary between years depending on overall flow levels, we conclude that monitoring fall Chinook salmon entrapment and stranding, such as planned by Idaho Power, would help to identify whether any changes in project operation or other protective measures would be warranted. Although it is unclear what specific measures would be implemented as part of Idaho Power's monitoring and operational plan and the benefits of such measures, we conclude that an adaptive management approach has the potential to substantially minimize stranding at less cost than the 4-inch-per-hour ramping rate during the rearing period. However, there is insufficient information at this time to evaluate the success of potential measures in minimizing stranding and entrapment and mortality. Therefore, we include in the Staff Alternative the 4-inches-per-hour ramping rate along with a stranding and entrapment monitoring program. The ramping rate would protect fish from stranding until the stranding and entrapment monitoring program shows that alternative measures could be successful in reducing fish mortality and entrapment. Accordingly, we include in the Staff Alternative a provision that the licensee develop and implement a stranding and entrapment monitoring program. We estimate the annualized cost of the program at \$28,700. As part of the monitoring program, Idaho Power would file a report that would outline the results of its monitoring efforts and would make recommendations, subject to Commission approval, for reducing entrapment and mortality downstream of the project.

NMFS (NMFS-4) also recommends that minimum flows be increased to 11,500 cfs if water temperatures in entrapment pools exceed 16°C for more than 3 days or when peak water temperatures in any pool exceed 18°C for more than 4 hours. We see little benefit to this recommendation, since most of the 2005 mortalities occurred at the middle Pine Bar pools, which Brink (2006) reports were disconnected from the river at a flow of 15,735 cfs and below (table 44). This high a minimum flow would essentially preclude load following while it was in effect, and would likely have an annual cost in excess of \$2 million in lost power benefits. We do not include NMFS's recommendation that sufficient flow be released to ensure that the largest juvenile entrapment areas are reconnected to the Snake River for at least 2 hours on a daily basis. While we cannot estimate a cost of this NMFS proposal, we conclude that ramping flows to reconnect entrapment areas could increase losses from stranding. We note that Idaho Power was not able to monitor stranding effectively on cobble bars during its 2005 entrapment surveys. As a result, their surveys may have underestimated the number of fish that were stranded during ramping. We conclude that the 4-inch-per-hour ramping rate that we include in the Staff Alternative, in conjunction with additional monitoring to determine whether additional measures are necessary, would be more effective in reducing potential losses from stranding and mortality.

We do not include in the Staff Alternative ODFW's recommendation (ODFW-33) that Idaho Power be required to meet a specified seasonal schedule of ramping rates, minimum flows, and maximum daily flow change restrictions. Based on our evaluation of the effects of project ramping on aquatic resources, we include Idaho Power's proposed operating restrictions during the fall Chinook spawning and incubation period and we incorporated an additional ramp rate restriction of 4 inches per hour during the fall Chinook rearing period in the Staff Alternative. However, we found no evidence to suggest that substantive adverse effects were being caused to aquatic resources by Idaho Power's current ramping rate outside of these time periods. We estimate that the annualized cost associated with ODFW's proposed measure would be about \$17.6 million in lost power benefits.

We see little benefit to the multi-year ramping rate study recommended by Interior (Interior-44 and -66) and the Forest Service (FS-30). We conclude that there is already sufficient site-specific information to determine appropriate operational constraints to protect rearing fall Chinook juveniles in conjunction with appropriate monitoring and provisions for limited adaptive management. The lost power benefits from implementing run-of-river operation for an estimated 6-year test period would have an annualized cost exceeding \$5 million.

We do not adopt Interior's recommendation (Interior-54) that Idaho Power implement seasonal run-of-river operations downstream of Hells Canyon dam during the white sturgeon spawning, incubation, and early life history stages. Idaho Power's studies demonstrate that the sturgeon population

in this reach benefits from regular recruitment, so there is no indication that load following is causing any adverse effects to white sturgeon spawning and recruitment. We estimate that the annualized cost of Interior's recommendation would be on the order of \$2 million in lost power benefits.

We do not adopt recommendations made by Interior (Interior-65) and NMFS (NMFS-15) that river flow and ramping rates be monitored within 1 mile downstream of Hells Canyon dam. Idaho Power reports that due to the high gradient and steep banks of the river at that point, there is a highly reactive relationship between stage and discharge near the dam that would make compliance difficult. Therefore, continuing to use the existing monitoring location at Johnson's Bar would facilitate compliance and would make it easier to compare past and future operations. This location also served as the measurement point for Idaho Power's licensing studies, which form the basis for the ramping rate restriction that we have included in the Staff Alternative. Furthermore, Interior and NMFS provide no evidence or rationale concerning how changing the compliance measurement point to within 1 mile of Hells Canyon dam would benefit aquatic resources.<sup>80</sup>

### 5.2.4.3 Anadromous Fish Restoration

The Hells Canyon Project has blocked anadromous fish from accessing spawning and rearing habitats upstream of Hells Canyon dam since initial attempts to provide passage were discontinued several years after Brownlee dam was constructed. A successful anadromous fish restoration effort above Hells Canyon dam would restore self-supporting runs in historically available habitat and increase the size and maintain the genetic diversity of Snake River populations.

Idaho Power proposes measures that are targeted toward the restoration of passage and habitat for bull trout. However, Idaho Power does not propose to restore passage for anadromous fish to habitat within and upstream of the project at this time.

State and federal agencies, tribes, and NGOs propose a range of approaches for restoring anadromous fish to areas upstream of Hells Canyon dam. We summarize these specific recommendations<sup>81</sup> and related general recommendations directed at improving water quality and habitat conditions to support anadromous fish restoration in sections 3.6.2.6, *Anadromous Fish Restoration*, 2.6.2.7, *Fish Passage Facilities*, and 3.6.2.8, *Resident Salmonid Passage*. Among the recommendations are suggestions for habitat improvement and the restoration of anadromous fish to historical habitat filed by the Burns Paiute and Shoshone-Paiute tribes (BPT-7 and SPT-3). ODFW (ODFW-2) recommends that specific target sizes be established for anadromous fish runs to areas upstream of the project.

Idaho Power conducted extensive studies to evaluate the potential for anadromous fish restoration, and concluded that restoring self-supporting runs was possible only in certain tributaries and under the most optimistic assumptions. In most of the major tributaries upstream of the project, they report that habitat and water quality conditions have been degraded by land use practices and development of the basins to support irrigated agriculture, and to provide municipal water supply. Water quality in the mainstem of the Snake River upstream of the project is also severely degraded, and the existence of eight mainstem dams in the downstream migratory corridor cause mortality during the upstream and downstream migration of all anadromous species. NMFS chose not to issue a specific Section 18 fishway prescription at this time, stating that poor water quality severely limits the potential

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<sup>80</sup> In its April 11, 2006, filing, Idaho Power estimates that changing the point of compliance measurement would cost as much as \$4 million to \$7.5 million annually, due to what amounts to an effective reduction in allowed ramping rates.

<sup>81</sup> A breakdown of anadromous fish restoration recommendations, including AR/IRU-1 through 7; CTUIR-11 and 12; IDFG-9; Interior-46, 47, 49, and 60; NMFS-14c, 16 and 17; NPT-8; and ODFW-1 through 17, 22, 24 and 40, is provided in table 51 in section 3.6.2.6, *Anadromous Fish Restoration*.

for fall Chinook salmon to incubate through emergence, and the degraded habitat in most tributaries would similarly limit the possibilities for successful reintroduction of spring Chinook salmon and steelhead into most areas upstream of the project.

Notwithstanding the aforementioned habitat limitations, state and federal resource agencies, tribes, and NGOs recommend numerous measures for upstream and downstream passage, mainstem passage studies, and habitat and water quality improvements as part of an overall restoration effort. Accordingly, after assessing the various agency, tribe, and NGO recommendations, we present and evaluate in section 3.6.2.6 a phased restoration approach (see table 54) that incorporates many of the agency, tribe, and NGO recommendations. This program would focus on tributaries within the project area that currently support resident salmonids without requiring passage at any major dams or reservoirs within the tributary. Based on our review of Idaho Power's reintroduction studies, tributaries that meet these criteria include Pine Creek, Indian Creek, the Wildhorse River, and several tributaries to the Powder River, especially Eagle Creek. These tributaries were also identified by many of the stakeholders as being suitable targets for an anadromous fish restoration effort.

Regarding fall Chinook restoration, in section 3.6.2.6, *Anadromous Fish Restoration*, we conclude that water quality conditions in the historic fall Chinook production areas upstream of Brownlee dam are not sufficient to support restoration at this time. Specifically, low dissolved oxygen levels and the presence of hydrogen sulfide in the incubation environment are not likely to allow a sufficient hatch rate to support a self-sustaining run of fall Chinook salmon. However, there is potential that conditions may improve over the term of the next license through implementation of the Snake River-Hells Canyon TMDL.

AR/IRU (AR/IRU-8b), IDFG (IDFG-9), NMFS (NMFS-14c), and the Nez Perce Tribe (NPT-8b) recommend that the condition of historic spawning habitat in the mainstem Snake River, upstream from Brownlee reservoir, be monitored by evaluating the hatch rate of fall Chinook eggs using artificial redds. We estimate that this monitoring effort would have an annualized cost of \$20,000. Given the poor current condition of spawning habitat upstream of Brownlee dam, we conclude that substantial water quality improvement would be required before reintroduction of fall Chinook salmon to this reach proceeds. We also conclude that existing water quality monitoring efforts underway in the basin should provide adequate information for determining when it would be appropriate to initiate reintroduction studies. Based on the discussion above and our analysis of the issue, the artificial redd studies proposed by the agencies would not be worth the cost.

As a means to improve water quality in the Brownlee to Swan Falls reach and other mainstem reaches, NMFS (NMFS-14a) and the Nez Perce Tribe (NPT-8a) recommend that Idaho Power provide funding to support TMDL implementation, as developed by ODEQ and IDEQ. Implementation of the phosphorus TMDL would reduce the high nutrient loads that currently result from anthropogenic factors, and thereby act to alleviate toxic hydrogen sulfide and low dissolved oxygen levels. However, nutrient loading upstream of the project is not directly related to the continuing operation of the Hells Canyon Project, and we do not include Idaho Power funding of TMDL implementation in upstream reaches as part of the Staff Alternative. The funding level recommended by NMFS and the Nez Perce Tribe would be between \$5 million and \$6 million annually.

Restoring fall Chinook salmon to areas upstream of Brownlee reservoir may be warranted under the appropriate circumstances. However, water quality and other habitat issues in the Snake River make such an effort premature at this time. Because restoring fall Chinook salmon to areas upstream of Brownlee depends on the future improvement in water quality, we must have a mechanism for monitoring those events, to determine when restoration activities for fall Chinook salmon should be initiated. Therefore, as part of the Staff Alternative, and in lieu of the NMFS and Nez Perce recommended funding, we include a fish habitat monitoring plan whereby Idaho Power would develop and file a report on TMDL efforts in the basin that includes: (1) a schedule and format for filing a status report with the

Commission every 5 years, reporting on the water quality monitoring data collected in the basin (with an assessment of how the data relates to the condition of the fall Chinook incubation environment in historic production areas and whether conditions indicate that survival rates may be high enough to support reintroduction); and (2) a description of the specific criteria (e.g., dissolved oxygen levels, phosphorus levels, etc.) that would trigger restoration planning for fall Chinook salmon in the Snake River between Brownlee reservoir and Swan Falls. Idaho Power would consult with NMFS, IDFG, ODFW, ODEQ, IDEQ and the tribes to develop this plan. The Staff Alternative also includes a specific provision that would afford the Commission an opportunity to reconsider restoration of fall Chinook salmon to historic habitat above Brownlee in the future.

Regarding restoration of other anadromous species, habitat in many of the tributaries that steelhead and spring Chinook salmon would potentially be able to access has been degraded through various land and water use activities, particularly in basins above Brownlee dam in which irrigation is extensive (Chandler and Chapman, 2003a). We share NMFS's view that the degraded habitat in the tributaries would limit the potential for successful reintroduction of spring Chinook and steelhead above the project. Because degraded tributary habitat could limit the restoration of spring Chinook salmon and steelhead, state and federal agencies, tribes, and NGOs recommend a variety of tributary habitat enhancement measures. As part of a plan to benefit native resident salmonids, Idaho Power proposes many similar measures in Pine Creek, Indian Creek, the Wildhorse River, and other smaller tributaries to the project (see section 3.6.2.10, *Tributary Habitat Improvements*). There is no guarantee, however, that these potential tributary improvements would result in habitat sufficient to support the reintroduction of steelhead and spring Chinook into these tributaries.

We are also concerned about the apparent lack of comprehensive planning necessary to reintroduce anadromous fish into the upper Snake River Basin. As stated earlier, no resource agency has provided us with any comprehensive resource or recovery plan, similar to the plan developed for reintroduction of Atlantic salmon into the rivers and streams of New England, which would clearly define management goals and strategies. We are convinced that a comprehensive plan of this nature is key to the success of a fish reintroduction program of this magnitude. Therefore, until such a plan is developed, it would not be prudent to advocate for the reintroduction of steelhead, spring Chinook salmon, or fall Chinook salmon upstream of the Hells Canyon Project.

In section 3.6.2.6, *Anadromous Fish Restoration*, we present a phased fish passage plan that would lead to the reintroduction of steelhead and spring Chinook into the tributaries of the project reservoirs. We estimate the annualized cost of developing and implementing this plan at \$1.7 million, assuming that all phases are implemented in a sequential manner over a 32-year period.<sup>82</sup> Given the uncertainties associated with the lack of quality fish habitat in the project tributaries and the lack of comprehensive planning identified above, we conclude that the benefits of such a plan would not be realized at this time and, therefore, we cannot justify its cost. Accordingly, we do not include this phased fish passage plan in the Staff Alternative. We are, however, currently requesting comments on this plan for the Commission's record should such a plan become more feasible in the future.

Many agencies, tribes, and NGOs filed recommendations associated with reintroduction of anadromous fish above the project. These recommendations include specific monitoring and evaluation measures, evaluation of reservoir drawdowns for downstream passage (CTUIR-11a and 11c; AR/IRU-8e), developing alternative mitigation if reintroduction efforts fail (ODFW-20), a downstream passage and collection facility at Hells Canyon dam (ODFW-12), survival studies of downstream

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<sup>82</sup> Our cost estimate assumed that 5 years would elapse between the construction of each major upstream and downstream passage facility. Under this timeline, installation of the Powder River smolt trap would not occur within the next 30 years, so the cost of this facility is not included in our estimate.

migrants (ODFW-14), and establishment of specific reintroduction targets (ODFW-2; BPT-7; SPT-3). For the reasons outlined above, we conclude that these recommended measures and their associated costs are premature and, accordingly, we do not include them in the Staff Alternative.

Finally, we do not include recommendations made by the agencies, tribes and NGOs that relate to Pacific lamprey passage or restoration (AR/IRU-13, CTUIR-17, 18 and 19, IDFG-10, Interior-56 and 57, NPT-19 and ODFW-17 and 49). Because very few Pacific lamprey succeed in migrating upstream past the Lower Columbia River and Lower Snake River dams to reach the project area, we do not consider restoration of this species to the project area to be feasible in the near future, and we also conclude that the scarcity of the species is not caused by the existence or operation of the project. Also, it appears that existing screening technology may not be effective for providing downstream passage for lampreys, and as a result we are not able to estimate the cost of providing effective downstream passage for this species.

#### **5.2.4.4 Resident Salmonid Passage**

Construction of the Hells Canyon project has blocked upstream passage and impeded downstream movement of native resident salmonids, thereby isolating local populations, inhibiting fluvial life histories, and reducing access to additional habitat and thermal refugia. The primary native resident salmonid species of concern are redband trout and the federally listed bull trout.

Idaho Power proposes a two-phased fish passage plan for transporting resident salmonids above Hells Canyon and Oxbow dams. The first phase would involve collecting bull trout, redband trout, and possibly other species in the Hells Canyon trap after it is modified (see section 3.6.2.7, *Fish Passage Facilities*) and transporting them to areas upstream of the Hells Canyon dam. The second phase would involve the construction of a new trap, similar in operation and design to the Hells Canyon trap, at the base of the Oxbow dam to collect fish for transport upstream. However, because of uncertainty surrounding the intent of fish collected in the trap and the status of habitat in tributaries such as the Wildhorse River, Idaho Power proposes delaying construction of the Oxbow trap for a minimum of 5 years following completion of the Hells Canyon trap modifications. Idaho Power also proposes to design, construct, and operate a permanent weir in Pine Creek to monitor the fluvial component of resident salmonid populations.

Interior (Interior-45 and -59), the Forest Service (FS-32), IDFG (IDFG-11 and -13), and ODFW (ODFW-18 and -36a) make recommendations that are consistent with Idaho Power's proposal to develop and implement a passage plan that would use the modified Hells Canyon trap and a newly constructed Oxbow trap to provide upstream passage for resident salmonids. The agencies, tribes, and AR/IRU also recommend that Idaho Power design, construct, and operate tributary weirs additional to the proposed Pine Creek weir (see section 3.6.2.6, *Anadromous Fish Restoration*). Prospective weir sites include Indian Creek, the Wildhorse River, and Eagle Creek. While it is the intent of these agencies, tribes, and NGOs that these weirs would be used to collect juvenile anadromous salmonids, they would also collect migrating native resident salmonids for transport to appropriate locations, as determined in a resident salmonid plan developed in consultation with the agencies and other stakeholders. The agencies also stipulate that the implementation of various plan components should be contingent upon the feasibility of passage measures and the suitability of habitat to which fish would gain access, as determined in consultation with the agencies and other stakeholders. To improve tributary habitat such that the translocation of resident salmonids would be beneficial, Idaho Power proposes, and the agencies and AR/IRU recommend, specific tributary habitat enhancement measures, which we address in the following section and describe in detail in section 3.6.2.10, *Tributary Habitat Improvements*.

ODFW (ODFW-18) further recommends that Idaho Power conduct a population viability risk analysis of genetic and demographic costs incurred by donor and recipient bull trout populations. ODFW (ODFW-36b and 37) also recommends that Idaho Power investigate bull trout mortality associated with spill or turbine passage.

In its preliminary fishway prescription, Interior (Interior-87) prescribes that Idaho Power develop a passage plan within 6 months of the issuance of a new license that would provide for the modification of the Hells Canyon fish trap to allow the collection of bull trout and the construction and operation of a weir at the mouth of Pine Creek, and identify specific habitat conditions that would trigger implementation of passage-related actions in Indian Creek, the Wildhorse River, and the Oxbow bypassed reach. Interior prescribes that the plan include: (1) specifications for construction and operation of permanent weirs and trap-and-haul fishways on these tributaries; (2) establish suitable upstream and downstream release points for adult and juvenile fish; (3) describe the location, functional design, and operating characteristics of all upstream and downstream fishways; and (4) include schedules and milestones for their timely modification, operation, and evaluation. Interior also prescribes that within 1 year of license issuance, Idaho Power develop a post-construction monitoring plan and implementation schedule to monitor fishway effectiveness.

In response, Idaho Power submitted an alternative section 18 prescription that, like Interior's prescription, would proceed with modifying the Hells Canyon fish trap and construction of the Pine Creek weir. For the Oxbow fish trap and the Indian Creek and Wildhorse River weir and trap fishways, however, Idaho Power specifically identified the types of triggers that would be included in its passage plan to control the timeline of construction. Under Idaho Power's alternative prescription, these triggers would be based on the status of bull trout within these tributaries in terms of their abundance, the potential for hybridization with non-native brook trout, the potential of the fishways to contribute toward recovery, and habitat conditions necessary to support bull trout. Idaho Power's alternative prescription also specifies that development of functional designs and monitoring plans would not be initiated until the trigger criteria for a facility have been met. The plan would also include: (1) final engineering design plans for modification of the Hells Canyon fish trap and the Pine Creek monitoring weir and trap, as well as operating protocols; (2) locations of release points and handling of all lifestages of bull trout and other fish collected at the two facilities; (3) provisions for bull trout transport between Pine Creek and Hells Canyon dam; (4) an assessment of monitoring needed to evaluate the risk of introducing deleterious pathogens; and (5) a post-construction monitoring plan.

We agree with the approach identified in Idaho Power's alternative prescription of establishing a more detailed set of triggers that must be met before the Oxbow fish trap and the Indian Creek and Wildhorse River weirs would be constructed. Inclusion of these more detailed trigger points would be more cost-effective and help ensure that the facilities would provide a biological benefit. In addition, developing functional designs and monitoring plans after trigger criteria for a facility have been met would allow experience and knowledge gained from early phases of the program to be applied to maximize the effectiveness of any facilities that would be constructed.

As recommended by ODFW (ODFW-18), a risk analysis that considered the genetic and demographic effects of increased immigration and emigration would be useful in developing procedures for translocation within the fish passage plan. However, we conclude that the demographic and genetic benefits of transferring fish that are collected in adult traps or tributary weirs to upstream or downstream populations can be considered based on the population data that were collected by Idaho Power in its licensing studies, which includes information on the distribution and abundance of bull trout populations and the abundance of brook trout and brook trout hybrids. Furthermore, Idaho Power would collect additional information on population demographics through trigger-related monitoring efforts under its alternative fishway prescription, which we include in the Staff Alternative.

ODFW also recommends (ODFW-36b and 37) that Idaho Power evaluate mortality associated with spill and turbine passage. Depending on the release locations of bull trout collected in the dam traps or tributary weirs, evaluating turbine or spill mortality would help to quantify any losses associated with these passage routes. However, fish collected in traps or weirs could be transported directly to other tributaries without being subjected to dam passage. Depending on the relative numbers of fish ultimately released into the project reservoirs, evaluating turbine and spill mortality may not be relevant. Radio

telemetry studies, however, would help to determine the susceptibility of resident salmonids that may be released into the project reservoirs to turbine entrainment and mortality, and this information would be useful for guiding decisions on optimal release locations for fluvial fish that are collected as they emigrate from project tributaries. For example, if bull trout released into Hells Canyon reservoir were found to be subject to a high degree of entrainment mortality, then a decision could be made to release fish that are collected emigrating from Pine or Indian Creeks downstream of Hells Canyon dam instead of into the reservoir. We included these types of post-construction facility evaluations along with monitoring related to triggers for their construction in our estimate of the cost of Idaho Power's alternative prescription, which we include in the Staff Alternative.

The provision of passage for native resident salmonids within the project would reestablish connectivity among currently isolated populations. Due to small population sizes and obstructed immigration and gene flow between populations, bull trout populations are particularly vulnerable to the effects of environmental variations such as low water years and hot meteorological conditions. Providing passage between isolated tributaries and the Snake River would enhance fluvial life histories. Likewise, providing passage would allow bull trout to access additional thermal refugia and forage, as well as spawning and rearing habitat. Collectively, these additional resources could result in increased growth, fecundity, and egg deposition and, consequently, abundance. Although redband trout populations are less sensitive to environmental variation, they would similarly benefit from increased connectivity.

We estimate the annualized cost of the FWS preliminary fishway prescription (Interior-87) to be \$1,927,000, and the cost of Idaho Power's alternative fishway prescription to be \$1,369,400.<sup>83</sup> Inclusion of the more detailed set of triggers in Idaho Power's alternative prescription would ensure that facilities are not constructed prematurely, and would help to ensure that bull trout populations benefit from any facilities that are constructed. Given the more detailed triggers that are included in Idaho Power's alternative prescription and our analysis of benefits to bull trout presented above, we conclude that Idaho Power's alternative section 18 fishway prescription is worth the cost, and we include it in the Staff Alternative, but with one modification. The modification is the deferment of Pine Creek weir construction until 5 years after license issuance. This deferment would allow initial efforts at brook trout control in Indian Creek to be evaluated and considered for application in Pine Creek prior to transferring bull trout into Pine Creek from downstream of Hells Canyon dam.

#### **5.2.4.5 Tributary Habitat Improvements**

As discussed in the preceding section, construction and operation of the Hells Canyon Project has adversely affected bull trout and redband trout populations in the project area, primarily through a loss of habitat connectivity. These species require access to high quality tributary habitat for every life stage and life history. Through a variety of causes, resident salmonid habitat in tributaries to the project has been degraded. The project has contributed to the degradation of habitat quality and ecological function by inundating low-gradient sections of the tributaries, precluding anadromous fish from contributing nutrients and forage important for supporting bull trout, and reducing connectivity among bull trout populations due to adverse water quality conditions in project reservoirs.

As part of its proposed native salmonid plan, Idaho Power proposes to prepare and implement a tributary enhancement plan targeted to benefit bull trout within the project area (Pine Creek, Indian Creek, and Wildhorse River basins and smaller tributaries to project reservoirs). This plan would include

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<sup>83</sup> For Interior's prescription, we assumed that the Indian Creek weir and trap fishway, the Oxbow adult trap and the Wildhorse River weir and trap fishway would all be constructed 5 years after license issuance. For Idaho Power's alternative prescription, we assumed that the Indian Creek weir and trap fishway would be constructed 10 years after license issuance and the Oxbow adult trap and Wildhorse River weir and trap fishway would be constructed 20 years after license issuance.

a technical advisory committee that would work with landowners adjacent to the tributaries to identify, prioritize, and recommend actions needed to improve bull trout habitat. Specific measures that would be considered in the plan include: (1) construction of irrigation diversion screens; (2) conservation easement agreements; (3) construction of riparian corridor fences (implementation of this measure would also depend on landowner maintenance agreements); (4) purchase or lease of water rights from willing sellers (these water rights would have to be those that can be demonstrated to provide improved instream flow in critical areas, especially those extending the coldwater refuge potential near the upper portions of streams that serve as spawning and rearing areas, and would apply only in Oregon tributaries); (5) land acquisition along key riparian corridors; and (6) instream habitat enhancement measures in critical spawning and rearing areas. The native salmonid plan would also include provisions for brook trout eradication in Indian Creek, a presence/absence survey in Eagle Creek (Powder River Basin), and restoration of stream nutrients through distribution of salmon carcasses or alternative nutrient supplements within known rearing areas in the Pine-Indian-Wildhorse core area. We evaluate Idaho Power's proposed measures in more detail, along with related recommendations received from ODFW, IDFG, Interior, and AR/IRU, in section 3.6.2.10, *Tributary Habitat Improvements*, and in section 3.3.2.11, *Marine-Derived Nutrients*.

Bull trout are extremely sensitive to environmental change because of their specific habitat requirements. Water temperature, in particular, may be the most critical factor affecting the suitability of habitat for bull trout. The prospective habitat enhancement measures proposed by Idaho Power and recommended by the agencies would reduce the effects of water- and land-use practices that alter stream temperatures. Depending on the scope of the measures taken, curtailing certain land-use practices and increasing instream flow would also indirectly enhance physical instream habitat by increasing woody debris contribution and vegetative cover, reducing erosion and sedimentation, enhancing natural geomorphological processes, and increasing wetted area. Measures targeted directly at enhancing physical habitat have the potential to increase population abundance by increasing the amount of spawning, rearing, and adult habitat available to bull trout. Although redband trout have generally less-specific habitat requirements, the proposed and recommended physical habitat enhancement measures would similarly enhance habitat for this species as well. Reestablishing connectivity among tributary populations by eliminating barriers and reducing entrainment by screening irrigation diversions would improve the health of the fluvial component and increase the viability of resident bull trout subpopulations.

Hybridization and competition with nonnative brook trout poses a serious risk to overlapping bull trout populations. Hybridization reduces the fertility and survival of progeny, and brook trout may out-compete and displace bull trout when resources are limited. Any action that limits hybridization by eliminating or reducing brook trout numbers could reduce the risk of extirpation of bull trout populations.

The bull trout populations that constitute the Hells Canyon Recovery Unit include the Pine-, Indian-, and Wildhorse core area and the Powder River core area. These core areas contain local populations, and are areas identified as containing potential spawning and rearing habitat. ODFW (ODFW-38) recommends that the habitat enhancement efforts also include the Burnt River Basin, and IDFG (IDFG-16) recommends that tributary habitat enhancement measures also include the Weiser River. Idaho Power's tributary enhancement plan would include improvements in the Pine Creek, Indian Creek, and Wildhorse River basins, but would not include measures in the Burnt River or Weiser basins. Based on our review of the record for this proceeding, we conclude that the three basins identified by Idaho Power have the greatest potential for restoring connectivity among bull trout populations among the basins that are directly affected by the project. We find little support in the record indicating that there is potential for meeting either of these objectives in the Burnt River Basin in the near term, and the Weiser Basin is located upstream of Brownlee reservoir and is not directly affected by the project. Aquatic resources in the Pine, Indian, and Wildhorse basins, and bull trout in particular, have been substantially affected by the loss of access to anadromous fish, which has reduced productivity and the forage base available to bull trout. Poor water quality conditions in project reservoirs also impede connectivity

among bull trout populations in these basins. As a result of the adverse effects on bull trout in these basins, we conclude that the appropriate geographic scope of the tributary habitat improvement plan is the Pine Creek, Indian Creek, and Wildhorse River basins, and smaller tributaries to the Hells Canyon Project reservoirs. Given the limited understanding of bull trout distributions and habitat conditions in some tributaries to the project, the proposed surveying and monitoring efforts would help to determine the feasibility and utility of future reintroduction and habitat restoration efforts.

AR/IRU (AR-IRU-11b) and Interior (Interior-41) recommend that anadromous fish be reintroduced upstream of Hells Canyon dam as a means to increase forage opportunities for bull trout, and ODFW (ODFW-39) and IDFG (IDFG-17) recommend that nutrient supplementation be implemented in tributaries to improve forage opportunities for bull trout. As we discuss in section 5.2.4.3, *Anadromous Fish Restoration*, we conclude that until a comprehensive resource or recovery plan is put forward for restoring anadromous fish upstream of Hells Canyon dam, it would not be prudent to advocate for the reintroduction of steelhead, spring Chinook, or fall Chinook upstream of the Hells Canyon Project. We conclude, however, that evaluation of nutrient augmentation in the form of carcass outplants or nutrient analogs is warranted to improve forage opportunities for bull trout, but the risk of introducing pathogens from carcass outplants would need to be assessed before such a program is undertaken.

Idaho Power's proposed tributary enhancement program would have a total capital cost of \$8.5 million. Although Idaho Power did not specify a time frame for implementation, its response to AIR DR-4 indicates that the funding would be allocated in year 1, which equates to an annualized cost of \$928,400. ODFW recommends that Idaho Power contribute \$750,000 annually over the term of the license. IDFG does not specify a recommended amount of funding. Idaho Power's proposed plans for nutrient enhancement, conducting the Eagle Creek presence/absence survey, and brook trout eradication in Indian Creek would have annualized costs of \$40,000, \$42,700, and \$51,700, respectively.

Implementing Idaho Power's tributary habitat enhancement program would help to reestablish connectivity among bull trout populations, increase available habitat and population sizes, and increase the viability of subpopulations within the Pine-Indian-Wildhorse core area. Such measures would concurrently benefit redband trout populations as well. Idaho Power's proposed brook trout eradication effort would allow brook trout populations in Indian Creek to be brought under control before bull trout passage to this tributary is restored, which would substantially improve the potential benefits of providing passage. We note, however, that Idaho Power identified hybridization with brook trout as a substantial problem in the Wildhorse River, and that brook trout are known to occur in one or two tributaries to Pine Creek. Therefore, the Staff Alternative would extend brook trout control efforts into these basins using techniques that prove to be effective in Indian Creek. We conclude that efforts in both basins can be accommodated in a phased approach for the same cost as Idaho Power's proposal. We also conclude that Idaho Power's proposed bull trout presence/absence survey in Eagle Creek would help to determine the distribution of bull trout in tributaries that are affected by the project, and could identify enhancement opportunities that could be implemented through the tributary enhancement plan. Finally, Idaho Power's proposal and the resource agency recommendations to supplement nutrients in tributaries using spawned salmon carcasses or nutrient analogs (IDFG-17 and ODFW-39) would replace much needed nutrients lost from the system and would increase growth rates, and consequently fecundity, of bull trout and redband trout. Because of the benefits to be derived by the federally listed bull trout and native redband trout at a reasonable cost, we include Idaho Power's tributary habitat improvement plan, brook trout suppression efforts, Eagle Creek bull trout presence/absence survey, and marine-derived nutrient supplementation program in the Staff Alternative.

#### **5.2.4.6 Fish Pathogen Assessment**

Prospective measures to restore anadromous fish, improve connectivity among resident fish populations, and supplement marine-derived nutrients through carcass outplants have the potential to

introduce fish pathogens to areas within and upstream of the project. These pathogens could adversely affect resident fish populations, including the federally listed bull trout.

Before implementing prospective passage measures, Idaho Power proposes to develop, fund, and implement a pathogen risk assessment plan for the Pine-, Indian-, and Wildhorse Core areas, after consultation with ODFW and IDFG fish pathologists. Following an initial assessment of pathogen risks, Idaho Power proposes follow-up surveys at 5-year intervals if the initial risks associated with upstream passage were deemed acceptable and passage was provided.

IDFG, AR/IRU, and the Shoshone-Bannock Tribes (IDFG-12 and AR/IRU-7d and 9c) support Idaho Power's proposal, but IDFG recommends that Idaho Power begin consultation with the IDFG Fish Health Laboratory prior to the issuance of a new license to discuss potential pathogens, sampling protocols, and priority sampling locations. Although supporting the measures proposed by Idaho Power, ODFW (ODFW-21) recommends the expansion of pathogen surveying and monitoring to both native resident and anadromous populations above, within, and below the project. In addition, ODFW recommends that the development of a pathogen assessment plan take place in the first year, and initial assessment in the third year, following issuance of a new license. ODFW also recommends that Idaho Power provide funding for a fish health specialist, supplies, and services associated with production of hatchery fish and the fish passage program, as well as fish health examination and storage areas.

In its April 10, 2006, submittal to the Commission, Idaho Power agrees with ODFW that there is a need to employ a fish pathologist to work with management agencies in addressing risks associated with the introduction of fish pathogens. Idaho Power also explicitly defines the scope of the proposed pathogen assessment as including the Snake River downstream of Hells Canyon dam (including the Imnaha River), Hells Canyon reservoir, and Oxbow reservoir during initial passage and restoration efforts.

By increasing the connectivity among currently isolated native resident salmonid populations, fish passage measures proposed by Idaho Power would increase the risk of pathogen transfer among these populations. In section 3.6.2.9, *Fish Pathogen Assessment*, we conclude that a comprehensive assessment of pathogen risks associated with resident salmonid passage would require the expansion of efforts beyond the Pine Creek, Indian Creek, and Wildhorse River basins if passage were provided beyond Oxbow and Hells Canyon reservoirs. Further, because resident fish from downstream of the project would potentially gain access to these tributaries, an assessment of the distribution of pathogens downstream of Hells Canyon dam would also be warranted.

As part of Idaho Power's alternative fishway prescription, which we include in the Staff Alternative, Idaho Power states that the bull trout passage plan would include an assessment of monitoring needed to evaluate the risk of introducing deleterious pathogens. We assume that the effort would include monitoring of pathogens among salmonid populations every 5 years, as proposed by Idaho Power, and the hiring of a full-time fish pathologist, as agreed to by Idaho Power. We conclude that hiring of a full-time pathologist is warranted to minimize the risk of spreading disease pathogens into bull trout populations upstream of Hells Canyon dam, and that a full-time pathologist would also help to manage disease issues associated with Idaho Power's hatchery operations and help to control disease risks among federally-listed salmon stocks downstream of Hells Canyon dam. The annualized cost of this expanded measure is estimated at \$107,100, \$72,400 more than Idaho Power's proposed plan. We include this cost within our estimate of the cost of Idaho Power's alternative prescription, and we conclude that the increased cost is justified by the expected benefits. In our cost estimate we assume that the fish pathologist would be hired when the Pine Creek weir is constructed and passage into Pine Creek would be initiated. As we discuss in section 5.2.4.4, we have deferred construction of the Pine Creek weir until 5 years after license issuance, to enable implementation of brook trout control efforts.

#### 5.2.4.7 Oxbow Bypassed Reach Flows

Diversion of flow through the Oxbow powerhouse reduces flow in the 2.5-mile-long bypassed reach immediately downstream of the dam, affecting the quantity and quality of habitat available to bull trout. Idaho Power currently releases a minimum flow of 100 cfs through the bypassed reach, and proposes to continue this release over the term of a new license.

Interior (Interior-43) recommends that, within 1 year of the issuance of a new license, Idaho Power develop and implement a plan to provide sufficient flow in the Oxbow bypassed reach to meet water quality standards and life history requirements for bull trout. The plan would focus on the duration, timing, and quantity of flow necessary to provide for the movement, foraging, and rearing of adult and sub-adult bull trout in the Oxbow bypassed reach, including unrestricted access to Pine and Indian creeks. Interior (Interior-63) also recommends that Idaho Power provide adequate flows and oxygen supplementation to maintain water quality parameters in the Oxbow bypassed reach.

AR/IRU (AR/IRU-11c) recommends that Idaho Power provide sufficient flows in the Oxbow bypass to allow physical access to the proposed Oxbow fish trap, as well as to maintain adequate water quality for bull trout.

The Oxbow bypassed reach currently provides overwintering habitat for bull trout and redband trout. However, high temperatures and low dissolved oxygen concentrations render this area unsuitable for native resident salmonids during warmer months when they typically seek refuge in Pine and Indian creeks. In section 3.5.2.5, *Oxbow Bypassed Reach Flows*, we note that the poor water quality conditions in this reach are largely a result of the water released from Oxbow reservoir and, at higher reservoir elevations, inundation from the upper end of Hells Canyon reservoir. Study results indicate that increasing flow would provide little improvement in water quality conditions in the bypassed reach. Further, we conclude that increasing bypass flow would not substantially increase the amount of habitat suitable for native resident salmonids, because, although increasing flow would increase the wetted width of the bypassed reach, study results indicate that corresponding increases in velocity reduced the suitability of available habitat. We estimate the annualized cost of providing oxygen supplementation as recommended by Interior would be \$447,800 and the effect of providing bypass flows would be a reduction in power benefits of \$1.6 million per year,<sup>84</sup> for an overall net power benefit reduction of \$2.05 million.

We conclude that increasing flows in the Oxbow bypassed reach would be unlikely to improve water temperatures for native resident salmonids during the summer months, and based on the habitat modeling results from the instream flow study conducted by Idaho Power, that the proposed minimum flow release of 100 cfs maximizes the amount of overwintering habitat that is available for these species. Accordingly, we include Idaho Power's proposed 100-cfs Oxbow bypass flow in the Staff Alternative, and we do not include Interior's recommendation for higher bypass flows and oxygenation. There is no incremental cost of this measure because it is part of the current operation.

As part of its section 18 fishway prescription, Interior (Interior-87) prescribed measures and operations necessary to provide adequate attraction flow to safely and rapidly attract bull trout into the Oxbow trap for collection and transport. We conclude that following construction of the Oxbow trap, radio-tracking studies would be necessary to demonstrate accessibility conclusively, and to ensure that a high percentage of fish are able to locate and enter the trap. We included costs for these types of post-construction facility evaluations along with monitoring related to triggers for their construction in Idaho Power's alternative prescription, which we include in the Staff Alternative. Interior also expressed

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<sup>84</sup> Our estimate is based on the following assumptions: (1) an additional 900 cfs would be required from May through October; (2) Idaho Power's power factor of 0.0072 MW/cfs (Bowling and Whittaker, 2005) would apply; and (3) the overall power value is \$53 per MWh.

concern regarding the accessibility of Pine and Indian creeks to bull trout seeking refuge from the bypassed reach. These types of passage obstructions would be evaluated and addressed as part of Idaho Power's proposed tributary habitat improvements, which we also include in the Staff Alternative.

#### **5.2.4.8 Hatchery Production**

Idaho Power's hatchery system has been in operation since initial attempts to provide passage were discontinued several years after Brownlee and Oxbow dams were constructed. The intent of the hatchery production was to mitigate for the loss of upstream production of salmon and steelhead and provide fish for harvest.

Idaho Power proposes to continue anadromous fish production at its hatchery facilities at the same levels specified in the 1980 Hells Canyon Agreement and the current license. This includes producing 3 million spring Chinook salmon smolts at the Rapid River Hatchery, 1 million summer Chinook salmon smolts at the Pahsimeroi Hatchery, 1 million fall Chinook smolts at the Oxbow hatchery, and 400,000 lbs of steelhead smolts. Idaho Power also proposes to make improvements to their hatchery facilities and to hire a full-time biologist to conduct monitoring and evaluation studies of their hatcheries' performance. We summarize the proposed improvements and agency recommendations pertinent to hatchery production and operations in section 3.6.2.12, *Hatchery Production*.

Idaho Power's proposals and agency and tribal recommendations to upgrade, modify, and in some cases expand, its hatchery facilities or operations would increase efficiencies, capacities, and staff safety to better meet current and future production goals, as well as monitoring and evaluation requirements. Updating facilities with more current technology could also decrease fish handling stress and mortality.

To address the many recommendations provided by the parties, and effectively integrate them with Idaho Power's hatchery proposals, we identify in section 3.6.2.12, *Hatchery Production*, the need for Idaho Power to develop a hatchery management plan for each hatchery in consultation with the agencies and tribes, and to submit the plans to the Commission for approval. The plans would address production goals associated with potential effects to federally listed stocks; evaluation of appropriate hatchery modifications, upgrades, and operating procedures to accomplish those goals; production and distribution of surplus fish from each hatchery program to maximize benefits to restoration efforts and to tribal and recreational fisheries; and the long-term monitoring and evaluation of each hatchery's operation. Establishing such plans would ensure that Idaho Power, agency, and tribal objectives are addressed and incorporated, where reasonable and feasible, into the hatchery programs funded by Idaho Power. Reviewing and updating the hatchery plans on an on-going basis would provide a mechanism to make necessary modifications to the program to respond to changing hatchery production needs and meet production goals.

We estimate the incremental annualized cost of developing and implementing the four hatchery management plans at \$94,400. This would be in addition to the estimated \$2.28 million annual cost of Idaho Power's hatchery proposals. We include Idaho Power's hatchery proposals in the Staff Alternative, along with development and implementation of the staff-identified hatchery management plans.

We do not include recommendations made by IDFG (IDFG-4), Interior (Interior-48), and ODFW (ODFW-26) that would require Idaho Power to replace hatchery production goals based on smolt production with goals based on adult escapement or returns to sport and commercial fisheries. Replacing hatchery production goals with escapement goals to the hatchery or to fisheries would be difficult, given the external management and environmental factors that affect escapement success in any given year. As a result, we are not able to estimate the cost of ODFW's proposed measure. We have identified a staff-developed measure that would require Idaho Power to work together with IDFG, NMFS, ODFW, Interior and the tribes to develop a hatchery management program that establishes production goals that would be sufficient to mitigate for project effects and contribute to agency goals for management of affected stocks.

The Shoshone-Bannock Tribes (SBT-4) recommend that Idaho Power develop two hatcheries in Yankee Fork and Panther Creek for the purpose of recovering wild stocks of sockeye and Chinook salmon and steelhead. While the cost of these facilities would depend upon their size and production capacity, annualized costs would likely exceed \$1 million even for modest-sized hatcheries. The Yankee Fork, a tributary to the Salmon River near Sunbeam, Idaho, historically supported populations of spring/summer Chinook. Panther Creek flows into the Salmon River east of the confluence of the Middle Fork Salmon River. Runs of Chinook salmon and steelhead in Panther Creek were largely eliminated as a result of mining activities in the drainage beginning in the 1940s. The tribes report that restoration activities have resulted in near complete restoration of these tributaries, and that they could again support native fish populations.

Providing additional sources of fish in the aforementioned tributaries would help in restoration efforts and provide harvest opportunities for recreational, cultural, and ceremonial purposes in this portion of the Salmon River drainage. In section 3.6.2.12, we conclude that it is unlikely that the fisheries in Panther Creek and Yankee Fork are being affected by the continued operation of the Hells Canyon Project. Accordingly, we do not include this recommendation in the Staff Alternative. We note, however, that there may be opportunities to use any available production space or surplus adult fish from Idaho Power's hatchery system to assist with restoration of these fisheries.

#### **5.2.4.9 Warmwater Fisheries**

Seasonal changes in water levels in Brownlee reservoir may affect the reproductive success of warmwater fish species including smallmouth bass, black crappie, white crappie, and channel catfish. These species support a substantial recreational fishery that is important to the economy of local communities.

To promote spawning success for warmwater fish species, Idaho Power proposes to limit the drawdown of Brownlee reservoir during the spawning period. Beginning on May 21, reservoir spawning habitat would be protected for a 30-day period, during which time the reservoir would not be drafted more than 1 foot from the highest elevation reached during the 30-day period, although exceptions would be allowed for system or economic emergencies. From the end of the 30-day period through July 4, the reservoir could be drafted more than 1 foot, but an elevation of at least 2,069 feet msl would be maintained through July 4. ODFW also recommends that Idaho Power conduct annual creel surveys in all three project reservoirs (ODFW-50) and studies of the food habits of warmwater fish species, including the effects of reservoir operations on zooplankton production (ODFW-52).

ODFW (ODFW-51) and IDFG (IDFG-27) recommend the same operating constraints that Idaho Power proposes to protect warmwater fish spawning, although ODFW recommends that drawdown of Brownlee reservoir to levels below elevation 2,069 msl be allowed if flow augmentation (for salmon migration) occurs before July 4.

In section 3.6.2.1, *Effects of Project Operation on Aquatic Resources*, we conclude that limiting reservoir fluctuation to a maximum of 1 foot from May 21 through June 20, as proposed by Idaho Power and recommended by ODFW and IDFG, would minimize adverse effects to smallmouth bass over their entire spawning season and limit adverse effects to crappie in the latter half of their spawning season. Limiting drawdown to elevation 2,069 (an 8-foot drawdown from full pool) through July 4 should protect early-spawning channel catfish but would afford little protection to later spawning fish, since their spawning period extends to the end of July and nests may remain active until mid-August. Our analysis of proposed and alternative operating scenarios, however, indicates that there is a relatively small potential for adversely affecting channel catfish, even with the drawdown associated with flow augmentation.

Since the proposed limitations are similar to current operations, any incremental cost of this restriction would be negligible. Therefore, we include this Brownlee reservoir warmwater fish spawning protection measure in the Staff Alternative.

To address the potential for conflict between this measure and other operating requirements in the Staff Alternative, and to address ODFW's (ODFW-51) concern that the limitation not restrict flow augmentation releases, we also indicate in the Staff Alternative that the requirement for warmwater fish spawning protection would be secondary to any conflicting operational requirements.

We do not include ODFW's recommendations (ODFW-50 and ODFW-52) to conduct annual creel surveys in all three project reservoirs and to conduct studies of the food habits of warmwater fish species, including the effects of reservoir operations on zooplankton production. We conclude that, due to the inherent variability in creel surveys, Idaho Power's proposed fish population monitoring effort using electrofishing techniques would provide more reliable information on the status of warmwater fisheries at a substantially lower cost. We also see no benefit of conducting a food habits study of warmwater fish species. Based on fish condition factors measured in Idaho Power's studies, it appears that warmwater fish populations are not limited by food supply. We do not see how either of these measures would provide any benefit to reservoir fisheries beyond the measures that are already proposed by Idaho Power. We estimate that ODFW's recommendations would have an annualized cost of \$278,500.

#### **5.2.4.10 Sturgeon Conservation Measures**

Construction of the Hells Canyon Project, 10 other dams on the Snake River downstream from Shoshone Falls, and other mainstem dams on the Columbia River has eliminated upstream connectivity and gene flow among sturgeon populations over most of their historical range in the basin. Idaho Power's monitoring studies indicate that little or no recent recruitment has occurred in seven of the nine populations that are isolated by mainstem dams on the Snake River between Shoshone Falls and Lower Granite dam (refer to section 3.6.2.13, *Sturgeon Conservation Measures*).

Idaho Power established a technical committee to address sturgeon conservation issues associated with its mainstem hydroelectric projects within the historical range of the white sturgeon, which includes the Hells Canyon Project and five upstream developments (Upper Salmon Falls, Lower Salmon Falls, Bliss, C.J. Strike, and Swan Falls). In consultation with the technical committee, Idaho Power developed a conservation plan that identifies the following conservation measures, which are part of Idaho Power's proposal for the Hells Canyon Project: (1) assessment of water quality-related impacts on early life stages of white sturgeon in the Swan Falls to Brownlee reach; (2) translocation of reproductive-sized white sturgeon to the Swan Falls to Brownlee reach to increase spawner abundance and population productivity; (3) development of an experimental conservation aquaculture plan; (4) periodic population assessments; and (5) monitoring of genotypic frequencies.

Recommendations by agencies, tribes, and NGOs relating to sturgeon conservation are summarized in section 3.6.2.13, *Sturgeon Conservation Measures*. The recommendations address Idaho Power's proposed measures, but also identify several additional measures, including evaluating the need for passage or anti-entrainment measures, measures to improve water quality, monitoring of contaminant bioaccumulation, and changes in operations to improve reproduction at Idaho Power's upstream projects.

Regarding actions associated with the upstream Idaho Power projects, Article 407 of the licenses issued for the Upper Salmon Falls, Lower Salmon Falls and Bliss Projects and Article 408 of the license issued for the C.J. Strike Project required Idaho Power to develop a white sturgeon conservation plan to include appropriate measures for the protection and enhancement of white sturgeon in the Snake River. Idaho Power filed an updated version of the plan in compliance with these license articles in August 2005. The Commission is currently reviewing the plan, and implementation of any measures associated with the

upstream projects would be implemented through Commission approval of the plan. Accordingly, we do not include any measures associated with the upstream projects in the Staff Alternative.

Several parties also recommended that the conservation plan be updated to include their recommendations (CTUIR-13, IDFG-24, Interior-51, NPT-18, ODFW-42), and Interior (Interior-52) recommended that Idaho Power develop an action plan to coordinate implementation. However, because implementation of measures at each project are subject to approval through the Commission's post-licensing process, we conclude that it would be more efficient to refine and specify the measures associated with each facility through the post-licensing process, which allows opportunity for resource agency and tribal consultation on the measures that are proposed. Accordingly, we do not recommend that the white sturgeon conservation plan be updated or an action plan be developed.

The results of Idaho Power's sampling program indicates that the sturgeon population is particularly depressed in the Swan Falls dam to Brownlee segment and in all three of the Hells Canyon project reservoirs. The lack of recruitment in the Swan Falls reach despite the presence of adult sturgeon suggests that water quality conditions may be affecting spawning success or the survival of early lifestages. Idaho Power proposes a phased approach to rebuilding the white sturgeon population in the Swan Falls to Brownlee reach, which would start with studies to evaluate the effects of water quality conditions on spawning success and survival of early life-stages. Based on the results of these studies, adult sturgeon would be translocated from a donor population, or, if current water quality conditions would not support natural reproduction, a conservation aquaculture program would be implemented to rebuild white sturgeon populations in the Swan Falls to Brownlee reach. Idaho Power does not propose any measures to rebuild sturgeon populations in the project reservoirs.

We conclude, in section 3.6.2.13, that implementation of a conservation hatchery program would have several advantages as a means for rebuilding sturgeon populations, and that risks associated with potential adverse genetic effects can be satisfactorily addressed. This approach would provide a much greater level of assurance that juveniles could be recruited to the recipient populations on a yearly basis, providing a more rapid and certain path towards rebuilding sturgeon populations to levels that could support both recreational catch and release and tribal harvest fisheries. Because sturgeon are a highly fecund species, collection and spawning of a small number of adult fish each year could provide sufficient juvenile production to rebuild sturgeon populations in the Swan Falls reach and in Brownlee, Oxbow and Hells Canyon reservoirs. We estimate that expanding the conservation aquaculture program to include stocking sturgeon in other reaches would increase the annualized cost of the program from \$28,000 to \$42,000.

Proceeding directly with a conservation aquaculture program would render Idaho Power's proposed assessment of water quality-related impacts on early lifestages of white sturgeon unnecessary. Because white sturgeon are a very slow-maturing species, it is likely that water quality conditions in the Swan Falls to Brownlee reach will have improved, through TMDL implementation, by the time planted sturgeon approach maturity.

We do not include recommendations made by AR/IRU, IDFG, ODFW, or Interior relating to white sturgeon genetic monitoring (IDFG-26, Interior-51 and ODFW-48), translocation (IDFG-23, Interior-51, ODFW-47), or assessment of water quality effects on early life stages (AR/IRU-12b, IDFG-22, Interior-51 and ODFW-46). The information that we have reviewed indicates that white sturgeon in the Snake River are a very long-lived species that, prior to dam construction, migrated freely throughout the Snake and Columbia rivers. We conclude that the conservation aquaculture plan included in the Staff Alternative would be more effective in restoring sturgeon populations by restoring gene flow from downriver populations. It would provide the most effective means of rebuilding sturgeon populations to provide fisheries in river segments where populations are currently limited by a range of factors including lack of suitable spawning habitat, larval emigration, or inadequate water quality to support reproduction. By carefully designing the program, genetic risks could be minimized and the benefits of restoring gene

flow and maintaining genetic variability would be realized. Juvenile sturgeon stocked as part of the program would not attain reproductive age for 10 to 20 years, by which time water quality conditions would likely have improved through TMDL implementation. This may make natural reproduction feasible in reaches such as the Swan Falls reach, where the potential for successful reproduction may be limited by current water quality conditions. We estimate the annualized cost of genetics monitoring, translocation, or studies of the effects of water quality on early lifestages to be \$93,800, and we conclude that the additional benefits from implementing these studies are not sufficient to justify their cost.

Based on the foregoing, we include in the Staff Alternative, Idaho Power's proposed Snake River White Sturgeon Conservation Plan, but exclude three elements: (1) the water quality-related impact assessment; (2) the translocation of reproductive-sized fish; and (3) the monitoring of genotypic frequencies. We modify the conservation aquaculture plan element to require that the plan include stocking in project reservoirs. The net effect of these deletions and modifications is to reduce the annualized cost of Idaho Power's proposed White Sturgeon Conservation Plan from \$170,800 to \$137,900. Idaho Power could, however, elect to voluntarily comply with these elements.

We do not include AR/IRU (AR/IRU-12e) and Interior's (Interior-50b) recommendations that Idaho Power evaluate the potential need for, and benefits of, implementing measures to protect sturgeon from entrainment and impingement. The potential for impinging juvenile sturgeon could increase substantially if trash rack spacing were reduced in an attempt to limit entrainment, and installing a fish screening system that provided sufficiently low velocities to limit impingement of juvenile sturgeon would involve modifications with costs in the order of tens of millions of dollars for each development. We conclude that the conservation aquaculture program provides a far more cost-effective means for rebuilding sturgeon populations to levels that would support viable recreational and tribal fisheries throughout the species' historical range in the Snake River.

We also do not include AR/IRU or ODFW's (AR/IRU-12d and ODFW-19) recommendations to conduct a study to determine whether white sturgeon passage is feasible and desirable. We conclude in section 3.6.2.13 that, due to a lack of proven technology, the construction of upstream passage facilities is not currently a viable means for restoring Snake River sturgeon populations or for maintaining the genetic variability. Further, we conclude that providing sturgeon passage, even if it were to become technically feasible, would not be as effective as a conservation aquaculture program for rebuilding sturgeon populations.

We also do not include ODFW's (ODFW-43) recommendation that Idaho Power evaluate bioaccumulation of contaminants in white sturgeon in Hells Canyon and Oxbow reservoirs and between Brownlee and Swan Falls dams, which we estimate would have an annualized cost of \$32,100. Because juvenile sturgeon that would be stocked as part of the conservation aquaculture program would not attain reproductive age for 10 to 20 years, levels of legacy contaminants that remain in the environment may be substantially reduced by the time that these fish are approaching maturity. Monitoring the bioaccumulation of contaminants in shorter-lived species would provide a better means of monitoring contaminant levels in the environment, and of risks to the angling public and fish-eating wildlife. Because low dissolved oxygen levels related to the project may act to increase the uptake and bioaccumulation of these types of contaminants, we recommend adopting ODFW's recommendation (ODFW-57) to evaluate the bioaccumulation of mercury, dieldrin, and DDT/DDE in Brownlee reservoir fish, which we estimate would have an annualized cost of \$21,400.

#### **5.2.4.11 Invertebrate Monitoring**

The invertebrate community downstream of Hells Canyon dam includes a number of special status mollusk species, and the composition of the aquatic invertebrate, periphyton and macrophyte communities serve as an indicator of water quality conditions as well as the food resources that are available to native species of fish including juvenile fall Chinook salmon, bull trout, redband trout, and

white sturgeon. Long-term monitoring can be useful for tracking ecological responses to changes in basin conditions and project operations, and the implementation of aquatic resource enhancement measures. Idaho Power does not propose any such monitoring efforts.

AR/IRU (AR/IRU-14) recommends that an adaptive management approach be employed to assess and mitigate project effects to the benthic community in the Snake River within and downstream of the project. Interior (Interior-70, 71, 72 and 73) recommends several monitoring programs associated with a recommendation to evaluate a series of three operational modes. Interior also recommends establishment and monitoring of experimental populations of Hells Canyon rapids snail and short-faced limpet within 10 miles downstream of Hells Canyon dam (Interior-74), and of western ridged mussel in appropriate habitat (Interior-75). Monitoring of the experimental populations would be conducted during the three operational test periods and continued for the term of the license or as determined to be appropriate.

We find it difficult to assess the potential benefits of AR/IRU's recommendation without knowing what specific measures would be implemented. For this reason, we do not include this measure in the Staff Alternative.

Idaho Power has provided sufficient information to allow us to assess the effects of load following and other operations on aquatic resources; accordingly, we do not include Interior's recommended multi-year study of operating modes in the Staff Alternative. We also see little benefit in Interior's recommendation that Idaho Power establish experimental populations of Hells Canyon rapids snail, short-faced limpet, and western ridged mussel downstream of Hells Canyon dam. In section 3.6.2.15, *Benthic Community Monitoring*, we point out that a wide range of variables could affect the success or failure of an experimental population, and this approach would not be an effective or efficient way to monitor trends in habitat condition over time.

## 5.2.5 Terrestrial Resources

### 5.2.5.1 Special Status Plant and Wildlife Protection

Idaho Power has documented the presence of a number of special status plants and animals in the project area.<sup>85</sup> In section 3.7.2.2, *Special Status Plant Protection*, we conclude that project operations, project-related maintenance, management activities, and recreational activities have the potential to disturb rare plant populations or to disturb the habitat that supports them. Idaho Power proposes to establish a rare plant advisory board that would coordinate the efforts of resource management agencies, local landowners and land managers, and other interested individuals and organizations in protecting sensitive species within the river corridor between the headwaters of Brownlee reservoir and the Salmon River confluence.

Additionally, Idaho Power identified 68 special status wildlife species in the project vicinity (section 3.7.2.8, *Special Status Wildlife*). Idaho Power does not propose to develop focused management plans for any special status wildlife species, but proposes to implement cooperative measures for mountain quail and waterfowl, and has identified several specific projects needed to protect wintering big game, bald eagle nests and roosts, bat hibernacula, neotropical migrant songbirds, and colonial nesting waterbirds.

Federal land managers (Interior and the Forest Service) and other parties provide numerous recommendations regarding the protection and management of special status species. We review these in

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<sup>85</sup> Species with special status includes those that federal or state agencies have listed as threatened, endangered, proposed or candidates for listing, and those designated as sensitive, rare or in need of special management.

sections 3.7.2.2, 3.7.2.8, and 3.8.2.8 through 3.8.2.12. They include Interior-34, a plan to manage threatened, endangered, and special status plants and wildlife on BLM-administered lands; Interior-78, a plan for sensitive plant species management; Interior- 80, a plan to manage mountain quail; Interior-81, a plan to manage bald eagles; Interior- 82, a plan to manage southern Idaho ground squirrels; Interior- 83, incorporating bat protection measures into the Integrated Wildlife Habitat Plan and Wildlife Mitigation and Management Plan; Interior-84, a plan to manage northern Idaho ground squirrels; and Interior-85, incorporating amphibian and reptile protection measures into the Integrated Wildlife Habitat Plan and Wildlife Mitigation and Management Plan.

The Forest Service also provided conditions to guide protection of special status plants and animals. Forest Service preliminary 4(e) condition no. 8 specifies a strategy for managing and monitoring threatened and endangered species on National Forest System lands affected by the project. Forest Service preliminary 4(e) condition no. 9 specifies a plan for managing sensitive species on National Forest System lands affected by the project.

Additionally, IDFG-33 indicates support of Idaho Power's approach to special status plants. ODFW-65 addresses a plan to manage threatened, endangered and sensitive plants and wildlife. ODFW-34 calls for a bald eagle management strategy.

Based on our analysis of Idaho Power's proposals and agency recommendations, we identified the need to consolidate the various proposals into a single project-wide threatened, endangered, and sensitive species management plan covering Forest Service, BLM, and Idaho Power lands within the project boundary and at locations directly affected by project operations, including along the river downstream of Hells Canyon dam. The Threatened, Endangered, and Sensitive Species Management Plan would have both plant and wildlife elements.

We incorporated many aspects of the recommendations into the Staff Alternative's more comprehensive plan, but rejected a few. We do not include in the Staff Alternative recommendations (e.g., ODFW-65) that specify monitoring for particular species (e.g., peregrine falcon), because pre-licensing surveys showed the project does not affect them. We do not include recommendations (e.g., Forest Service preliminary 4(e) condition no. 9) that specify certain survey intervals (e.g., every 2 years for the first 6 years of any new license period, and then every 3 years thereafter) that were not linked to the potential for project effects, concluding it would be more beneficial to tie monitoring frequency to site-specific conditions. For example, seasonal surveys might be needed to provide adequate protection for sensitive plant sites near roads and trails, while 5-year survey intervals might afford adequate protection at more remote sites with a low risk of disturbance. We also do not include recommendations that specify enhancement measures for resources that have not been documented as limiting (e.g., ODFW-64), and recommendations that could be more effectively addressed through implementation of other measures (e.g., Interior-80).

With the plan we include in the Staff Alternative, additional surveys and monitoring would focus on identifying and preventing adverse project effects, not on inventory or trend evaluation. In the case of plants, additional surveys would be conducted at sites where ground-disturbance regularly occurs or is planned in order to provide information useful in planning and implementing projects during any new license period, and to support Idaho Power's preparation of biological evaluations to address potential effects of any proposed actions on federal lands. For wildlife, additional surveys would be conducted if sites are affected by on-going project activities or if proposed measures would cause ground disturbance or habitat loss or alteration (or noise disturbance, in the case of wildlife). We estimate the annualized cost of developing and implementing this consolidated threatened, endangered, and sensitive species management plan at \$28,900.

Addressing federally listed species within the same plan as other special status species would result in a more coherent, comprehensive plan for rare plants, maximize the efficiency of field efforts, and minimize the need for consultation that might otherwise be duplicative. Limiting the scope of the plan to

areas within the project boundary and locations directly affected by project operations would address agency provisions for protection of threatened and endangered species, while assuring that the plan has a nexus to the project and its direct effects. Relying on a flexible schedule based on site-specific threats to rare plant populations and special status wildlife would be both more effective and more economical than relying on a pre-determined surveying and monitoring schedule.

The consolidated, project-wide Threatened, Endangered, and Sensitive Species Management Plan included in the Staff Alternative would specifically address timing restrictions to prevent disturbance to bald eagles and monitoring of nesting, productivity, roosting, and winter use. Although the plan would not include as many winter surveys as Interior recommends or as much habitat enhancement as ODFW recommends, it is otherwise consistent with agency goals of protecting this listed species.

Additionally, the plan would include measures to protect the northern Idaho ground squirrel if this species is found to occur on lands Idaho Power proposes to acquire as mitigation for project effects. The plan also would include measures to protect habitat and reduce disturbance to southern Idaho ground squirrels, bats, amphibians and reptiles, as recommended by Interior. Finally, we recommend bat surveys, because no information about their use of project facilities is available, and O&M and project-related recreation have the potential to adversely affect bats.

#### **5.2.5.2 Noxious Weed and Exotic Invasive Plant Management**

Reservoir fluctuations and flow fluctuations can cause soil disturbance that creates conditions that promote the establishment and spread of noxious weeds and invasive exotic plants. Project maintenance, management activities, and project-related recreation can also cause soil disturbance and act as vectors for the spread of weeds.

Idaho Power proposes to develop an integrated management plan to coordinate priorities and actions for preventing, eradicating, containing, and controlling non-native invasive plants and noxious weeds along the Snake River corridor from Weiser to the Salmon River confluence, focusing on riparian species and habitats in particular. Idaho Power proposes to establish a noxious weed advisory board as the primary mechanism for coordination and implementation of weed management measures. Idaho Power would consult with federal and state resource management agencies in developing and implementing the plan, and would participate in cooperative efforts with existing cooperative weed management areas, landowners, land managers, and other interested individuals and organizations.

IDFG supports Idaho Power's proposed weed management measures, and indicates that the agency would cooperate with Idaho Power and other stakeholders to implement the weed management plan. Interior recommends a similar plan, further specifying a full inventory of project-affected and Idaho Power-owned lands, to be completed within 3 years of license issuance. Interior also recommends that Idaho Power submit to BLM a plan for use or application of pesticides on project lands or non-project lands adjacent to BLM-administered lands, and prepare an annual report detailing the use of pesticides.

The Forest Service preliminary 4(e) condition no.7 and ODFW-66 are also similar to Idaho Power's proposal, except that they call for Idaho Power to establish a new Hells Canyon Cooperative Weed Management Area as part of an integrated weed management plan. The Forest Service and ODFW outline specific elements to be included in the plan to address goals and objectives, responsibilities, schedules, lands for cooperative efforts, data gaps, 5-year updates, and other subjects.

In section 3.7.2.3, *Noxious Weed and Exotic Invasive Plant Management*, we point out that noxious weeds and invasive non-native plants are a growing threat throughout the west. Project operations and human activity, in addition to wind, water, and animal transport, would continue to serve as vectors for weeds. Weeds will likely continue to spread, even with an appropriate management plan in place, but on-going, coordinated efforts would help to slow this process.

In the Staff Alternative, we include Idaho Power's proposed noxious weed control and non-native invasive weed management plan, including establishment of a Noxious Weed Advisory Board. The integrated, project-wide plan would address monitoring and management of weeds on Idaho Power, Forest Service and BLM-administered lands within the project boundary (including an annual pesticide report to BLM). It would also have Idaho Power participate in cooperative projects implemented outside the project boundary, if such projects are shown to address project effects or protect project resources. Except in two respects, this plan would be consistent with agency recommendations. We estimate the annualized cost of this measure at \$55,000.

In terms of inconsistencies with agency recommendations, the Staff Alternative does not include a full inventory of project-affected and Idaho Power-owned lands within 3 years of license issuance. Relicensing studies (Krichbaum, 2000) provide information about weed species that are present, their density and distribution, and the factors that are contributing to their spread, and serves as an adequate starting point for prioritizing and then implementing weed control projects without a 3-year delay. Idaho Power's proposal would address inventories through its focus on weed prevention as the most effective, economical approach to weed management. Prevention requires early detection, which requires regular surveys of high-risk areas. The outcome of this approach should be consistent with Interior's recommendation.

The Staff Alternative would not include establishment of a new Hells Canyon Cooperative Weed Management Area, as specified by Forest Service preliminary 4(e) condition no.7 and recommended by ODFW-66. We conclude that the establishment of a Noxious Weed Control Board and cooperation with existing local cooperative weed management areas would promote efficient planning, coordination, and implementation, without requiring additional administrative cost and effort.

### **5.2.5.3 Road, Transmission Line, and Right-of-Way Management**

The project's road and transmission line rights-of-way must be managed to maintain safe and efficient operating conditions, but management activities (e.g., brushing, mowing, herbicide treatment, removal of hazard trees) may adversely affect native plant communities and the wildlife species that use them. In section 3.7.2.4, *Road, Transmission Line, and Right-of Way Management*, we note that Idaho Power's management activities may also promote the establishment and spread of noxious weeds and exotic plants, which, in turn, also adversely affect native plant communities. Further, management activities have the potential to disturb wildlife. Disturbance during the winter can cause physiological stress to big game and communally roosting bald eagles. Disturbance during the breeding season can impair reproductive success of many bird species.

As a result of the Commission's orders dated March 31, 2005, and October 25, 2005, the only transmission line remaining within the Hells Canyon Project boundary is transmission line 945.<sup>86</sup> Transmission line 945 is located entirely within Hells Canyon. It runs along the eastern shore of Hells Canyon reservoir from Oxbow dam to Hells Canyon dam, a distance of about 22 miles. The line runs parallel to a paved road (Hells Canyon Road). Several short spur roads lead off the Hells Canyon Road to provide maintenance access to transmission line 945.

Idaho Power, in separate measures for botanical and wildlife resources (shown in section 5.1.1 as Idaho Power measure nos. 16, 20, and 21), proposes to develop transmission line operation and maintenance plans to address the effects of right-of-way management. The primary components of the plans would include: (1) development of BMPs for O&M activities along transmission line 945 and

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<sup>86</sup> The Staff Alternative does not include agency recommendations that address non-jurisdictional transmission lines, because they are outside the scope of this relicensing. For this reason, we do not discuss these recommendations further.

service roads, including scheduling the timing and location of O&M activities so that they would occur outside critical periods for plants, raptors, nesting neotropical migrant birds and wintering big game; (2) restoring and revegetating disturbed sites; and (3) managing noxious weeds and invasive exotic plants. Idaho Power would consult with the Forest Service on the development of BMPs, because transmission line 945 and the service roads traverse National Forest System lands.

In section 3.7.2.4, *Road, Transmission Line, and Right-of Way Management*, we review recommendations from ODFW and preliminary conditions from the Forest Service relating to various aspects of Idaho Power's proposals, and conclude that Idaho Power's proposals would generally meet the objectives of the agencies, including FS-11, ODFW-67, ODFW-69, ODFW-70, and ODFW-72. Accordingly, we include Idaho Power's proposed measures in the Staff Alternative, but combine them into a single measure requiring Idaho Power to develop and implement a transmission line operation and maintenance plan for transmission line 945 to address protection and enhancement of wildlife and botanical resources, including those that occur on any National Forest System lands crossed by the transmission line.

As included in the Staff Alternative, the plan would include a provision to monitor raptor electrocution and evaluate collision potential, and to retrofit as needed. The estimated annualized cost of this measure is \$16,200.

#### **5.2.5.4 Upland and Riparian Habitat Acquisition**

Continued operation of the Hells Canyon Project would adversely affect more than 20,000 acres of wildlife habitat. Idaho Power's studies indicated that most impacts would be associated with reservoir fluctuations that reduce the abundance and connectivity of riparian habitat, limit waterfowl brooding habitat, decrease the suitability of shoreline areas for many wildlife species, and contribute to shoreline erosion. The presence and operation of the reservoirs also reduces the habitat capability of mule deer winter range and increases annual winter mortality.

To address these ongoing project effects, Idaho Power initially proposed to acquire and manage 23,582 acres of habitat for wildlife. Before submitting its proposal, Idaho Power and the Terrestrial Resources Work Group assigned the highest priorities for acquisition to large, contiguous blocks of land near the project that would provide riparian and/or upland habitat for threatened, endangered, candidate, and sensitive species; waterfowl; big game; upland game birds; aquatic furbearers; amphibians; and neotropical migrant birds. In its response to AIR TR-1, Idaho Power proposed to manage 2,990 acres of land in its ownership for wildlife, and if possible, to acquire the Daly Creek Ranch, Cottonwood Creek (or Lawrence) property, Rocking M Ranch, and Sturgill Creek property. Since filing the response to TR-1 in 2005, Idaho Power has completed the purchase of both the Daly Creek Ranch (10,695 acres) in Oregon and the Cottonwood Creek property (1,971 acres) in Idaho. The combination of Idaho Power lands, lands proposed for acquisition, and already acquired lands totals 24,884 acres (1,004 acres of riparian habitat and 23,564 acres of uplands).

In section 3.7.2.5, *Upland and Riparian Habitat Acquisition*, we review the preliminary terms, conditions, or recommendations submitted by agencies and tribes regarding acquisition of mitigation lands. While similar in some respects, the recommendations reflect different conclusions about the amount of land the project affects and the amount of land needed for mitigation. In section 3.7.2.5, we summarize Idaho Power's proposal and the minimum acreage that would be acquired under each agency or tribal recommendation.

Idaho Power's proposal would bring 20,592 acres of land into the project boundary for management as wildlife habitat through any new license period, together with 2,990 acres already in Idaho Power's ownership, at an estimated annualized program cost of \$1.65 million. It would provide mitigation for the on-going project effects on terrestrial resources identified in relicensing studies. Idaho Power would acquire (and at this time, has acquired) parcels of private land that are located adjacent to or

near the project reservoirs, at relatively low elevations. These parcels would provide on-site, in-kind habitat, similar to uplands and riparian areas affected by project operation, and would benefit the species identified by the Terrestrial Resources Work Group as having high priority (e.g., big game, raptors, and threatened, endangered, candidate, and sensitive species).

Idaho Power proposes to finalize and implement the plan described in its response to AIR TR-1(a)(i)—Options for Meeting Acreage Targets and TR-1(a)(ii)—Characteristics of IPC’s Preferred Options (Edelmann and Huck, 2005) to acquire, enhance and manage approximately 22,761 acres of upland and 821 acres of riparian habitat in the vicinity of the Hells Canyon project reservoirs. Components of this plan include finalizing and implementing the Integrated Wildlife Habitat Plan and Wildlife Mitigation and Management Plan.

We include this measure in the Staff Alternative for the previously mentioned reasons that the plan provides appropriate on-site, in-kind mitigation for effects of project operation, and the proposed parcels address current resource needs as identified during consultation with the Terrestrial Resources Work Group. All four of the major land parcels included in Idaho Power’s proposal are located adjacent to Brownlee reservoir, where project effects are most evident. Proposed parcels are about evenly divided between the west and east sides of the reservoir, with adjustments to take advantage of specific opportunities (e.g., presence of high priority habitats, extending habitat connectivity). This measure would be consistent with Forest Services preliminary 4(e) condition no. 6 and IDFG-28.

We do not include ODFW-61 or Interior-76 regarding acquisition of mitigation lands, or IDFG-29 regarding land acquisition if initial target lands are unavailable, because they call for land acquisition greater than is needed to mitigate for ongoing impacts. Our analysis (section 3.7.2.5, *Upland and Riparian Habitat Acquisition*) indicates that mitigation ratios of greater than 1:1 are not appropriate, given that Idaho Power’s proposal provides on-site, in-kind habitat, similar to uplands and riparian areas affected by project operation. Idaho Power’s proposal would benefit species affected by project operations and those identified by the Terrestrial Resources Work Group as having high priority.

The justifications given by Interior and ODFW for higher mitigation ratios are based on typical wetland mitigation provisions imposed by federal and state regulatory agencies to account for the difficulty in creating or re-establishing wetland functions and values. We note that these concerns do not apply to Idaho Power’s proposal, which does not involve wetland creation or re-establishment.

ODFW’s mitigation policy calls for no net loss of upland habitat quantity or quality, and net benefits for riparian habitat. We conclude that the Staff Alternative would likely meet these criteria by protecting parcels that have high value because of physical factors (relatively low elevation and location adjacent to the reservoirs and adjacent to other lands that are or will be managed for wildlife), and improving their ecological values through implementation of enhancement measures. Under this alternative, Idaho Power would work with the Integrated Wildlife Habitat Plan workgroup to develop site-specific plans for the acquired lands as part of the Wildlife Mitigation and Management Plan. Idaho Power would measure baseline conditions, identify desired conditions and implement treatments to improve habitat values (e.g., by managing livestock, excluding livestock from riparian areas, controlling weeds, seasonally restricting recreation to reduce disturbance, planting native trees, shrubs and herbaceous species). Idaho Power would monitor the effectiveness of treatments over time, using the results to adaptively manage each site and update the plans as needed.

Interior states that BLM has limited formal guidance for mitigation. Mitigation ratios may be 1:1 or higher, depending on the resource and the distance of acquired lands from the project. Interior’s guidance also indicates that it is important to acquire lands that serve a similar functional component, and the suitability of a site may outweigh the parcel size. The Staff Alternative would be in keeping with this guidance, because the target parcels are adjacent to the project, provide the same acreage as is affected by on-going project operations, and serve similar functions (e.g., provide big game winter range, habitat connectivity, and support for special status species).

We estimate that the annualized cost of implementing ODFW-61, Interior-76, or IDFG-29 would be about \$2.5 million, \$2.9 million, or \$3.3 million, respectively. By contrast, the annualized cost of implementing Idaho Power's proposal would be about \$1.7 million. Because Idaho Power's proposal addresses on-going project effects at a reasonable cost, we include it in the Staff Alternative.

Based on studies of riparian ecology that we review in section 3.7.2.1, *Effects of Project Operations on Terrestrial Resources*, current project operations do not affect vegetation within the scour zone, and generally enhance riparian vegetation along the Snake River shoreline downstream of Hells Canyon dam. Based on modeling results, Idaho Power estimates that potential changes in project operation would result in the loss of 2 to 30 acres (approximately) of riparian habitat, depending on what flow regime is adopted. We estimate that implementation of the Staff Alternative operation would result in the loss of about 13.2 acres of scrub-shrub wetland. In the Staff Alternative, we therefore include a measure that would require Idaho Power to enhance 13.2 acres of low-elevation riparian habitat downstream of Hells Canyon dam. These enhancement activities should be coordinated with mountain quail habitat improvement projects discussed in the next section. We estimate the annualized cost of this staff-developed measure at \$6,200.

As we note in section 3.7.2.5, *Upland and Riparian Habitat Acquisition*, Idaho Power points out that the project reservoirs are relatively recent features, and predicts that banks will continue to erode until shorelines reach equilibrium. Idaho Power's proposal would provide 1:1 mitigation for the acreage of erosion that has been documented to date along reservoir shorelines, but does not take into account the acreage of erosion that is likely to occur during any new license period. Based on the age of each reservoir, the acreage of existing erosion, and an assumed constant rate of erosion, another 70 acres could be affected during the next 30 years. We therefore include in the Staff Alternative a provision that Idaho Power develop and implement a long-term stabilization/revegetation program to address erosion sites around project reservoirs. Development of the plan would be preceded by a study to determine the feasibility of using riparian plantings to provide bank stability. If the results indicate a high likelihood of success, Idaho Power would implement the program; if not, Idaho Power would acquire 70 acres of riparian habitat and manage them under the Integrated Wildlife Habitat Plan/Wildlife Mitigation and Management Plan. We estimate the annualized cost of this staff-developed measure at \$26,400.

ODFW-61, Interior-76, and NPT-22 provide for the mitigation of effects of original project construction. We do not include these measures in the Staff Alternative because original project construction is not the focus of relicensing; Commission policy establishes current conditions as the baseline for environmental analysis. In addition, ODFW-61 assumes an area of project effect on mule deer winter range that conflicts with the results of the mule deer studies (see section 3.7.2.1, *Big Game Winter Range and Migration Routes*), and calls for mitigation to address this impact. ODFW-61 assumes that habitat capability would be reduced at elevations up to 3,200 feet, while the mule deer studies show that habitat capability is reduced only within a very narrow band above full pool at Brownlee reservoir. Idaho Power's proposal provides mitigation to elevation 2,700 feet, which encompasses acreage above the documented zone of effect, and we conclude that additional mitigation would not be warranted.

We do not include SPT-5, which calls for Idaho Power to acquire 10,000 acres near the Duck Valley Indian Reservation and transfer title to the Shoshone-Paiute Tribes. The project does not affect this area, and property located at this distance from the project (more than 100 miles) would not meet the TRWG criteria for on-site, in-kind mitigation.

Interior-79, BPT-9, and SPT-7 call for Idaho Power to conduct a HEP to establish pre-dam baseline conditions and/or to determine suitable habitat units for mitigation. We do not include these measures in the Staff Alternative, because we conclude that studies completed to date provide a sufficient basis for determining on-going project effects and mitigation needs.

### 5.2.5.5 Cooperative Wildlife Management Projects

Reservoir fluctuations at Brownlee reservoir adversely affect riparian habitats along the shoreline and on several small islands at the upper end of Brownlee reservoir, reducing their ability to support nesting and brooding waterfowl. Reservoir fluctuations also contribute to riparian habitat fragmentation along the shoreline, reducing its suitability for mountain quail.

To address project effects on waterfowl, Idaho Power proposes to provide funding, equipment, personnel, logistical support, and expertise to IDFG and ODFW to support habitat enhancement projects on four Snake River islands. Idaho Power purchased the islands as mitigation for the effects of project construction on waterfowl and then conveyed title to the states to manage them. IDFG owns and manages Gold Island (331 acres), while ODFW owns and manages Patch (about 100 acres), Porter (about 70 acres), and Hoffman (60 acres) islands. The states have managed the islands primarily to provide waterfowl and upland game bird habitat, but lack of funding for management activities has resulted in a gradual decline of habitat values. Currently, non-native invasive weeds are the dominant vegetation on all four islands.

IDFG and ODFW make various recommendations regarding funding levels, funding mechanisms, habitat improvement projects, and cooperative management for the islands. These measures specify that Idaho Power should fund the capital cost of equipment purchase (\$298,800) and provide \$32,000 per year (\$57/acre) during the term of a new license to support habitat management on four islands in the Snake River. We note that two of the islands (Patch and Gold islands) are located upstream of the project boundary and there is no evidence on the record to indicate that they are affected by project operations. For this reason, we include in the Staff Alternative only the parts of IDFG-31 and ODFW-62 that pertain to the two islands that are affected by the project. Nothing, however, prevents Idaho Power from following through on its proposal to fund wildlife management of these two islands.

Porter and Hoffman islands are located inside the project boundary and afford an opportunity to provide on-site mitigation, consistent with Terrestrial Resources Work Group priorities, for the effects of project operation on several small islands at the upper end of Brownlee reservoir. The Staff Alternative would have Idaho Power consult with ODFW to identify and implement habitat improvement projects on Porter and Hoffman islands. Idaho Power could contract with the agency to implement the improvement projects, but Idaho Power would retain ultimate responsibility for complying with the terms of the license. ODFW-62 describes the overall cost of managing the islands, but does not explain the basis for determining what Idaho Power's level of support should be. We include in the Staff Alternative a funding level of \$46 per acre, consistent with Idaho Power's proposed funding. Although Idaho Power anticipates that annual O&M for lands it will acquire and manage will be about \$28 per acre, a higher level of funding for these islands would account for intensive management and difficult access. We estimate the annualized cost of this measure at \$6,000.

Project operation affects potential habitat for the mountain quail by preventing establishment of riparian vegetation along the Brownlee reservoir shoreline and limiting its extent along the shorelines of Oxbow and Hells Canyon reservoirs. Also, grazing on Idaho Power lands could reduce the cover of woody shrubs that provide important cover and forage for mountain quail, and project-related maintenance activities and recreation may cause some disturbance to this reclusive bird.

Idaho Power proposes to cooperate with state and federal wildlife management agencies to develop and implement a mountain quail restoration project by participating in enhancing low-elevation riparian habitat and reintroducing a mountain quail population. Idaho Power anticipates that state and federal wildlife management agencies would take the lead in identifying projects, and Idaho Power would provide funding, equipment, personnel, logistical support, and expertise to support them. We analyze Idaho Power's proposal and related recommendations from the Forest Service, Interior, ODFW, and IDFG in section 3.7.2.6.

Idaho Power identified 2,500 acres of scrub-shrub wetland and forested wetland that could provide high-quality mountain quail habitat. Most of this is located along steep tributaries to Oxbow reservoir. Enhancement of existing riparian vegetation in the lower reaches of tributaries and along the reservoir shoreline could improve habitat quality and allow for secure movement of quail, if present, between tributaries. We include in the Staff Alternative a measure whereby Idaho Power would consult with state and federal wildlife management agencies to develop and implement measures to enhance potential mountain quail habitat on lands within the project boundary. Idaho Power could contract with the agencies to implement the improvement projects, but Idaho Power would retain ultimate responsibility for complying with the terms of the license.

We do not include Interior-80 in the Staff Alternative, regarding development of a Mountain Quail Management Plan. Under this measure, Idaho Power would fund analysis of pre-project conditions, mitigate for limiting factors that are not related to project operation, and meet population targets that are based on unreliable historic population data. The Commission has established current conditions as the baseline for analysis related to relicensing decisions, and data that could be obtained from a study of pre-project conditions are not necessary to guide the development of measures to mitigate for on-going project effects. Interior-80 would also have Idaho Power fund planning-level activities that would duplicate state efforts that are already underway, as described in the Idaho Mountain Quail Conservation Plan (Sands et al., 1998). The conservation plan addresses existing conditions and calls for IDFG to establish local working groups to identify and coordinate projects aimed at recovery of this species. Idaho Power's proposal to participate in projects coordinated by the state or by federal agencies would be consistent with this conservation plan. Idaho Power's proposal would also be consistent with IDFG-30 and ODFW-63 recommendations, and may partially meet Interior's objectives for mountain quail management in the Hells Canyon project area.

Activities included in the Staff Alternative would address on-the-ground habitat improvements; collection of new information about quail habitat requirements and behavior; and/or establishment of new populations in the project area. The estimated annualized cost of this measure is \$9,600.

#### **5.2.5.6 Wildlife Management on Project Lands**

In addition to project-related operation and maintenance, Idaho Power manages a variety of other activities on project lands, including residential areas for employees, recreation sites, and specific leases and permits for agriculture and livestock grazing. These activities influence the abundance, distribution, and quality of wildlife habitat. Livestock grazing, in particular, has the potential to damage soils and native plant communities, promote the establishment and spread of invasive weeds, and increase competition with native ungulates for forage.

To address these project effects, Idaho Power proposes to consult with agencies, tribes, nongovernmental organizations and other entities (which together would function as a work group, similar to the Terrestrial Resources Work Group) to develop and implement an integrated wildlife habitat program. The program would provide guidelines for general stewardship, including restrictions on grazing, recreation, and maintenance activities that would help protect habitat and minimize disturbance to wildlife. The program would tier to the Hells Canyon Resource Management Plan (see section 3.12, *Land Management and Use*) and would be the mechanism for administering Idaho Power's wildlife management policies, environmental measures, and stewardship activities. Idaho Power also proposes to develop a Wildlife Mitigation and Management Plan to implement the programmatic goals and objectives and BMPs outlined in the overall program, and to develop site-specific management plans and cooperative projects.

In section 3.7.2.7, *Wildlife Management on Idaho Power Lands*, we review various recommendations made by resource agencies and tribes regarding wildlife management. All of the recommendations contain similar goals and objectives for protection, management and enhancement;

recognize the need for effectiveness monitoring; and propose to use the results of monitoring to adaptively manage habitat. All of the measures specify that schedules for work planning, implementation, and reporting should be included in the management plan, and all of the measures provide for establishment of a cooperative work group.

In section 3.7.2.7, we conclude that Idaho Power's proposal to implement the resource management plans would benefit wildlife and botanical resources on lands in its ownership and lands the company would acquire as mitigation for project effects. Idaho Power's proposal would help support biodiversity; restore and enhance native shrub-steppe, grassland, and riparian habitat; improve riparian habitat connectivity; and reduce traffic and noise disturbance at sensitive sites. To further minimize disturbance to wildlife, we recommend that Idaho Power include, as part of its WMMP, specific measures regarding scheduling of O&M and implementing a program to inform and educate visitors about protection of sensitive species and habitats. This measure would be consistent with agency recommendations and conditions, including Forest Service preliminary 4(e) condition no. 5, FS-34, IDFG-28, habitat management aspects of Interior-79 (but not the recommendation regarding HEP), ODFW-59, ODFW-60, ODFW-72, ODFW-73, and SPT-9. It would not necessarily be consistent with NPT-23, which calls for Idaho Power to hold any parcels acquired for mitigation as open and unclaimed lands, to be open to the Tribe's hunting, gathering, and pasturing treaty rights. We conclude that this aspect of management would best be determined on a site-by-site basis. We estimate the annualized cost of the measure included in the Staff Alternative at \$195,500.

In the Staff Alternative, we include a provision that Idaho Power establish a terrestrial resource work group to assist in finalizing and implementing the management plans, as described in Idaho Power's response to AIR TR-1. This measure would also be consistent with agency and tribal recommendations, with some exceptions. We do not include certain aspects of BPT-9 because it defines tasks for the work group that have already been completed (e.g., quantifying habitat losses and identifying criteria for land acquisitions).

BPT-9 and SPT-6 call for Idaho Power to fund the tribes' participation in the work group, and we do include that funding in the Staff Alternative. In our analysis in section 3.9.2.4, *Support for Native American Programs*, we find that tribal participation in designing and implementing measures for protection and management of natural resources would be valuable in meeting the natural resource goals, as well as cultural resource goals, identified in the Hells Canyon Resource Management Plan. The cost of this tribal participation is reflected in the estimates we provide below in section 5.2.6.5, *Tribal Participation, Education, and Training*.

Finally, we extend coverage of the plans to include all lands within the project boundary (including National Forest System and BLM-administered lands, as well as Idaho Power lands) and lands acquired for mitigation. We estimate the incremental annualized cost of extending the plan coverage, establishing the work group, and adding an information and education program would be \$178,800. Monitoring protocols would be developed as part of the IWHP/WMMP and would be tailored to the specific management needs identified in the plans.

## **5.2.6 Cultural Resources**

### **5.2.6.1 Finalization of the Historic Properties Management Plan**

Project operations and project-related activities such as recreation can affect cultural resources by exposing sites to natural forces such as water and wind erosion and air pollution, as well as to accidental or intentional destruction by people. To address these issues, the Commission typically requires applicants to prepare and submit draft Historic Properties Management Plans (HPMP) with their license applications. An HPMP contains measures, strategies and procedures for resource management and protection, and for resolving known or potential project-related adverse effects to historic properties over

the term of the license. Idaho Power's license application includes a draft HPMP. The tribes, Idaho State Historical Society, Forest Service, and BLM have all recommended that Idaho Power revise, finalize and implement the HPMP.

There is a need for Idaho Power to finalize the HPMP in consultation with the SHPOs, tribes, agencies, and Commission within 1 year of license issuance. In accordance with section 106 of NHPA, the Commission would execute, prior to issuance of a license, a Programmatic Agreement with the SHPOs and Advisory Council to formally implement the HPMP, with Idaho Power, the tribes, BLM, and the Forest Service as consulting parties to the agreement. We have included in the Staff Alternative a measure explicitly documenting this. The estimated annualized cost of the measure is \$1,600. In the following subsections, we discuss various recommendations about what should be included in the final HPMP, and indicate what elements we include in the Staff Alternative.

### **5.2.6.2 Cultural Resources Monitoring**

As noted above, the potential for adversely affecting cultural resources is generally addressed in an HPMP that includes, among other things, site treatment measures designed to avoid, mitigate for, or repair resource damage. In section 3.9.2.2, *Site Treatment*, we point out that a first step in treatment of cultural resources is assessment of their existing condition and periodic monitoring thereafter to determine whether the condition of a given resource has changed, and if so, why. Monitoring may indicate that project operations do, or are likely to, adversely affect the condition of a resource. In that case, the next step is to develop and implement treatments to repair damage where possible, and prevent further deterioration or loss.

Idaho Power proposes to monitor the condition of selected eligible archaeological sites in the areas of potential effect of the project's three reservoirs, as well as the known burial site at Oxbow reservoir. All sites would be monitored annually for 3 years, at the end of which Idaho Power would review the monitoring results and the effectiveness of the program and revise the program as necessary. This pattern would continue throughout the license term, with the monitoring program being reviewed and revised as needed every 3 years.

Forest Service preliminary 4(e) condition no. 25 specifies that Idaho Power's HPMP should provide for periodic monitoring of all identified historic properties, including traditional cultural properties, within the areas of potential effect, with special provisions for monitoring rock art that shows increasing lichen coverage.

The Umatilla Tribes and the Forest Service recommend that Idaho Power monitor the condition of traditional cultural properties, including rock art (CTUIR-35b, FS-25), and the Umatilla Tribes also recommend that Idaho Power develop a framework for monitoring traditional cultural properties in consultation with the tribes (CTUIR-35d).

The Nez Perce Tribe's recommendation (NPT-28) that all known historic properties in the area of potential effect be monitored to identify project-related effects is similar to the Forest Service's preliminary 4(e) condition no. 25.

The Idaho State Historical Society (ISHS-2) recommends that the monitoring program include confirmation of information on the archaeological site records Idaho Power submitted in association with relicensing, and that Idaho Power ensure that its cost estimates for monitoring are sufficient to cover this additional work.

We conclude in section 3.9.2.2 that an initial 3-year program in which all National Register listed and eligible resources (including not only archaeological sites but also rock art and other traditional cultural properties) are monitored annually (as recommended in Forest Service preliminary 4(e) condition no. 25) and existing site data are corrected or brought up to current conditions (as recommended by the Idaho Historical Society) would provide an informed starting point for the program. Review of the

program and its findings every 3 years, as proposed by Idaho Power, would provide Idaho Power with an opportunity to make any necessary adjustments to monitoring methods and the frequencies with which various sites are monitored based on ongoing review of site conditions and project-related effects. We therefore include these measures in the Staff Alternative.

The estimated annualized cost of the staff measures is \$187,800.

### **5.2.6.3 Cultural Resource Site Stabilization**

Water level fluctuations can destabilize soils and lead to seepage failure that affects not only shorelines but also archaeological materials that may be present in those soils. Erosion of soils containing archaeological materials can result in displacement or loss of artifacts, and also to exposure of artifacts where they may be vulnerable to unauthorized collecting or inadvertent damage.

Idaho Power proposes to stabilize 7 archaeological sites on Brownlee reservoir that are affected by project operations and approximately 20 sites between Hells Canyon dam and the confluence with the Salmon River that show evidence of active erosion potentially attributable to project operation. Idaho Power proposes to coordinate with the appropriate SHPO, land management agency (or other landowner), and tribes to develop stabilization measures appropriate to each individual site.

Over the license term, periodic monitoring of all eligible cultural resources in the area of potential effect (as discussed in the preceding section) would ensure that if project-related effects to other resources (additional to the 27 archaeological sites proposed by Idaho Power) are identified, appropriate treatments could be developed and implemented in consultation with the tribes, agencies, and SHPOs.

We conclude in section 3.9.2.1, *Effects of Project Operations on Cultural Resources*, that continued project operation presents the possibility that sites on all three project reservoirs could experience erosion from water level fluctuations in the future. Idaho Power recognized this possibility early in its pre-application process when it proposed in its Formal Consultation Package to examine the effects of reservoir water level fluctuations on cultural resources. Consultation with the Cultural Resources Work Group led to Idaho Power's deferral of this work, which we estimate to cost \$1,900 on an annualized basis. In its draft HPMP, Idaho Power indicates its plan to obtain information to complete this analysis during its periodic monitoring of archaeological sites on the reservoirs. To avoid any doubt about this proposed step, we include in the Staff Alternative a provision that Idaho Power develop and implement the deferred monitoring and analysis, integrating the results into the cultural resources monitoring program.

### **5.2.6.4 Ethnographic and Oral History Studies**

The Shoshone-Paiute, Nez Perce, Burns Paiute, and Shoshone-Bannock Tribes have made generally similar recommendations that Idaho Power provide funding to undertake, expand or complete ethnographic and oral histories of these tribes (SPT-9, NPT-25, BPT-16, and SBT-3).

As part of relicensing activities, Idaho Power funded a Hells Canyon-area ethnographic overview as well as oral history studies for each of the tribes. Oral histories from the Warm Springs Tribes, Umatilla Tribes, and Burns Paiute Tribe were included as technical report appendices in the draft and final license applications, and the applications reported that the oral history for the Nez Perce Tribe was in progress. To date, no oral histories other than the three included in the draft and final license applications have been filed with the Commission.

Idaho Power's funding of the ethnography and oral history studies offered the tribes the opportunity to identify traditional cultural properties and to provide information that Idaho Power could use in its management and protection of resources and places in the project that are of importance in the area's Native American cultural traditions (refer to section 3.9.2.4, *Support for Native American Programs*). Completion of oral history studies by the Nez Perce, Shoshone-Paiute, and Shoshone-

Bannock Tribes would complement the studies already completed by the other tribes, and would contribute additional information toward effective and appropriate management of traditional cultural properties and sacred sites in the project.

Accordingly, we include in the Staff Alternative a measure whereby Idaho Power would renew its offer to arrange for and fund the development of oral histories for the Shoshone-Bannock and Shoshone-Paiute Tribes, and to file those oral histories that are completed (including the oral history for the Nez Perce Tribe) with the Commission. We estimate the annualized cost of this measure at \$7,600.

### **5.2.6.5 Tribal Participation, Education, and Training**

In consultation with each of the tribes, Idaho Power proposes to provide support for tribal programs and tribal participation in resource management in the project. Specifically, Idaho Power proposes to: (1) fund costs of tribal staff time and travel costs associated with tribal-related implementation of environmental measures; (2) support educational development programs, including scholarships/training; and (3) support ongoing and future cultural enhancement projects in consultation with each tribe. Idaho Power proposes to allocate \$1 million in support of each tribe (total \$6 million) over the term of the license, equating to a total annualized cost of \$200,400.

The Burns Paiute, Shoshone-Paiute, and Shoshone-Bannock Tribes have recommended generally that Idaho Power support tribal participation in natural and cultural resource management of the Snake River and its tributaries (BPT-16, SPT-12, and SBT-3). The Umatilla Tribes recommend that Idaho Power provide \$1 million to the tribes to facilitate consultation and coordination on matters pertaining to cultural resources (CTUIR-35j). The Burns Paiute Tribe recommends establishment and continued funding of a tribal education scholarship fund that would be administered by the tribe, and also recommends that Idaho Power provide annual funding to support the tribe's participation in cultural resources management in the project (BPT-11 and BPT-15). The Shoshone-Paiute Tribe recommends that the funding measures for each tribe be increased to \$10 million (SPT-15). The Nez Perce Tribe recommends that Idaho Power grant each tribe its share of the funds in a lump sum at the beginning of the license term, for the tribe to use for license-related programs (NPT-31).

In section 3.9.2.4, *Support for Native American Programs*, we conclude that informed participation by groups for whom project-area resources are of both historical and ongoing cultural importance could contribute significantly to management and protection of such resources. To that end, we have included in the Staff Alternative Idaho Power's six proposed measures to promote tribal participation in cultural resource management and to support cultural enhancement and interpretation projects of the tribes. However, we delete the funding of scholarships from the Staff Alternative because of the lack of nexus with project effects. Although we recognize the benefit to the tribes that would result from Idaho Power's commitment to tribal programs, there is no nexus between that funding and the project and its effects. The resulting cost impact is to reduce the annualized cost of Idaho Power's proposed measures by \$70,200. We note, however, that if this commitment of funding is not included in a new license, it would in no way preclude Idaho Power from fulfilling this commitment outside the license. We also do not include in the Staff Alternative recommendations to increase the funding to \$10 million per tribe or to pay the funds in a lump sum because those measures cannot be tied to project effects and thus lack nexus to the project.

### **5.2.6.6 Cultural Resources Interpretation**

Idaho Power proposes to create, install and maintain 14 informational kiosks at various locations throughout the project, focusing on the Native American presence and land use in the project area (6 kiosks), Euro-American occupation (4 kiosks), and the Asian-American experience (4 kiosks). Idaho Power also proposes to provide financial assistance in the form of grants to local communities and organizations to support the acquisition, display, and curation of museum collections, and for other public

information and outreach projects focusing on the Euro-American and Asian-American presence in the Hells Canyon area.

Informational/interpretive kiosks proposed by Idaho Power, placed in appropriate locations in the landscape, would be an effective way to introduce visitors to the cultural history and resources of the Hells Canyon area (see section 3.9.2.3, *Cultural Resources Interpretation*). They also could potentially contribute to resource protection by noting legal penalties for vandalism and looting, and by making visitors aware of activities that could inadvertently damage or destroy resources. Accordingly, we include the kiosk installation measures proposed by Idaho Power in the Staff Alternative. We also include Idaho Power's proposed grant program to assist local community museums as a measure to enhance public appreciation of the area's European-American and Asian-American cultural heritage and resources. Similar grant programs to the tribes, as proposed by Idaho Power and discussed above, would provide effective support for interpretation of Native American traditions and resources without the need for Idaho Power to build and operate a Native American cultural center as recommended by the tribes.

### **5.2.6.7 Other Cultural Resource Management Issues**

The Umatilla Tribes (CTUIR-24) recommend that the area of potential effect be expanded to the confluence of the Snake and Clearwater rivers, and that the added land be surveyed for cultural resources. The Nez Perce Tribe (NPT-30) recommends that the area of potential effect extend beyond the confluence of the Snake and Salmon rivers to the upper limit of the next downstream reservoir, near Asotin, Washington. The Idaho State Historical Society (ISHS-5) recommends that archaeological surveys be conducted along the reach of the Snake River between the Salmon and Grande Ronde rivers. The Shoshone-Paiute Tribe (SPT-11) recommends that the area of potential effect, and therefore the provisions of the HPMP, include all lands between the confluence of the Snake and Salmon rivers upstream to Shoshone Falls. We do not include expansion of the area of potential effect in the Staff Alternative because: (1) the recommendations of the tribes and the Idaho State Historical Society to expand the area of potential effect do not provide a factual basis for attributing erosional impacts to cultural resources below the Salmon River to project operations and (2) extension of the Hells Canyon project's area of potential effect to Shoshone Falls would not afford historic properties upstream of this project any greater protection than they now receive.

The Idaho State Historical Society (ISHS-7) and the Umatilla (CTUIR-27), Nez Perce (NPT-32), Shoshone-Paiute (SPT-12), and Burns Paiute (BPT-15) Tribes recommend formation of a standing organization (variously called a task force, advisory committee, or work group) specifically concerned with implementation of the HPMP for the project. Such an organization composed of representatives from the tribes, land management agencies, other landowners, and SHPOs would give these directly concerned parties a voice in the management and protection of cultural resources in the project over the license term. There are many kinds of cultural resources in the project area, and committee members' contributions of knowledge and recommendations would inform Idaho Power's decision-making and would facilitate Idaho Power's adaptation, as necessary, of the HPMP to address the changing circumstances inevitable over the period of any new license. We therefore include this measure as part of the Staff Alternative. The cost for this measure is included in the \$50,000 annualized estimate for technical advisory committees given in section 5.2 8.1, Land Use Management.

The Umatilla Tribes (CTUIR-35h) recommend that Idaho Power conduct periodic training sessions to enhance staff understanding of cultural resources and their importance to the tribes. In its draft HPMP, Idaho Power has already proposed to develop a company-wide education program, particularly for departments involved in construction and other potentially ground-disturbing activities. Such a program would appropriately include discussion of the different kinds and significance of cultural resources in the project area as a way of enhancing employees' understanding of issues that would influence planning and implementation of project-related activities. We therefore do not include the Umatilla Tribes' recommendation in the Staff Alternative.

The Umatilla Tribes (CTUIR-35i) recommend that Idaho Power re-survey the area of potential effect every 10 years to identify cultural resources beyond those identified to date. Recognizing the possibility that additional archaeological sites may be discovered in the area of potential effect over the license term, Idaho Power in its draft HPMP has already specified the actions it would take, and the guidelines it would follow, should previously unidentified resources be encountered in the course of project operations. Implementing these guidelines would ensure that any such resources would be properly treated. We therefore do not include the Umatilla Tribes' recommendation in our Staff Alternative.

The Umatilla Tribes (CTUIR-33) recommend that artifacts recovered in the area of potential effect as a result of project operations be reburied on site or curated at a federally recognized repository. Under federal law, disposition of archaeological materials recovered on federal land is the responsibility of the land-managing agency. Because Idaho Power has not indicated how it would treat archaeological materials recovered from state, county and private land, we include in the Staff Alternative a requirement that Idaho Power include in the HPMP a policy regarding disposition of archaeological materials recovered from non-federal land. The cost of this measure would be included in the overall cost for finalization and implementation of the HPMP.

BLM (Interior-36) recommends that Idaho Power evaluate, and then protect or mitigate, scientifically important paleontological resources discovered in the course of project operations. Idaho Power's HPMP already provides for development and implementation of site-specific treatment plans for newly-discovered paleontological resources in consultation with BLM and in accordance with BLM's Paleontological Resources Manual. We therefore do not include BLM's recommendation in the Staff Alternative.

The Idaho State Historical Society recommends that Idaho Power provide funding to student and professional/academic researchers to support study of archaeological materials recovered during previous investigations in the project area that have not been analyzed or formally reported on (ISHS-2-1). While we recognize that such study could potentially enhance the state of knowledge concerning the cultural history of the project area, we conclude that it would not contribute materially toward management and protection of those resources extant and still in place within the project, and do not include this measure in the Staff Alternative.

The Idaho State Historical Society and the Nez Perce Tribe recommend that Idaho Power update the 1984 National Register nomination for the Hells Canyon Archaeological District, to incorporate the numerous additional sites identified during the relicensing surveys (ISHS-6 and NPT-27). We conclude that updating the 1984 Hells Canyon Archaeological District would be beneficial since a number of new sites have been recorded since 1984, and the measure would not result in any significant additional cost to Idaho Power over the term of a new license. We include this measure in the Staff Alternative at an annualized cost of \$5,700.

We also considered the fact that over time, buildings evaluated in 2003 as ineligible for the National Register because they were at that time under 50 years of age would need to be reexamined to determine their eligibility under the standard National Register Criteria, potentially resulting in a large number of historic buildings that could be affected by project operations. We therefore include in the Staff Alternative a measure for developing and implementing a schedule and methodology for re-evaluating buildings and structures as they reach 50 years of age. The estimated annualized cost of the measure is \$3,000.

## 5.2.7 Recreation Resources

### 5.2.7.1 Recreation Plan

The Hells Canyon Project includes some of the most important recreational resources in the region, and acts as a gateway to the upstream end of the nationally significant Hells Canyon whitewater boating run. Idaho Power proposes to implement a project recreation plan designed to achieve 10 objectives that we list in section 3.10.2.2, *Recreation Plan*.

The proposed recreation plan would formalize Idaho Power's responsibilities to provide and maintain recreational resources throughout the project area, including those formal and dispersed recreational sites managed by others that provide public access to the project. The plan would provide a framework for Idaho Power to implement the recreational site improvements (discussed in section 3.10.2.3, *Recreational Site Improvements*) and coordinate management of recreational resources with the many land managers that have jurisdiction over project lands, and monitor recreational use and needs over the term of any new license. In section 3.10.2.2, we find that these measures would provide substantial improvements to management and delivery of recreational resources and would substantially expand recreational opportunities within the project. We estimate the annualized cost of implementing all the components and site-specific enhancements of the Recreation Plan would be about \$1.2 million.

In section 3.10.2.2, we find that some of the standards and procedures included in Interior's preliminary 4(e) condition no. 6 would improve the proposed Recreation Plan and benefit recreational opportunities by establishing procedures for communication and consultation with other land managers. Interior's condition to establish a stakeholder workgroup, with procedural components of the measure clarified by Idaho Power in its alternative 4(e) condition, would help ensure that appropriate consultation occurs as the plan is being developed and implemented without including too many stakeholders in a manner that slows planning and delivery of the plan. Similarly, Interior's recommendation to establish protocols for consultation with agencies, as clarified by Idaho Power in its alternative 4(e) recommendation, would ensure that Interior and other agencies have reasonable opportunities to provide input into the finalization and implementation of the plan. Interior's recommendation to include an ADA discussion in the proposed Recreation Plan would help ensure that an appropriate level of barrier-free access is achieved and maintained for the term of any new license.

Based on our analysis in section 3.10.2.2 and our review of agency and tribal conditions and recommendations, we include Idaho Power's proposed recreation plan in the Staff Alternative, but we modify it to include standards for construction that meet the disparate agency requirements; consideration of ADA standards; a description of how Idaho Power would plan, design, and construct new facilities (including a detailed description of each measure to the conceptual design level); and a description of how Idaho Power would comply with various federal and state standards for site development, help define appropriate procedures for implementing the plan, and help ensure that adequate standards are met for all recreational improvements over the term of any license issued. Also, we indicate that the plan would be finalized in consultation with the primary land managers, including the Forest Service, BLM, IDPR, IDFG, ODFW, OPRD, and the Oregon and Idaho counties around the Hells Canyon Project. The staff modifications would add an estimated annualized cost of \$7,600 to Idaho Power's proposed plan.

We do not see a particular benefit to that component of Interior's preliminary 4(e) condition No. 6 to use the Recreation Opportunity Spectrum approach to identify, enhance, and sustain an appropriate range of recreational settings and experiences on lands for the public over the entire complex. Lands that would be subject to the proposed Recreation Plan include lands managed by other federal agencies, local and state agencies, and Idaho Power. Although the Recreation Opportunity Spectrum system may be appropriate for evaluating recreational needs on lands managed by Interior, there is no indication on the record that the system is appropriate for Idaho Power or other land managers. Idaho Power's alternative

to this condition would limit any assessment using the Recreation Opportunity Spectrum to BLM-managed lands.

The Burns Paiute Tribe (BPT-19) recommends that Idaho Power prepare an Integrated Comprehensive Recreational Plan, subject to approval by the federal agencies and the Burns Paiute Tribe. The plan recommended by the Burns Paiute Tribe appears to be generally consistent with Idaho Power's proposal and would include measures to provide interpretive signage for education and information that would be developed in consultation and with approval of the Tribe. The Tribe also recommends that it have the authority to review and approve the selection of all contractor(s) and sub-contractor(s), and, whenever possible, that tribal preference would be exercised to develop and increase competencies and capacities of the tribe.

In implementing its Recreation Plan, Idaho Power may select any contractor to do the work. However, we note that Idaho Power's proposed plan would include consultation with agencies, tribes, and other stakeholders prior to implementing the measure, which would be the appropriate time for Interior and/or the Burns Paiute Tribe to comment on the plan and any proposed contractors.

### **5.2.7.2 Recreation Site Improvements**

As part of the proposed recreation plan (discussed immediately above), Idaho Power proposes to improve existing recreational sites and upgrade some informal recreational facilities to provide an improved level of service. These proposed measures are summarized in section 3.10.2.3, *Recreation Site Improvements*, as are the various agency recommendations regarding Idaho Power's proposal.

In section 3.10.2.3 we find that, overall, Idaho Power's proposed site improvement measures at existing sites would increase recreational opportunities by providing new facilities and would enhance visitors' recreational experiences. These measures represent a substantial improvement over existing conditions and would provide additional capacity in an area where existing project recreational facilities would continue to receive heavy recreational use, particularly on some weekends and holidays. We find that these measures would address recreational needs associated with growing recreational demand, changing recreational needs, and, in cases, deferred maintenance. Accordingly, we include in the Staff Alternative Idaho Power's proposed recreation site improvements. We estimate that the annualized cost of implementing Idaho Power's proposed site improvements (as a component of the total Recreation Plan costs described above) would be about \$653,300.

We supplement Idaho Power's proposal in six specific areas, summarized in the following paragraphs and discussed more fully in section 3.10.2.3. Interior's preliminary 4(e) condition no. 16 specifies site planning and enhancements at the Oasis recreation site. The Oasis site is the most southern recreational site within the project boundary that provides access to project lands and waters. It is within the backwater influence of Brownlee reservoir, and lies within the project boundary. Unlike the more remote sites within the project, Oasis is near Interstate 84 and is easily accessible by road from Weiser and other nearby population centers. It provides unique recreational access to both riverine and lake areas, a characteristic that is somewhat limited in the area, and we therefore anticipate growing use. In the Staff Alternative, we include a provision that the recreation plan include development and implementation of a plan for an initial round of site improvements that would define and contain parking and formalize areas for other recreational uses, and, if needed, install improved toilets. We estimate the additional annualized cost of the measure to be \$4,400.

Interior's preliminary 4(e) condition no. 12 specifies site planning and enhancements at the Steck recreation site. Interior's specification to expand Steck recreation site in anticipation of future recreational use does not appear to be needed at this time, since facilities at the site have substantial capacity to meet current use. However, we find in section 3.10.2.3 that it is likely that growing future use would degrade the existing facilities and ultimately require expansion and upgrades. Therefore, we include in the Staff Alternative Idaho Power's proposal to include Steck recreation site in the Recreation

Adaptive Management Plan (see section 3.10.2.9). We find that it would allow Idaho Power and BLM to address future recreational requirements, including expansion of the site if needed, over the term of any new license issued.

We do include in the Staff Alternative one component of Interior's 4(e) condition no. 12, specifying that an improved emergency communication system be developed under any license issued for the project. The project area is remote and communication throughout the area is difficult. Cellular phone reception is intermittent to non-existent around much of Brownlee reservoir, and evacuations could take many hours to arrange. We conclude that Idaho Power should evaluate the need for and feasibility of an improved communication system as a project-wide effort. This approach may be more efficient and effective at addressing the project area's communication needs than installing a single landline at Steck recreation site. We estimate the additional annualized cost of the feasibility study to be \$3,800.

During the spring freshet, sediment deposition occurs where inflow meets the backwater from Brownlee reservoir adjacent to Farewell Bend State Park. Developing and implementing a plan to remove the sediments in a systematic manner would improve public access to the reservoir, improve aesthetics of the docks, and address project-related effects on the park's irrigation pumps. In section 3.10.2.3, we find that seasonal fluctuations of Brownlee reservoir and boat wave action cause erosion along almost 80 percent of the Farewell Bend State Park shoreline. Therefore, we include in the Staff Alternative measures to harden and protect the shoreline as part of the final recreation plan (OPRD-2). We conclude that these measures would help reduce project-related losses of recreational land and infrastructure, help protect riparian habitats from further degradation, and improve aesthetic characteristics of the site. We estimate that the additional annualized cost of the measure would be \$4,200.

In preliminary 4(e) condition no. 13, Interior specifies an enhancement plan for Jennifer's Alluvial Fan. Currently, the informal recreational site is about 6 acres with no facilities, and it is used for project-related camping and fishing activities. Interior indicates that recreational use of the area has created problems with litter, disposal of human waste, vehicle damage to shoreline areas, and erosion damage at the entry/exit point of the site. Given the type of project-related use at the site, and the impact from existing use patterns, we find that the site needs a certain amount of formalization to meet existing and projected future use. Therefore, we include in the Staff Alternative a measure to develop and implement a site plan that includes basic infrastructure such as toilet facilities, vehicular barriers, signage, and regular maintenance. This measure would help improve the site condition and would help protect the surrounding area from prohibited recreational activities. We estimate that the additional annualized cost of the measure would be \$9,800.

Forest Service preliminary 4(e) condition no. 16 specifies improvements to the Deep Creek stairway and trail. The Deep Creek stairway and trail descends from the Hells Canyon dam parking area to the mouth of Deep Creek. The stairway starts within the project boundary and exits the project at a point approximately half way down. The stairway and trail is currently operated and managed by the Forest Service. The trail provides the only public access to the Idaho side of the Hells Canyon dam tailrace area, and we find in section 3.10.2.3 that recreational use of the stairway and trail from the dam to the Deep Creek confluence is project related. Based on comments in the record, it appears that the stairway may need improvements to meet safety standards and support the level of current and projected future use. In the Staff Alternative, we include a recreation plan provision that Idaho Power complete a condition and safety inspection of Deep Creek stairway and trail and correct any deficiencies found, consistent with preliminary FS 4(e) condition no. 16. The Staff Alternative also calls for including the stairway and trail within the project boundary to help ensure that reasonable public access to the tailrace and Deep Creek area would be maintained for the term of any new license. We estimate that the additional annualized cost of the measure would be \$11,700.

As part of its preliminary 4(e) condition no. 21, the Forest Service specifies enhancements to the Hells Canyon Creek boat launch to improve safety and meet recreational needs. The Hells Canyon Creek boat launch site is the only area for boaters, and the primary area for anglers, to access the Snake River immediately downstream of the project. Given the national significance of the boating run downstream of the project, the launch site represents minimal and reasonable access to the Snake River downstream of the project, and we conclude that improving the site to enhance access and safety, provide potable water, and provide a portable waste disposal system is required for project recreation purposes. Accordingly, we include these improvements in the Staff Alternative, with the provision that the project boundary be adjusted to include the launch site and access thereto. We estimate that the additional annualized cost of the measure would be \$36,100.

We do not include two recommended measures in the Staff Alternative that do not appear to have a project nexus. Interior-28 recommends that Idaho Power develop and implement a plan for major facility upgrades at Heller Bar, a site considerably downstream and outside of the project boundary. IDFG-8 recommends that Idaho Power fund development of angler access sites that would also be downstream and outside of the project boundary, with no clear nexus to the project's recreational resources. In section 3.10.2.3, we find that although the recommended measures could improve site conditions outside the project, there is no indication that recreational use of these sites is project related or that project operations adversely affect the site. We estimate the annualized cost for the Heller Bar measure would be \$38,000. IDFG did not recommend any particular level of access site development in its recommendation (IDFG-8), but we estimate a minimum annualized cost of \$20,000 to develop and maintain each site.

### **5.2.7.3 Sanitation and Litter Management**

The project provides recreational opportunities for many thousands of visitors from the region. Due to this intense use, litter and human waste problems occur along the project shorelines, which can create public health and safety impacts and aesthetic impacts, and can detract from recreational experiences.

In section 3.10.2.4, *Sanitation and Litter Management*, we discuss Idaho Power's proposal to enhance its existing litter and sanitation plan for the project by providing additional portable and vault toilets at appropriate dispersed recreational sites and by implementing a biannual litter pickup program throughout the project area. Idaho Power would develop the plan in consultation with the appropriate parties and would implement the litter and sanitation plan for the term of any new license. We conclude there that Idaho Power's litter and sanitation proposal would address an important recreational issue that affects both the quality of the recreational experience and the environmental attributes of the dispersed sites. Accordingly, we include Idaho Power's proposed measure in the Staff Alternative. We estimate that the annualized cost of the measure would be \$61,600.

Additionally, however, we supplement the proposal in three ways. Part of Interior's 4(e) condition no. 7 specifies that Idaho Power should service dumpsters and trash receptacles weekly. We find in section 3.10.2.4 that such a schedule could lead to substantial waste of resources when recreational use is low. Idaho Power's alternative 4(e) condition to conduct litter patrol "as needed" is reasonable and responsive to recreational needs within the project area, given the wide variety of recreational use over the year. Therefore, we include in the Staff Alternative Idaho Power's alternative condition that would address development of reasonable standards for maintenance of trash receptacles, with an anticipated trash service schedule, as part of the proposed litter and sanitation plan. We conclude that this measure would help ensure that trash does not accumulate and cause sanitation issues without undue waste of Idaho Power's resources. The estimated annualized cost for this measure is included in the cost estimate below.

Idaho Power proposes, and Interior's 4(e) condition no. 7 specifies, the installation of floating restrooms on the project reservoirs. Although it is not entirely clear from the record, we assume that these recommendations are associated with Idaho Power's proposal to install moorings for overnight camping. If the final locations of the mooring sites are associated with shoreline facilities, the recommended floating restrooms do not appear to be needed. If the location of the moorings is more than 1 mile from a developed public access site, then floating restrooms would provide an appropriate level of service. Accordingly, in the Staff Alternative we include a provision that Idaho Power consult with the appropriate parties to confirm the need for, location of, and maintenance standards for floating restrooms. The estimated annualized cost for this measure is included in the cost estimate below.

Lastly, preliminary Forest Service 4(e) condition no. 21 specifies that Idaho Power design, construct and maintain a gray water and sanitary cleaning system capable of cleaning portable human waste carry-out systems at the Hells Canyon Creek area, which is the only area for boaters and anglers to access the Snake River immediately downstream of the project. The area is very remote and is accessible only along one project road. The specified sanitation measures appear to be necessary infrastructure to support reasonable public access to trips into the HCNRA. We conclude that this measure would benefit project purposes, and include it as an element of the litter and sanitation plan in the Staff Alternative. We estimate that the annualized cost of these three measures would be \$66,800.

We do not include one recommended measure in the Staff Alternative because it does not appear to have a project nexus. In section 3.10.2.4, we find that there is no indication in the record that Oregon State Marine Board's recommendation (OSMB-5) to develop a dump station for boat holding tanks at the upstream end of the project is needed. Boaters and recreational vehicle campers have options to pump holding tanks along major highways throughout the region, and there is no evidence in the record to suggest that these regional facilities are insufficient to meet project-related visitor demand for such services. We estimate the cost for this measure to be \$41,800.

#### **5.2.7.4 Information and Education**

Idaho Power proposes to develop an information and education plan that includes: (1) review and selection of appropriate themes; (2) review and selection of appropriate interpretive media to be used; (3) development of a web site and toll-free phone number accessing pertinent recreation-related information; and (4) review and selection of prioritized sites where the interpretive media would be located. Idaho Power would implement the plan in consultation with the appropriate parties, and operate and maintain the facilities and amenities resulting from the plan. Agency and tribal recommendations generally support Idaho Power's proposal (refer to section 3.10.2.5, *Information and Education*).

The proposed information and education plan would promote protection and preservation of cultural, natural, and historical resources by providing educational and interpretation materials at primary recreational sites. The plan would also provide consistency of information and education materials between recreational sites, which would help give recreational users the sense of coherent management throughout the project area. As described by Idaho Power, the plan does not specify the location or type of materials that would be developed. Including this information in the plan, as well as operational and maintenance activities and any scheduled updates to the information and education materials, would help ensure that the plan can be successfully managed over the term of any new license. We include Idaho Power's development and implementation of an information and education plan in the Staff Alternative. The estimated annualized cost of developing and implementing the plan is \$149,800.

In the Staff Alternative, we modify the proposed measure to require that the plan include specification of the location and types of information materials to be provided at each location. Additionally, in section 3.10.2.5, we agree with NMFS-20 and OSMB-6 that the plan should include the provision of information about anadromous fish and invasive species. In the Staff Alternative, therefore, we supplement Idaho Power's proposal to include this provision. Idaho Power contributes substantial

resources annually toward the improvement of anadromous fish runs, without which certain populations of salmon would be further stressed. Including in the plan information about the effects of hydroelectric projects and other human activities on anadromous fish runs, and the efforts underway to improve and protect these runs within the context of modern energy demands, would help place this issue in a contemporary context. Including information about invasive species would help inform visitors about the incremental role individual boaters play in spreading non-native species and about the potential harm these plants and animals can cause. The estimated annualized cost of these staff modifications is \$1,400.

#### **5.2.7.5 Trails**

Of the numerous recreational and hiking trails that provide access to public lands managed by federal agencies near the project, many begin along project roads or at project-related recreational sites. Idaho Power proposes to maintain trailheads within the project, but does not propose any specific measures for trails outside the project boundary. Idaho Power states that funding for trail improvements and maintenance of trails located on federal lands outside the project boundary should remain the responsibility of the Forest Service.

In preliminary 4(e) condition no. 20, the Forest Service specifies that Idaho Power perform trail maintenance on Forest Service trails accessed from the Hells Canyon reservoir and Hells Canyon Creek launch site. In section 3.10.2.6, *Trails*, we find that recreational use within the project boundary is primarily associated with the project reservoirs, including boating, fishing and camping. With the exception of a few specific trails within the project boundary, little evidence in the record suggests that use of hiking trails originating at the project are related to a project purpose. In our analysis in section 3.10.2.6, we do not find a clear nexus between project operations and recreational use of Forest Service-managed trails outside of the project boundary. We conclude that Idaho Power addresses the primary project-related effects on Forest Service managed trails originating within the Hells Canyon Project by proposing to maintain pull-out and parking areas along Hells Canyon Road and improving sanitation and increasing litter patrols throughout the project. Therefore, we do not include this Forest Service condition in the Staff Alternative. The estimated annualized cost of this condition is \$3,000.

Interior, in preliminary 4(e) condition no. 3, specifies that, as part of an integrated travel and access management plan for BLM-administered lands affected by the project, Idaho Power develop and implement a plan for non-motorized use of trails connecting recreation sites along the Oregon side of Hells Canyon reservoir and conduct a feasibility study for developing a trail system along the Hells Canyon, Brownlee, and Oxbow reservoirs connecting Farewell Bend State Park to the HCNRA. We conclude that Interior has not established a clear need for the recommended trail system to provide reasonable public access to the project or between project facilities, and we do not include this measure in the Staff Alternative. The estimated annualized cost if this measure is included in the cost of measures discussed below under *Road Management Plan*.

#### **5.2.7.6 Operation and Maintenance at Forest Service and BLM Sites**

In section 3.10.2.7, *Operation and Maintenance of Forest Service and BLM Sites*, we discuss Idaho Power's proposal to continue operation and maintenance of its parks and recreation facilities and to perform operation and maintenance at Idaho Power-enhanced BLM and Forest Service reservoir-related recreational sites within the project boundary. This proposal would ensure that these facilities are adequately maintained for the license term and we include this measure in the Staff Alternative at an estimated annualized cost of \$85,300

Forest Service preliminary 4(e) condition no. 18 specifies that Idaho Power perform O&M necessary to meet Forest Service Standards (Meaningful Measures as amended over the license term) but does not define what these standards would be. In section 3.10.2.7, we find that the condition appears to be primarily concerned with Idaho Power developing O&M standards in consultation with the Forest

Service as part of the recreation plan. Idaho Power's alternative 4(e) condition would achieve similar goals of standardizing O&M practices without requiring Idaho Power to meet unspecified operation and maintenance standards and without requiring open-ended maintenance responsibilities that could be changed by the Forest Service or other agencies over time. Thus, it appears that the alternative 4(e) condition would be more cost effective and would address specific project-related effects. Therefore, in the Staff Alternative, we include Idaho Power's alternative 4(e) condition, including the development of clear standards in the Recreation Plan to ensure that recreational sites are operated and maintained consistent with Forest Service expectations for the term of any new license, but in a manner that could be applied throughout the project area.

Forest Service preliminary 4(e) condition no. 21 specifies that, among other things, Idaho Power perform 100 percent of the O&M necessary to maintain the Forest Service-specified improvements at the Hells Canyon launch and 50 percent of the remaining O&M needs at the Hells Canyon Creek launch. As discussed in section 3.10.2.3, *Recreation Site Improvements*, we find a clear nexus between the project and providing reasonable public access to the Snake River downstream of the project. For that reason, we recommend including the site in the project boundary (see section 5.2.8.3). However, we also acknowledge that the launch is on Forest Service-managed lands and many of the activities that occur at the launch may not be project related. Because of the importance of the launch area and to ensure that the site is adequately maintained for the term of any new license, we include in the Staff Alternative a provision for Idaho Power to develop a detailed agreement with the Forest Service regarding O&M as part of the final Recreation Plan. It is, however, Idaho Power's responsibility to ensure that the site is maintained.

Interior specifies as part of its site-specific preliminary 4(e) measures that Idaho Power perform O&M at all BLM-administered recreational sites. Idaho Power does not propose to handle O&M at BLM sites within the project boundary except where Idaho Power is proposing site enhancements. In section 3.10.2.7 we note that, regardless of which party provides or funds O&M services, the Commission would hold Idaho Power, as the licensee, responsible for the proper implementation of any measure included in any license for the project. Therefore, the Staff Alternative indicates that Idaho Power should prepare an O&M plan for each site within the project boundary that describes the maintenance standard applicable to the site and indicate how that standard will be met, to ensure an appropriate level of O&M at all developed Forest Service and BLM sites within the project boundary. Idaho Power may enter agreements with the agencies to cost-share O&M and other capital measures, but it is ultimately the licensee's responsibility to ensure that recreational resources that provide public access to the project are maintained at an adequate level.

### **5.2.7.7 Adaptive Management**

Idaho Power proposes to develop a Recreation Adaptive Management Plan to identify and address recreation management, measures, and facility needs for the project over the term of any new license. Idaho Power would use recreational monitoring as the basis for evaluating and recommending any changes to the Recreation Plan that may be needed. Proposed monitoring would include annual informal onsite observations and traffic counters, as well as a more detailed recreational survey of social indicators and general recreational use every 6 years. Idaho Power would prepare summary reports for stakeholders annually and a comprehensive report every 6 years in coordination with FERC Form 80 (Licensed Hydropower Development Recreation Report) filing. Consultation with agencies and entities would occur in coordination with FERC Form 80 filing.

We review numerous conditions, alternative conditions, and recommendations pertaining to ongoing recreation management in section 3.10.2.9, *Adaptive Management*. In that section, we conclude that Idaho Power's proposed Recreation Adaptive Management Plan would provide a flexible tool that could accommodate changing use over time, and we include it in the Staff Alternative. Idaho Power's consultation list includes the primary recreational managers in the project area, and the plan would

provide a substantial level of coordination and consultation. The estimated annualized cost of developing and implementing the Recreation Adaptive Management Plan is \$100,500.

Interior preliminary 4(e) condition no. 14 specifies development of a management plan for dispersed sites, which are undeveloped or informal sites. We note that Idaho Power's proposed Recreation Adaptive Management Plan does not include the numerous dispersed recreational sites throughout the project area. These sites may be the appropriate locations for further development if the Recreation Adaptive Management Plan identifies a need for more development in the future. Therefore, and based on our analysis in section 3.10.2.9, we include in the Staff Alternative a modification of Idaho Power's measure, indicating that the Recreation Adaptive Management Plan's scope should include dispersed site management, and that it include detailed procedures for recreational use monitoring and reporting. The estimated annualized cost of the staff additions is \$69,000.

## **5.2.8 Land Management and Aesthetics**

### **5.2.8.1 Land Use Management**

Project facilities and operations can be incompatible with other land and water uses within the project boundary, such as when development of a recreation facility leads to shoreline erosion or adverse effects on wildlife habitat or cultural resources. Land management issues also include the adequacy of buffers that separate incompatible uses, and the adequacy of management measures designed to protect natural and cultural resources.

Idaho Power proposes to implement the Hells Canyon Resource Management Plan (HCRMP) to guide land management decisions within the project boundary. The plan has already been developed and includes defining buffers between incompatible uses and establishing and maintaining compatibility between and among the various land and water uses in the project. Various policies within the plan require the development of implementation tools and programs as well as management plans specific to a resource or issue, and would include an information and education program; evaluation of dispersed recreation sites; evaluation of recreation/riparian interfaces; establishment of O&M standard practices; a GIS atlas; land and water use classifications; an Idaho Power interdisciplinary team; a program for coordinating with other parties, including forums for coordination, evaluation of existing agreements; and new agreements and partnerships with agencies; and establishment of best management practices.

The Burns Paiute Tribe (BPT-3) recommends that Idaho Power establish and fund a resource coordinating committee comprising involved stakeholders to review and maintain oversight over the implementation of project activities, including the implementation of mitigation, adaptive management, and license implementation decision-making. AR/IRU recommends (AR/IRU-3) that the final license include an adaptive management approach and that a Technical Advisory Committee be convened to oversee adaptive management in the license. The Technical Advisory Committee, which would include the various stakeholders, would oversee study design and implementation, develop mitigation measures based on those studies, and oversee implementation and monitoring of the measures.

Including the proposed HCRMP and its common policies and including the proposed implementation tools in consultation with stakeholders would help ensure that compatibility among land uses is achieved and maintained by determining appropriate land and water uses and applying standard approaches to managing human use and resource protection. However, the proposed HCRMP includes only a few details about how the plan would be implemented. Including additional details regarding implementation of the HCRMP, such as identifying which policies require the development of specific management plans, and identifying additional implementation programs that might be necessary to address project effects on other resources, would help ensure that policies are acted upon, stakeholders understand Idaho Power's intent, and resources are protected while allowing for human use and necessary project operations. We include Idaho Power's proposed HCRMP in the Staff Alternative, and indicate

that the additional details should be provided. We estimate the extra cost of the staff modifications to be \$1,500 on an annualized basis.

The HCRMP calls for development of several programs to facilitate coordination and consultation between Idaho Power and local, state and federal agencies as well as other stakeholders. Post-license consultation is also required in the development and implementation of plans for aquatic, terrestrial, cultural, and recreation resources. Formation of an oversight committee, as recommended by the Burns Paiute Tribe (BPT-3) and AR/IRU (AR/IRU-3), would provide a standing forum for consultation and coordination. Similarly, formation of resource-specific Technical Advisory Committees would facilitate ongoing consultation on resource plans and programs required by a new license. We include the creation and support of an oversight committee and resource-specific Technical Advisory Committees by Idaho Power in the Staff Alternative to facilitate consultation on the development and implementation of plans required by the new license and to provide a forum for consultation on the ongoing implementation of license provision using adaptive management principles. We estimate the annualized cost of this measure to be \$50,000.

### **5.2.8.2 Law Enforcement and Fire Protection**

Disturbances requiring law enforcement at the project occur throughout the year and peak during the summer recreational season. Issues include conflicts between users and the timeliness of response to safety-related incidents in remote areas such as the HCNRA. Various stakeholders have commented that the level of resources for and support of emergency services provided by Idaho Power is not sufficient to provide for visitor safety.

Idaho Power proposes to continue to support local law enforcement, indicating that such support improves public safety in the project area by decreasing emergency response times and increasing law enforcement presence. Additionally, Idaho Power proposes to sponsor biannual meetings regarding law enforcement issues, resources, and responsibilities; provide access to its property and facilities; and contribute to the O&M costs associated with this measure.

In section 3.12.2.3, *Law Enforcement*, we describe preliminary conditions and recommendations of Interior (Interior-4), ODFW (ODFW-85), and the Oregon State Marine Board (OSMB-1, -2, and -3). In that section, we point out that the responsibility of funding law enforcement activities on private, state, and federal lands, including the funding of law enforcement personnel as specified by Interior and recommended by the Oregon State Marine Board and ODFW, lies with the county, state, and federal agencies having jurisdiction over those areas. Therefore, we do not include Idaho Power funding of third parties for law enforcement activities in the Staff Alternative.

Because several state and federal agencies and counties have land management and law enforcement responsibilities within the project area, we see the merit of Idaho Power coordinating these efforts through biannual meetings, as specified by Interior and recommended by the Oregon State Marine Board and ODFW. Including such meetings in a law enforcement plan would assist in evaluating and coordinating law enforcement activities. We modify Idaho Power's proposed HCRMP to include this element.

The project includes a mix of private and public lands adjacent to large tracts of undeveloped lands. Fires started on Idaho Power-owned lands within the project could rapidly spread to adjacent properties or onto the large public tracts. Fire suppression is the responsibility of the counties and the federal land managers, but, given the rural character of the project, it is unclear whether this is sufficient to protect the health, safety, and welfare of project visitors.

Idaho Power proposes as part of the HCRMP to continue to coordinate with public agencies regarding the occurrence of controlled and uncontrolled fires, to suppress fires on its property, and to cooperate with agencies to manage visitor access during uncontrolled fires. In section 3.12.2.4, *Fire*

*Protection*, we review Interior preliminary 4(e) condition no. 4 and Forest Service preliminary 4(e) condition no. 3 and conclude that the HCRMP lacks sufficient detail in the area of fire protection. Accordingly, we include in the Staff Alternative a provision that, in finalizing the HCRMP, Idaho Power include fire protection plan details including how Idaho Power would suppress fires on its lands and how it would manage and communicate with project visitors during evacuations. Also, developing a fire prevention plan for lands within the project boundary as specified by Interior and the Forest Service could help prevent potential fires from spreading beyond project lands and would aid county and agency personnel if a fire were to move beyond the project boundary. The plan would cover all lands within the project boundary, including private and public recreational sites. Idaho Power would be the appropriate entity to coordinate fire prevention efforts on project lands, but Idaho Power would bear the responsibility for funding only efforts required within the project boundary. We estimate the annualized cost of these modifications to Idaho Power's HCRMP to be \$7,000.

### **5.2.8.3 Boundary Modifications**

The FPA requires the project licensee to provide safe public access to project lands and waters and include those lands necessary for project purposes in the project boundary. In accordance with this law, the Commission requires that the project boundary contain the primary recreational facilities used to access project waters, as well as the lands necessary to ensure access for the term of the license, and the lands necessary to ensure an appropriate buffer between the project and neighboring lands.

Idaho Power proposes to remove 3,800 acres of federal land from the existing boundary. The new boundary would follow the same contour line as that followed on private lands, rather than following the metes and bounds system that was used to determine the project boundary on federal lands. We discuss this issue in section 3.12.2.5, *Boundary Modifications*.

We conclude there that standardizing the boundary at the same contour line on both private and federal lands appears to be a sound approach to setting the project boundary. Including all dispersed recreation sites within 200 yards of project waters in the proposed project boundary and defining them on a map that includes the project boundary would clarify which sites would be included within the project boundary and would help ensure that dispersed sites are maintained in place to provide project access. The recreation sites that Interior recommends for inclusion in the project boundary—Airstrip, Steck Park, Swedes Landing, and Westfall recreation sites—are currently at least partially located within the project boundary and provide access to the reservoirs. As discussed above, we also recommend including the Hells Canyon Launch area and the Deep Creek trail in the project boundary. Including these recreation sites within the project boundary is appropriate. Additionally, all lands acquired for wildlife mitigation purposes should be included within the project boundary.

As part of any new license, Idaho Power would provide a revised exhibit G (project boundary map) that would include a detailed description and maps of the project boundary. We conclude that this information, supplemented by Idaho Power's plan to provide aerial photos marked with the project boundary, would provide sufficient definition of the boundary. Surveys may be necessary before any ground disturbing activities are undertaken to verify the boundary on the ground. This is true for all project lands, not just Forest Service lands. Such surveys would ensure that natural and cultural resources are not compromised and that ground disturbing activities occur only within the project boundary. We estimate the annualized cost of the aerial photos and mapping provisions at \$3,000, and we include them in the Staff Alternative.

### **5.2.8.4 Road Management Plan**

Idaho Power-owned or maintained roads within the project area provide both public access to project lands and waters and Idaho Power access to project developments. Project roads may have adverse effects on cultural and natural resources by allowing public access to areas where these resources

occur. Appropriate project road management provides for safety and protection of environmental resources while continuing to provide reasonable public access to the project.

Idaho Power proposes to continue maintenance of roads that it owns and maintains: Oxbow–Hells Canyon Road, 22 miles; Homestead Road from Oxbow, Oregon, to Ballard Creek, 6 miles; and Brownlee–Oxbow Road, 12 miles. In addition, within the HCRMP, Idaho Power proposes to develop a road management plan in consultation with county, state, and federal agencies.

As proposed by Idaho Power and recommended by ODFW (ODFW-76) and specified by the Forest Service as part of its preliminary 4(e) condition no. 12, a road management plan would improve access management by considering appropriate traffic levels to protect natural and cultural resources while providing reasonable public access. Such a plan would increase public safety by providing for road maintenance and management consistent with recreational demand and the goals of the HCRMP on those roads within the project boundary. We include the road management plan in the Staff Alternative and estimate that the annualized cost of the plan is \$27,800.

Idaho Power’s proposed plan lacks certain details that would be necessary to ensure public access and protect project-related environmental resources. Therefore, we include in the Staff Alternative three additional measures to be included in the plan. The first is a provision that Idaho Power include in the road management plan development of a road atlas that depicts locations of natural areas and cultural resources designed to limit conflicts between human use and valuable resources. The second staff-developed provision is that Idaho Power, in consultation with federal land managers and adjacent local governments, provide as part of the plan information detailing which roads are required for project purposes. We note that any such roads would need to be included within the project boundary. Finally, the road management plan, as modified by staff, would include a maintenance schedule describing Idaho Power’s maintenance responsibilities on all project roads. We estimate the annualized cost of these extra road management plan provisions to be \$1,100.

Interior’s preliminary 4(e) condition no. 3 specifies that Idaho Power develop an integrated travel and access management plan for BLM-administered lands affected by the project, to be incorporated into the Interior-recommended comprehensive recreation management plan and coordinated with the Interior-recommended integrated wildlife habitat program and wildlife mitigation and management plan. However, most of the roads listed in the condition are outside of the project boundary and are managed by county and state governments. Interior has not established in the record a clear nexus between project operations and the need for road maintenance on all of the county and state roads outside of the project boundary. Given the numerous roads that provide access to the project, it appears that this measure overstates the licensee’s responsibility to provide reasonable public access to the project. Further, it is the responsibility of state and county governments to maintain roads that are within their jurisdiction and that are used for non-project purposes. Therefore, we do not include this measure in the Staff Alternative. We estimate the additional annual cost of this measure, if included in the Staff Alternative, would be \$15,100.

#### **5.2.8.5 Aesthetic Resource Management**

Idaho Power proposes to address aesthetic resource issues within the Hells Canyon Resource Management Plan (HCRMP) (see section 5.2.8.1, *Land Use Management*). The Common Policies outlined in the proposed HCRMP include various policies aimed at protecting the project area’s aesthetic values, and Idaho Power proposes the following seven specific measures for improving aesthetic conditions:

1. Develop standards and guidelines for designing new physical structures and modifying existing structures to achieve aesthetic and other goals;

2. Establish standards and guidelines for the design of vegetation and hardscape elements and structures in developed areas to control noxious weeds and to achieve aesthetic and other goals;
3. Implement a general aesthetic clean-up plan to enhance the quality of the recreational experience in specific areas;
4. Replace guardrails and Jersey barriers with barriers of corten steel or other visually acceptable material, except where Jersey barriers function as barriers to slides and falling rocks along roads and developed areas;
5. Reduce the visual contrast of certain project facilities with their environment to improve aesthetics and enhance the recreational experience near those facilities;
6. Cooperate with the BLM and Forest Service to develop and assist them with implementing proposed design standards and guidelines at specific BLM and Forest Service facilities, including the Spring recreational site on Brownlee reservoir (BLM), Copper Creek trailhead on Hells Canyon reservoir (BLM), and Big Bar and Eagle Bar on Hells Canyon reservoir (Forest Service); and
7. Provide signs and/or facilities that interpret some elements of the Hells Canyon Project that cannot be effectively modified to reduce their visual contrast.

Included in the fifth item, above, is a measure to develop and implement an aesthetic improvement plan for Hells Canyon dam, which would involve enhancing the road entrance to the dam and HCNRA, painting contrasting or reflective fixtures, relocating or interpreting stop logs, and revegetating the shoreline below the dam.

In a series of three preliminary 4(e) conditions that we discuss in section 3.11.2.2, *Aesthetic Improvements and Resource Management*, the Forest Service specifies the timing and content of the HCRMP as it relates to Forest Service lands, calls for the development and implementation of a Scenery Management Plan for project facilities and operations on Forest Service lands within the project boundary, and calls for an aesthetic improvement plan for enhancement of the upper deck and entrance and egress areas of Hells Canyon dam (FS-22, -23, and -24).

In its alternative 4(e) conditions, Idaho Power states that the plan should adopt the standards/guidelines for physical structures and landscaping previously developed by the Aesthetic Subgroup during the course of pre-filing consultation; that the standards and guidelines should be applied to all lands within the project boundary, not just Forest Service lands; that some of the of Hells Canyon dam improvements might conflict with the dam's security plan.

Interior-25 specifies that Idaho Power develop a visual resource management plan (VRMP) for project facilities to address the design, maintenance, and construction of project facilities (both existing and future) in order to preserve or enhance visual resource values. Interior would have the VRMP apply to the following facilities: (1) dams, bypass canals, spillways (concrete structures); (2) switch yards, power houses, buildings, penstocks, powerlines (metal structures); (3) project recreation facilities including campgrounds and day-use sites; and (4) powerline access corridors and cutbanks.

Based on our analysis presented in section 3.11.2.2, we conclude that development and implementation of an aesthetics improvement management plan as part of the proposed HCRMP would improve the aesthetic character of the Hells Canyon Project by creating a framework of aesthetic design standards and guidelines under which Idaho Power would plan, develop and rehabilitate project facilities over the term of a new license. Including the seven aesthetic measures proposed by Idaho Power would improve the scenic integrity of the landscape within the project vicinity, and we include them in the Staff Alternative. We estimate the annualized cost of Idaho Power's proposal to be \$158,700.

In the Staff Alternative, we include Idaho Power's alternative 4(e) condition and clarify that the aesthetics improvement management plan would apply to all lands within the project boundary, and would apply to all facilities and features specified by Interior, including explicit treatment of the project transmission line and right-of-way. The plan would include the aesthetic improvements at Hells Canyon dam recommended by the Forest Service, with the exception of measures that would compromise security and of the addition of restrooms, which we conclude are not needed. The plan would include a detailed aesthetic improvement schedule tied to Idaho Power's scheduled maintenance program. We estimate that implementing this measure would not materially affect the cost of what Idaho Power proposes in its general aesthetics cleanup plan.

## **5.3 SUMMARY OF 10(j) RECOMMENDATIONS AND 4(e) CONDITIONS**

### **5.3.1 Fish and Wildlife Agency Recommendations**

Under the provisions of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. In response to our REA notice, the following fish and wildlife agencies submitted recommendations for the project: NMFS (letter filed January 25, 2006), Interior (letter filed January 27, 2006), ODFW (letter filed January 25, 2006) and IDFG (letter filed January 26, 2006).

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 97 lists the federal and state recommendations filed pursuant to section 10(j) and indicates whether the recommendations are included 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.

Of the 173 recommendations that we consider to be within the scope of section 10(j), we wholly include 92, include 27 in part, and do not include 54. We discuss the reasons for not including those recommendations in section 5.2, *Discussion of Key Issues*. Table 97 indicates the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j).

### **5.3.2 Interior and Forest Service 4(e) Conditions**

In section 2.3.1.3, *Section 4(e) Federal Land Management Conditions*, we list the preliminary 4(e) conditions submitted by Interior and the Forest Service, and note that section 4(e) of the FPA, 16 U.S.C. § 797(e), provides that any license issued by the Commission "for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation." Thus, any 4(e) condition that meets the requirements of the law must be included in any license issued by the Commission, regardless of whether we include the condition in our Staff Alternative. Table 98 summarizes our staff conclusion with respect to the preliminary 4(e) conditions. Of the 45 preliminary 4(e) conditions submitted by Interior and the Forest Service, we include in the Staff Alternative 17 conditions as specified by the agency and include 21 slightly modified to adjust the scope of the measure. We note that one condition (regarding reservation of authority) would be addressed in the license order, and do not include the remaining six conditions for reasons summarized in table 98 and discussed in more detail in section 5.2, *Discussion of Key Issues*.

Table 97. Fish and wildlife agency recommendations for the Hells Canyon Project. (Source: Staff).

Agency/ Recommendation Number	Recommendation	Within the Scope of 10(j)?	Annualized Cost	Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency	
IDFG-1a	Continue Idaho Power’s fall Chinook spawning program, which includes providing stable flows.	Yes	\$0 <sup>a</sup>	Adopted	
IDFG-1b	Conduct juvenile entrapment and stranding study to assess effects of load following on juvenile fall Chinook salmon, establish long-term monitoring sites and operating protocols.	Yes	\$28,700	Adopted, except that an initial ramping rate of 4 inches per hour would be required and additional operating protocols would be developed through adaptive management.	
IDFG-2	Continue to conduct shallow redd surveys and monitor temperature; distribute temperature monitors broadly so that differences in emergence timing between reaches can be predicted.	Yes	\$0 <sup>a</sup>	Adopted; temperature monitoring protocol would be addressed in proposed fall Chinook spawning and incubation flow management plan.	
616	IDFG-3a	Investigate effects of hatchery steelhead on federally listed steelhead.	Yes	\$46,200	Adopted
IDFG-3b	Develop locally adapted steelhead broodstock.	Yes	\$10,500	Adopted	
IDFG-3c	Expand Oxbow hatchery Chinook rearing.	Yes	\$293,500	Adopted	
IDFG-3d	Make improvements to Niagara Springs Hatchery.	Yes	\$136,600	Adopted	
IDFG-4	Establish anadromous fish hatchery goals, based on adult returns and societal use.	Yes	\$66,700	Not adopted <sup>b</sup> (see section 5.2.4.8)	
IDFG-5a	Fund fish hatchery performance evaluations.	Yes	Not estimated	Adopted	
IDFG-6a	Purchase a new fish marking unit.	Yes	\$81,400	Adopted	
IDFG-6b	Upgrade facility to reduce pathogens at Pahsimeroi hatchery.	Yes	\$649,000	Adopted	
IDFG-7	Purchase new adult fish transport vehicle.	Yes	\$18,300	Adopted	
IDFG-8	Provide fund to improve public angler access to several fisheries.	No, recreation measure	Not estimated	Not adopted	
IDFG-9	Fall Chinook incubation survival monitoring upstream of Brownlee reservoir.	Yes	\$20,000	Not adopted <sup>d</sup> (see section 5.2.4.3)	

<b>Agency/ Recommendation Number</b>	<b>Recommendation</b>	<b>Within the Scope of 10(j)?</b>	<b>Annualized Cost</b>	<b>Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency</b>
IDFG-10	Monitor Pacific lamprey population status downstream of the project and participate in the Columbia River Basin Lamprey Technical Work Group.	No <sup>c</sup>	\$8,300	Not adopted
IDFG-11	Develop a native salmonid plan.	Yes	\$2,500	Adopted
IDFG-12	Implement a pathogen risk assessment.	Yes	\$40,000	Adopted
IDFG-13	Initiate a fish passage program, but do not translocate adult bull trout into Indian Creek or Wildhorse River unless adverse effects from brook trout can be addressed.	Yes	Not estimated	Adopted
IDFG-14	Design, construct and operate improved adult collection facilities at Hells Canyon dam.	Yes	\$658,500	Adopted
IDFG-15	If the Oxbow trap is not constructed reallocate funds (\$7 million) to alternative habitat enhancement projects.	No <sup>c</sup>	\$270,200	Not adopted
IDFG-16	Expand tributary habitat enhancement program to include the Weiser River drainage and include a mechanism for re-allocating funds not used for fish passage or other measures.	No, no nexus to project	Not estimated	Not adopted
IDFG-17	Supplement nutrients for resident salmonids using spawned carcasses or carcass analogs, consider supplementing nutrients in the Weiser River recovery subunit until brook trout suppression efforts in Indian Creek and the Wildhorse River have been effective.	Yes	\$40,000	Adopted, except for consideration of Weiser River <sup>d</sup> (see section 5.2.4.5)
IDFG-18	Conduct Eagle Creek presence/absence survey to determine, with statistical probability, the presence or absence of bull trout within the Eagle Creek Basin.	No <sup>c</sup>	\$42,700	Adopted
IDFG-19	Design, construct, and monitor a weir facility at Pine Creek designed to collect bull trout (sized for fall flows).	Yes	\$365,500	Adopted

<b>Agency/ Recommendation Number</b>	<b>Recommendation</b>	<b>Within the Scope of 10(j)?</b>	<b>Annualized Cost</b>	<b>Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency</b>
IDFG-20	Explore feasibility of methods to control brook trout in Indian Creek, reallocate funding to other measures if not feasible.	Yes	\$50,000	Adopted, except for reallocation of funds.
IDFG-21	Use the White Sturgeon Conservation Plan to contribute to the long-term goal of restoring healthy white sturgeon populations.	Yes	Not estimated	Adopted
IDFG-22	Assess water quality-related effects on early life stages of white sturgeon in the Swan Falls-Brownlee reach.	No <sup>c</sup>	\$24,000	Not adopted
IDFG-23	Translocate reproductive-sized white sturgeon into the Swan Falls-Brownlee reach to increase spawner abundance and population productivity, if water quality is found to be adequate.	Yes	\$20,600	Not adopted <sup>d</sup> (see section 5.2.4.10)
IDFG-24	Evaluate the genetic implications of hatchery supplementation on wild stocks of white sturgeon before developing an experimental conservation aquaculture program.	No <sup>c</sup>	\$1,080	Adopted; evaluation of genetic implications would be addressed in the development of the Conservation Aquaculture Plan.
IDFG-25	Make periodic population assessments to monitor white sturgeon populations in the Swan Falls-Brownlee, Brownlee-Hells Canyon, and Hells Canyon-Lower Granite reaches of the Snake River.	Yes	\$82,100	Adopted
IDFG-26	Monitor genotypic frequencies of white sturgeon between Shoshone Falls and Lower Granite dams.	No <sup>c</sup>	\$2,300	Not adopted
IDFG-27	Implement proposed reservoir level restrictions to benefit warmwater fish; if economic or system emergencies occur that require changes in the operational regime, consult IDFG and ODFW to evaluate alternative strategies to protect warmwater fisheries.	Yes (except for the consultation requirement)	\$1,080	Adopted
IDFG-28	Acquire and manage 23,582 acres as mitigation for project effects.	Yes	\$1,651,100	Adopted

Agency/ Recommendation Number	Recommendation	Within the Scope of 10(j)?	Annualized Cost	Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency	
IDFG-29	Acquire and manage 47,164 acres if initial target lands are unavailable.	Yes	\$3,323,100	Not adopted <sup>d</sup> (see section 5.2.5.4)	
IDFG-30	Enhance low-elevation riparian habitat and participate in mountain quail projects for 5 years.	Yes	\$9,600	Adopted	
IDFG-31	Fund habitat management on four state-owned islands.	Yes	\$42,900	Not adopted <sup>b</sup> , except for two of the islands (see section 5.2.5.5)	
IDFG-32	Implement cooperative weed control, site monitoring, and reseeding.	Yes	\$50,000	Adopted; included in TES Management Plan	
IDFG-33	Implement cooperative protection and monitoring of rare plant sites.	No <sup>c</sup>	\$6,000	Adopted	
619	Interior-37a	Develop and implement a plan to improve habitat conditions in Pine Creek and associated tributaries.	Yes	\$535,200	Adopted
	Interior-37b	Design, construct, and monitor a weir facility at Pine Creek designed to collect bull trout (sized for fall flows)	Yes	\$365,500	Adopted
	Interior-37c	Conduct population monitoring activities, including periodic weir monitoring or radio telemetry studies of bull trout in Pine Creek.	Yes	\$20,000	Adopted; cost is included with weir O&M
	Interior-37d	Explore and implement, if necessary, measures to control brook trout in Pine Creek	Yes	\$50,000	Adopted
	Interior-38a	Develop and implement a plan to improve habitat conditions in Indian Creek and associated tributaries	Yes	\$76,500	Adopted
	Interior-38b	Operate and maintain a permanent weir structure at the mouth of Indian Creek.	Yes	\$182,700	Adopted, except that the timing of construction would be determined by a more detailed set of trigger elements to determine that the facility would contribute toward species recovery
Interior-38c	Conduct population monitoring activities, including periodic weir monitoring or radio telemetry studies of bull trout in Indian Creek.	Yes	\$20,000	Adopted; cost is included with weir O&M.	

<b>Agency/ Recommendation Number</b>	<b>Recommendation</b>	<b>Within the Scope of 10(j)?</b>	<b>Annualized Cost</b>	<b>Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency</b>
Interior-38d	Explore and implement, if necessary, measures to control brook trout in Indian Creek.	Yes	\$50,000	Adopted
Interior-39a	Develop and implement a plan to improve habitat conditions in the Wildhorse River and associated tributaries.	Yes	\$316,700	Adopted
Interior-39b	Operate and maintain a permanent weir structure at the mouth of the Wildhorse River.	Yes	\$365,500	Adopted, except that the timing of construction would be determined by a more detailed set of trigger elements to determine that the facility would contribute towards species recovery
Interior-39c	Conduct population monitoring activities, including periodic weir monitoring or radio telemetry studies of bull trout in the Wildhorse River.	Yes	\$20,000	Adopted; cost is included with weir O&M.
Interior-39d	Explore and implement, if necessary, measures to control brook trout in the Wildhorse River.	Yes	\$50,000	Adopted
Interior-40	Conduct presence absence surveys for bull trout and evaluate habitat conditions within Eagle Creek, and depending on survey results, determine the feasibility of introducing bull trout into suitable habitats in Eagle Creek.	Yes	\$42,700	Adopted
Interior-41	Reintroduce anadromous salmon and steelhead to restore marine-derived nutrients.	Yes	\$50,000	Not adopted <sup>d</sup> (see section 5.2.4.5)
Interior-42	Satisfy existing water quality standards in Oxbow and Hells Canyon reservoirs.	Yes	Not estimated	Not adopted <sup>b</sup> (see section 5.2.3.1)
Interior-43a	Develop Oxbow Bypassed Reach conservation flow plan.	Yes	\$5,500	Not adopted <sup>d</sup> (see section 5.2.4.7)
Interior-43b	Implement Oxbow Bypassed Reach conservation flow plan to meet state water quality standards and life history requirements for bull trout.	Yes	\$1,600,000 <sup>e</sup>	Not adopted <sup>d</sup> (see section 5.2.4.7)

<b>Agency/ Recommendation Number</b>	<b>Recommendation</b>	<b>Within the Scope of 10(j)?</b>	<b>Annualized Cost</b>	<b>Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency</b>
Interior-44	Conduct two-phased study of operational effects on bull trout with 12-inch-per-hour ramping rate measured within 1 mile downstream of Hells Canyon dam in Phase 1 and ROR operation in Phase 2	Yes	\$5,000,000	Not adopted <sup>d</sup> (see section 5.2.4.2)
Interior-45	Develop a plan for providing bull trout passage past Hells Canyon and Oxbow dams, operating permanent monitoring weirs on Pine and Indian Creeks.	Yes	\$2,700	Adopted, except that the timing of construction would be determined by a more detailed set of trigger elements to determine that the facility would contribute towards species recovery
Interior-46a	Develop a phased plan for restoring passage of anadromous fish to Pine Creek, Indian Creek, the Wildhorse River, and Eagle Creek.	Yes	\$2,700	Not adopted <sup>d</sup> (see section 5.2.4.3)
Interior-46b	Design, construct and operate improved adult collection facilities at Hells Canyon dam.	Yes	\$658,500	Adopted
Interior-46c	Design, construct and operate a juvenile spring Chinook collection facility on Eagle Creek.	Yes	\$411,200	Not adopted <sup>d</sup> (see section 5.2.4.3)
Interior-47a	Fall Chinook incubation survival monitoring upstream of Brownlee reservoir.	No <sup>c</sup>	\$20,000	Not adopted <sup>d</sup> (see section 5.2.4.1)
Interior-47b	Develop and refine plans to provide downstream passage of fall Chinook salmon around the project reservoirs.	Yes	\$10,000	Not adopted <sup>d</sup> (see section 5.2.4.3)
Interior-48	Establish hatchery production goals based on adult returns.	Yes	\$16,700	Not adopted <sup>b</sup> (see section 5.2.4.8)
Interior-49	Transfer surplus hatchery fish for put-and-take fisheries.	No, recreation measure	\$700	Adopted
Interior-50a	Implement water quality improvement measures elsewhere in the basin to aid in sturgeon recovery.	No, no nexus to project	Not estimated	Not adopted
Interior-50b	Determine which Idaho Power facilities need to have their trashracks replaced to protect juvenile sturgeon from entrainment.	Yes	Not estimated	Not adopted <sup>b</sup> (see section 5.2.4.10)

Agency/ Recommendation Number	Recommendation	Within the Scope of 10(j)?	Annualized Cost	Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency	
Interior-50c	Implement ROR operations at Lower Salmon Falls, Bliss, C.J. Strike projects during sturgeon spawning, incubation and early life stages.	No, no nexus to project	Not estimated	Not adopted	
Interior-51	Update and implement White Sturgeon Conservation Plan including specific measures endorsed by Interior including assessment of water quality impacts on early lifestages, sturgeon translocation, experimental conservation aquaculture program, population monitoring and monitoring of genotypic frequencies.	Yes	\$170,800	Not adopted <sup>d</sup> (see section 5.2.4.10), except that we include development of a conservation aquaculture plan and periodic monitoring of white sturgeon populations	
Interior-52	Complete and implement a White Sturgeon Conservation and Action Plan.	Yes	\$2,700	Not adopted <sup>b</sup> (see section 5.2.4.10)	
622	Interior-53	Construct and operate a white sturgeon hatchery facility for supplementing sturgeon populations from Shoshone Falls to Hells Canyon dam.	Yes	\$259,200	Adopted, except that Idaho Power would have the discretion on whether to construct a hatchery or lease hatchery space.
Interior-54	Seasonal run-of-river operations to protect sturgeon spawning and early lifestages below Hells Canyon dam.	Yes	Not estimated	Not adopted <sup>b</sup> (see section 5.2.4.2)	
Interior-55	Install protective trash racks at CJ Strike and Bliss dams to protect white sturgeon.	No, no nexus to project	Not estimated	Not adopted	
Interior-56	Complete and implement a Pacific lamprey Management Plan including monitoring and evaluation to determine the downstream passage routes and timing, estimate survival through the project, and effects of reservoir and river fluctuations on rearing habitat.	Yes	\$10,000	Not adopted <sup>d</sup> (see section 5.2.4.3)	
Interior-57	Determine structural measures needed to mitigate for project effects to Pacific lamprey.	Yes	\$2,624,900 <sup>f</sup>	Not adopted <sup>d</sup> (see section 5.2.4.3)	
Interior-58	Develop and implement a Native Fish Management Plan for native resident and anadromous fish.	Yes	Not estimated	Adopted; the measures specified by Interior are included in Idaho Power's proposed native salmonid plan.	

<b>Agency/ Recommendation Number</b>	<b>Recommendation</b>	<b>Within the Scope of 10(j)?</b>	<b>Annualized Cost</b>	<b>Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency</b>
Interior-59	Complete an action plan and implementation schedule to correct fish passage barriers at road crossings and culverts.	Yes	Not estimated	Adopted, but in developing tributary habitat enhancement plan, select and prioritize those tributary barriers for which removal would provide access to useable habitat for bull trout and/or redband trout. Otherwise, barrier removal should be delayed until habitat conditions improve to the point where the barrier removal would provide access to useable habitat.
Interior-60	Complete a stock assessment of anadromous and resident fish populations.	Yes	\$1,080	Not adopted <sup>d</sup> (see section 5.2.4.3)
Interior-61	Turbine vent Brownlee units 1, 2, 3, 4, and possibly Brownlee unit 5 and the three Hells Canyon units.	Yes	\$17,000	Not adopted <sup>b</sup> (see section 5.2.3.1)
Interior-62ai	Construct TDG-abatement structures on Hells Canyon dam.	Yes	\$407,600	Adopted
Interior-62aii	Construct TDG-abatement structures on Brownlee dam.	Yes	\$354,700	Adopted
Interior-62b	Monitor effectiveness of TDG-abatement measures.	Yes	\$14,100	Adopted
Interior-63	Oxbow Bypassed Reach flow and DO supplementation to support primary production, native invertebrates, and resident fishes.	Yes	\$2,048,000 <sup>g</sup>	Not adopted <sup>d</sup> (see section 5.2.4.7)
Interior-64	Comply with IDEQ and ODEQ water quality certifications.	No <sup>c</sup>	Not estimated	Adopted
Interior-65	Take river flow and stage measurements for licensed operations and compliance for the Snake River in Hells Canyon within 1 mile below Hells Canyon dam or at U.S. Geological Survey Gage No. 13290450.	Yes	Not estimated	Not adopted <sup>b</sup> (see section 5.2.4.2)

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Interior-66	Monitor a series of modified operations to determine effects on aquatic species downstream of the Hells Canyon dam including : (1) peak-loading with 12 inches per hour ramping rate; (2) same but with DO enhancement measures; and (3) year-round run-of-river.	Yes	\$5,000,000	Not adopted <sup>d</sup> (see section 5.2.4.2)
Interior-67	Monitor water quality downstream of Hells Canyon dam twice per month.	Yes	\$200,000	Not adopted <sup>d</sup> (see section 5.2.3.1)
Interior-68	Monitor beaches, cobble bars, and sand bars to determine rate of depletion.	Yes	\$28,800	Adopted
Interior-69	Monitor the quantity and quality of all known gravel deposits.	Yes	\$40,000	Adopted, except that representative monitoring sites will be selected during development of the pilot gravel augmentation study.
Interior-70	Conduct biannual monitoring of benthic macroinvertebrates to assess changes in the composition of benthic macroinvertebrates, with emphasis on species and taxonomic groups useful in determining water quality.	Yes	\$57,000	Not adopted <sup>d</sup> (see section 5.2.4.11)
Interior-71	Conduct biannual monitoring of benthic macrophytes and algae.	Yes	\$14,200	Not adopted <sup>d</sup> (see section 5.2.4.11)
Interior-72	Conduct zonal distribution surveys and monitoring of keystone and sensitive benthic species to assess the effects of peak-loading operations on the benthic community.	Yes	\$28,500	Not adopted <sup>d</sup> (see section 5.2.4.11)
Interior-73	Monitor known colonies of the Hells Canyon rapids snail and the short-faced limpet to assess the species response to dissolved oxygen enhancement and operational modifications.	Yes	\$14,200	Not adopted <sup>d</sup> (see section 5.2.4.11)

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Interior-74	Establish and monitor experimental populations of Hells Canyon rapids snail and/or the short-faced limpet in the 10-mile reach immediately below Hells Canyon dam.	Yes	\$14,200	Not adopted <sup>d</sup> (see section 5.2.4.11)
Interior-75	Establish and monitor experimental populations of the western ridged mussel in appropriate habitat in the Snake River below Hells Canyon dam	Yes	\$14,200	Not adopted <sup>d</sup> (see section 5.2.4.11)
Interior-76	Acquire and manage 41,747 acres as mitigation for project effects on wildlife.	Yes	\$2,941,400	Not adopted <sup>d</sup> (see section 5.2.5.4)
Interior-77	Develop and implement Integrated Weed Management Plan for project lands, including cooperative projects on adjacent lands.	Yes	\$51,100	Adopted, except that a full inventory would not be conducted within 3 years of license issuance
Interior-78	Develop and implement Sensitive Plant Species Management Plan, survey and monitor sensitive plants.	No, plant species measure	\$6,100	Not adopted, but most aspects would be incorporated into TES Management Plan
Interior-79	Develop and implement IWHP and WMMP, including establishment of pre-dam baseline conditions.	Yes	\$27,300	Adopted, except for establishment of pre-dam conditions.
Interior-80	Develop and implement Mountain Quail Management Plan.	Yes	\$31,800	Not adopted, <sup>d</sup> but mountain quail measures included in Cooperative Wildlife Management Projects
Interior-81	Develop and implement Bald Eagle Management Plan for some project lands and reservoirs.	Yes	\$15,500	Adopted, except that plan would not be completed if eagles are de-listed; nest survey area would be extended, and the number of winter surveys would be reduced
Interior-82	As part of TES Species Management Plan, implement measures to protect Townsend's big-eared bat maternity sites and hibernacula.	Yes	\$1,500	Adopted
Interior-83	As part of TES Species Management Plan, implement measures to protect southern Idaho ground squirrel.	Yes	\$2,100	Adopted
Interior-84	Develop and Implement Northern Idaho Ground Squirrel Management Plan.	No, no nexus to project	\$6,100	Not adopted, but would be addressed if Idaho Power acquires lands that support this species

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Interior-85	As part of TES Species Management Plan, implement measures to protect special status amphibians and reptiles.	Yes	\$1,000	Adopted	
NMFS-1	Provide stable flows between 8,500 and 13,500 cfs below Hells Canyon dam throughout fall Chinook spawning season.	Yes	Not estimated	Adopted, except that flow range would be 8,000 to 13,500 cfs	
NMFS-2	Provide instantaneous minimum flows below Hells Canyon dam that are equal to, or greater than, the stable flows provided during the preceding fall Chinook spawning period throughout the incubation period.	Yes	Not estimated	Adopted	
626	NMFS-3	Monitor the natural construction of fall Chinook salmon redds in the mainstem Snake River between Lower Granite reservoir and Hells Canyon dam.	Yes	\$125,000	Adopted
NMFS-4	Release flows sufficient to ensure that the largest juvenile entrapment areas are reconnected with the mainstem Snake River for at least 2 hours on a daily basis.	Yes	Not estimated	Not adopted <sup>b</sup> (see section 5.2.4.2)	
NMFS-5	Develop and implement a stranding and entrapment monitoring plan.	No <sup>c</sup>	\$28,700	Adopted	
NMFS-6	Complete study of fall Chinook spawning gravel.	No <sup>c</sup>	\$20,000	Adopted	
NMFS-7	Evaluate fall Chinook egg-to-fry survival in at least two representative spawning areas downstream of Hells Canyon dam in 2015 and every 5 years thereafter.	No <sup>c</sup>	\$20,000	Not adopted	
NMFS-8	Refill Brownlee reservoir to within 1 foot of the April 15 and April 30 minimum elevations necessary to meet the Corps flood control requirements and coordinate refill with NMFS.	Yes	Not estimated	Adopted	

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NMFS-9	Refill Brownlee reservoir to full pool by June 20, release 237 kaf of stored water from Brownlee reservoir between June 21 and July 31 (release at least 150 kaf of this water by July 15) and not refill until after August 31.	Yes	Not estimated	Adopted
NMFS-10	Construct TDG-abatement structures on Hells Canyon dam.	Yes	\$407,600	Adopted
NMFS-11	Construct TDG-abatement structures on Brownlee dam.	Yes	\$354,700	Adopted
NMFS-12	Evaluate and implement the most effective methods to augment Hells Canyon outflow DO levels in late summer and fall.	Yes	\$10,900	Adopted
NMFS-13a	Make improvements to the Oxbow fish hatchery	Yes	\$331,000	Adopted
NMFS-13b	Expand fall Chinook rearing program at Oxbow hatchery.	Yes	\$282,300	Adopted
NMFS-13c	Monitor and evaluate hatchery performance at Oxbow hatchery.	Yes	\$46,200	Adopted
NMFS-13d	Make improvements to the Pahsimeroi fish hatchery to control pathogens.	Yes	\$690,300	Adopted
NMFS-13e	Develop a locally adapted steelhead broodstock at Pahsimeroi hatchery.	Yes	\$690,300	Adopted
NMFS-13e	Complete upgrades to the Niagara Springs fish hatchery, acquire additional smolt tanker, acquire a fish marking unit.	Yes	\$251,200	Adopted
NMFS-13f	Monitor and evaluate hatchery performance Pahsimeroi hatchery.	Yes	\$690,300	Adopted
NMFS-13g	Monitor and evaluate hatchery performance at Niagara Springs.	Yes	\$46,200	Adopted

Agency/ Recommendation Number	Recommendation	Within the Scope of 10(j)?	Annualized Cost	Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency
NMFS-13h	Complete upgrades to Rapid River fish hatchery facilities, distribute carcasses, construct offsite smolt acclimation/adult collection facility.	Yes	\$336,700	Adopted
NMFS-13i	Monitor and evaluate hatchery performance at Rapid River hatchery.	Yes	\$46,200	Adopted
NMFS-13j	Fund Hatchery and Genetic Management Plans and hatchery program evaluations.	No <sup>b</sup>	\$12,900	Adopted
NMFS-13k	Mark all releases with adipose clip.	Yes	Not estimated	Adopted
NMFS-13l	Screen hatchery water intakes to meet NMFS juvenile fish screen criteria.	Yes	\$1,100	Adopted
NMFS-13m	Assess and minimize impacts of Hatchery steelhead to listed ESUs.	Yes	\$8,300	Adopted
NMFS-14a	Contribute \$10 million annually for 5 years and \$5 million annually thereafter to fund water quality improvement projects in the Snake River Basin upstream of Hells Canyon dam.	No, no nexus to project	\$9,278,400	Not adopted
NMFS-14b	Monitor Snake River water quality downstream of Brownlee and Hells Canyon dams along with four sites between Bliss dam and Brownlee reservoir.	Yes, except the upper sites have no nexus to project	\$150,000	Adopted, with exception of TDG at sites downstream of Bliss, C.J. Strike, and Swan Falls dams
NMFS-14c	Fall Chinook incubation survival monitoring upstream of Brownlee reservoir.	Yes	\$20,000	Not adopted <sup>d</sup> (see section 5.2.4.3)
NMFS-15	Measure flows and ramping rates within 1 mile downstream of Hells Canyon dam.	Yes	\$10,000	Not adopted <sup>b</sup> (see section 5.2.4.2)
NMFS-16	Within 20 years, begin passage and reintroduction studies of fall Chinook salmon in the Snake River downstream of Bliss, C.J. Strike and Swan Falls dams.	Yes	\$17,300	Not adopted <sup>d</sup> (see section 5.2.4.3)

Agency/ Recommendation Number	Recommendation	Within the Scope of 10(j)?	Annualized Cost	Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency
NMFS-17	Within 20 years, begin passage and reintroduction studies of spring/summer Chinook salmon and steelhead in three tributaries to be selected in consultation with agencies.	Yes	\$54,600	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-1	Establish and convene a Hells Canyon Project Coordinating Committee upon license issuance.	No <sup>c</sup>	\$500	Not adopted
ODFW-2	Develop, fund and implement a long-term program to achieve specified target population sizes of anadromous fish above the project and to reconnect resident fish populations isolated below, within, and above the project.	Yes	\$6,127,200	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-3	Develop and implement a fish passage plan for native migratory resident and anadromous species to include spring, summer and fall Chinook salmon, summer steelhead, Pacific lamprey, bull trout, redband trout and white sturgeon.	Yes	\$6,127,200	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-4	Establish a Fish Passage and Reintroduction Committee.	No <sup>c</sup>	\$500	Not adopted
ODFW-5	Consult with ODFW in development of fishway and trap designs.	No <sup>c</sup>	\$0	Adopted; costs would be included in the facility design process
ODFW-6	Prepare and implement a written post-construction evaluation plan for the construction and modification of the Hells Canyon dam fish trap.	Yes	\$0	Adopted; costs would be included in the facility design process
ODFW-7	Maintain all fishways and traps in proper order.	Yes	\$0	Adopted; costs would be included in O&M
ODFW-8	Develop a fishway and trap operation and maintenance plan.	Yes	\$0	Adopted; costs would be included in O&M
ODFW-9	Provide ODFW personnel access to the Hells Canyon Project site and pertinent project records to inspect fishways and traps.	No <sup>c</sup>	\$0	Adopted; costs would be included in O&M
ODFW-10	Design, construct and operate improved adult collection facilities at Hells Canyon dam.	Yes	\$658,500	Adopted

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ODFW-11	Design and construct a fish trap and sorting facility at Oxbow dam for passing anadromous and resident fish within 10 years, and evaluate whether delay, injury, or mortality of adult salmonids occurs at the Oxbow powerhouse or bypassed reach. The facility would be similar in design and operation to the Hells Canyon trap.	Yes	\$270,200	Adopted, but timing would be contingent on triggers established in the bull trout passage plan and would not address anadromous fish
ODFW-12	Install and maintain a downstream fish passage and collection facility at Hells Canyon dam within 10 years.	Yes	\$2,624,900	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-13	Design and implement a study of fish predators in Hells Canyon reservoir.	No <sup>e</sup>	\$48,000	Not adopted
ODFW-14	Initiate studies of spring Chinook salmon and summer steelhead migration into and from Pine Creek, and egg to fry, in-reservoir, turbine and spill survival. Initiate studies within 1 year, install smolt collection facility in 2009 if warranted.	Yes	\$837,300	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-15	Initiate studies of spring Chinook salmon and summer steelhead juvenile and adult migration behavior and survival in Eagle, Daly and Goose creeks. Initiate studies by 2012, design and install smolt collection facility in 2017 if warranted.	Yes	\$485,100	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-16	Monitor fall Chinook egg survival in Swan Falls reach every 5 years, starting in year 15 initiate adult and juvenile fall Chinook migration studies, design and construct smolt collection facilities once egg survival is sufficient, assess facility efficiency and performance and implement necessary modifications.	Yes	\$1,203,200	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-17	Develop a detailed upstream and downstream passage plan for Pacific lamprey mid-way through the license term and a schedule for implementation.	Yes	\$2,624,900 <sup>f</sup>	Not adopted <sup>d</sup> (see section 5.2.4.3)

Agency/ Recommendation Number	Recommendation	Within the Scope of 10(j)?	Annualized Cost	Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency
ODFW-18	Develop fish passage plan for bull trout and/or redband trout, conduct bull trout population viability analysis, conduct radio tag studies of bull trout collected in the Hells Canyon trap, develop and implement protocols for capturing and managing bull trout at Pine and Eagle Creek weirs, if constructed.	Yes	\$54,900	Adopted
ODFW-19	Develop and implement a fish passage plan for white sturgeon if this is determined to be feasible.	Yes	\$4,756,800 <sup>b</sup>	Not adopted <sup>d</sup> (see section 5.2.4.10)
ODFW-20	Develop and implement measures to address key limiting factors if passage and reintroduction efforts are terminated for a species in a selected tributary or reach (develop alternative mitigation measures in these cases).	Yes	\$5,000,000	Not adopted <sup>b</sup> (see section 5.2.4.3)
ODFW-21	Implement a pathogen risk assessment.	Yes	\$40,000	Adopted
ODFW-22	Evaluate anadromous and resident fish populations to pass for reintroduction, review stock performance every 5 years.	Yes	\$7,700	Not adopted <sup>d</sup> (see section 5.2.4.3)
ODFW-23	Fund fish habitat enhancement measures to mitigate for ongoing and unavoidable losses.	No <sup>c</sup>	Not estimated	Not adopted
ODFW-24	Monitor bull trout emigration and immigration from tributaries, redband trout abundance and redd surveys assess proportion of resident and anadromous forms of rainbow trout, conduct steelhead and Chinook spawning surveys to assess spawning escapement, distribution and timing of spawning.	Yes	\$50,000	Not adopted <sup>d</sup> (see section 5.2.4.10), except that bull trout and redband trout monitoring would be conducted as part of the bull trout passage plan identified in Idaho Power's alternative section 18 condition.
ODFW-25a	Implement M&E program for Pahsimeroi hatchery.	Yes	\$46,200	Adopted
ODFW-25b	Implement M&E program for Oxbow hatchery.	Yes	\$46,200	Adopted
ODFW-25c	Implement M&E program for Niagara Springs hatchery.	Yes	\$46,200	Adopted
ODFW-25d	Implement M&E program for Rapid River hatchery.	Yes	\$46,200	Adopted

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ODFW-26	Develop a Hatchery Production Plan.	Yes	\$42,700	Adopted, except for replacing smolt production goals with escapement goals (see section 5.2.4.8).
ODFW-27	Investigate and supply alternative fisheries in Oregon.	Yes	\$0	Adopted. As part of the proposed hatchery management plan, Idaho Power would consult with resource agencies and tribes to determine the best use of surplus hatchery fish, and tributary enhancements would improve or restore fisheries in Pine Creek, the Wildhorse River and in tributaries to the Powder River.
ODFW-28	Expand Oxbow Hatchery for fall Chinook rearing.	Yes	\$282,300	Adopted
ODFW-29	Expand Oxbow Hatchery for fall Chinook broodstock collection, spawning, and upgrading hatchery facilities.	Yes	\$282,300	Adopted
ODFW-30	Continue hatchery operations at Oxbow, Rapid River, Pahsimeroi, and Niagara Springs hatcheries to meet target goals and added responsibilities related to anadromous fish reintroduction (fund).	Yes	Not estimated	Adopted
ODFW-31	Manage project operations to meet objectives for anadromous fish migration, fall Chinook spawning and rearing, redband and bull trout rearing, white sturgeon spawning, and reservoir fisheries.	Yes	Not estimated	Adopted
ODFW-32	Shape BOR flow augmentation releases by pre-releasing 100 kaf of storage from Brownlee reservoir from June 21 to August 31 and refilling Brownlee reservoir with an equivalent of BOR water when that water reaches Brownlee reservoir. Attempt to hold Brownlee reservoir full through July 4, and thereafter coordinate releases from Brownlee reservoir, up to 237 kaf, by August 7. Consult with the Corps for a Brownlee reservoir target refill date of June 20 after flood season.	Yes	\$9.29 million	Not adopted (see section 5.2.2.3).

Agency/ Recommendation Number	Recommendation	Within the Scope of 10(j)?	Annualized Cost	Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency
ODFW-33	Implement 6-inch-per hour ramping rate from December 12th through March 20th, four inch-per-hour ramp rate and minimum flow of 11,500 cfs from March 21st through June 21st, 6-inch-per-hour ramp rate with a maximum 10,000 cfs daily flow change limit from June 22nd through September 30th, 6-inch-per-hour ramp rate from October 1st through October 20th, and no ramping from October 21 through December 11.	Yes	\$17.6 million	Not adopted <sup>d</sup> (see section 5.2.4.2)
ODFW-34	Continue fall Chinook spawning flow program.	Yes	Not estimated	Adopted
ODFW-35	Fund and participate in annual spawning surveys for fall Chinook salmon in the Snake River downstream of Hells Canyon dam, conduct deep-water surveys every 5 years or when escapement exceeds 10,000, 15,000, and 20,000 adults, whichever comes first, consult with ODFW and ODEQ on location and frequency of temperature monitoring.	Yes	\$125,000	Adopted; temperature monitoring protocol and frequency of deep-water redd surveys would be addressed in proposed fall Chinook spawning and incubation flow management plan.
ODFW-36a	Develop, fund, and implement a native salmonid plan including a habitat enhancement program, a permanent monitoring weir at Pine Creek, a bull trout survey in Eagle Creek, input of nutrients, and passage measures.	Yes	\$520,000	Adopted
ODFW-36b/37	Investigation of turbine and spill related mortality.	No <sup>c</sup>	\$85,500	Not adopted
ODFW-38	Develop and implement a plan to improve habitat conditions in the Pine, Powder and Burnt River basins.	Yes	\$750,000	Not adopted <sup>b</sup> (see section 5.2.4.5), except that tributary enhancements would occur in the Pine Creek Basin
ODFW-39	Investigate, fund and implement nutrient supplementation in all tributaries to the project.	Yes	\$80,000	Adopted
ODFW-40	Design, construct and operate a weir/trap on Pine Creek designed to collect anadromous smolts (sized to accommodate spring flows) within 3 years.	Yes	\$783,000	Not adopted <sup>b</sup> (see section 5.2.4.3)

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ODFW-41	Conduct Eagle Creek presence/absence survey to determine, with statistical probability, the presence or absence of bull trout within the Eagle Creek Basin.	No <sup>c</sup>	\$42,700	Adopted
ODFW-42	Update and implement White Sturgeon Conservation Plan including evaluating bioaccumulation of contaminants in sturgeon, assessment of water quality impacts on early lifestages, sturgeon translocation, funding habitat enhancement, population monitoring, and monitoring of genotypic frequencies.	Yes	\$274,900	Not adopted <sup>d</sup> (see section 5.2.4.10), except that we include performing long-term population monitoring
ODFW-43	Evaluate bioaccumulation of contaminants in white sturgeon in Hells Canyon and Oxbow reservoirs and upstream of Brownlee reservoir.	No <sup>c</sup>	\$32,100	Not adopted
ODFW-44	Implement water quality improvement measures elsewhere in the basin to aid in sturgeon recovery	No, no nexus to project	\$100,000	Not adopted
ODFW-45	Make periodic population assessments to monitor white sturgeon populations in the Swan Falls-Brownlee, Brownlee-Hells Canyon, and Hells Canyon-Lower Granite reaches of the Snake River.	No <sup>c</sup>	\$82,100	Adopted
ODFW-46	Assess water quality-related effects on early life stages of white sturgeon in the Swan Falls-Brownlee reach.	No <sup>c</sup>	\$24,000	Not adopted
ODFW-47	Translocate reproductive-sized white sturgeon into the Swan Falls-Brownlee reach to increase spawner abundance and population productivity, if water quality is found to be adequate and if genetic and demographic risks to the donor population are found to be acceptable.	Yes	\$20,600	Not adopted <sup>d</sup> (see section 5.2.4.10)
ODFW-48	Monitor genotypic frequencies of white sturgeon between Shoshone Falls and Lower Granite dams.	No <sup>c</sup>	\$2,300	Not adopted
ODFW-49	Develop, fund and implement Pacific lamprey habitat enhancement measures and lamprey monitoring.	Yes	\$105,000	Not adopted <sup>d</sup> (see section 5.2.4.3)

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ODFW-50	Monitor warmwater fish populations and conduct annual creel surveys in all three project reservoirs.	Yes	\$250,000	Not adopted <sup>d</sup> (see section 5.2.4.9)
ODFW-51	Brownlee target refill date of June 30, beginning on May 21 the reservoir would not be drafted by more than one foot for the next 30 days and will not be drafted below 2069 msl through July 4 unless flow augmentation occurs before July 4.	Yes	Not estimated	Adopted
ODFW-52	Conduct studies of food habits of Brownlee reservoir warmwater fish species, including effects of reservoir operations on zooplankton production.	No <sup>c</sup>	\$28,500	Not adopted
ODFW-53	Implement a gravel monitoring program and implement a gravel augmentation program if effects are detected.	Yes	\$27,600	Adopted, except that the benefits and extent of gravel augmentation program would be determined based on the effectiveness of a pilot gravel augmentation program.
ODFW-54a	Develop TDG-abatement plan.	Yes	\$2,200	Adopted
ODFW-54b	Monitor effectiveness of TDG-abatement measures.	Yes	\$14,100	Adopted
ODFW-54c	Construct TDG-abatement structures on Hells Canyon dam.	Yes	\$407,600	Adopted
ODFW-54d	Construct TDG-abatement structures on Brownlee dam.	Yes	\$354,700	Adopted
ODFW-54e	Construct TDG-abatement structures on Oxbow dam, if necessary to satisfy water quality standard.	Yes	\$287,900	Adopted, except that implementation would not occur until Brownlee spillway deflectors are constructed and evaluated.
ODFW-55	Develop and implement plan to avoid project-caused exceedances of Oregon's dissolved oxygen standards.	Yes	\$2,200	Adopted
ODFW-56	Develop and implement temperature management plan.	Yes	\$5,500	Adopted
ODFW-57	Evaluate bioaccumulation of mercury, dieldrin, and DDT/DDE in Brownlee reservoir fish.	No <sup>c</sup>	\$21,400	Adopted

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ODFW-58	Develop and implement a plan to monitor temperature, TDG, dissolved oxygen, and other water quality parameters.	Yes	\$4,400	Adopted
ODFW-59	Develop and implement Terrestrial Resources Management and Mitigation Plan.	Yes	\$0	Adopted
ODFW-60	Establish a Terrestrial Resources Work Group, with pre-defined roles, responsibilities, and schedules.	No <sup>c</sup>	\$17,500	Adopted, except that group would define roles, responsibilities and schedules.
ODFW-61	Acquire and manage 35,739 acres as mitigation for project effects on wildlife.	Yes	\$2,518,100	Not adopted <sup>d</sup> (see section 5.2.5.4)
ODFW-62	Fund habitat management on four state-owned islands.	Yes	\$64,600	Not adopted, <sup>b</sup> except for two of the islands (see section 5.2.5.5)
ODFW-63	Enhance low-elevation riparian habitat and participate in mountain quail projects for 5 years.	Yes	\$8,300	Adopted
ODFW-64	Develop and implement Bald Eagle Management Plan and enhance eagle habitat.	Yes	\$21,100	Adopted, except that habitat would not be enhanced.
ODFW-65	Protect and monitor sensitive flora and fauna species within 1/4 to 1/2 mile of reservoirs and river downstream to Salmon River confluence.	No, no nexus to project (includes lands and species not affected by project).	\$21,100	Not adopted, but special status species affected by the project would be addressed in TES Management Plan
ODFW-66	Control and monitor exotic and invasive vegetation, and establish a CWMA	Yes	\$50,500	Adopted, except that no CWMA would be established.
ODFW-67	Develop and implement an Integrated Transmission Line Operation and Maintenance Plan for 700 miles of transmission lines.	No, no nexus to project (lines not jurisdictional)	\$310,900	Not adopted
ODFW-68	Develop and implement T-Line Management Plan for Line #907.	No, no nexus to project (line not jurisdictional)	\$10,500	Not adopted

<b>Agency/ Recommendation Number</b>	<b>Recommendation</b>	<b>Within the Scope of 10(j)?</b>	<b>Annualized Cost</b>	<b>Adoption Status in Staff Alternative and Basis for Preliminary Determination of Inconsistency</b>
ODFW-69	Develop and implement a detailed bird electrocution monitoring plan for transmission line 945 and implement measures to minimize risk of electrocution.	Yes	\$1,000	Adopted, except that monitoring would be included in transmission line O&M plan, instead of requiring separate detailed plan.
ODFW-70	Monitor bird collisions on transmission lines 923 and 951 and implement measures to minimize risk of collision.	No, no nexus to project (lines not jurisdictional).	\$1,000	Not adopted
ODFW-71	Conduct study of harsh winter effects on mule deer.	No <sup>c</sup>	\$18,600	Not adopted <sup>b</sup>
ODFW-72	As part of WMMP, schedule O&M to minimize disturbance on deer winter range.	Yes	\$1,000	Adopted
ODFW-73	As part of WMMP and Transmission Line Management Plan, develop and implement I&E program to minimize risk of wildlife disturbance.	Yes	\$1,500	Adopted
ODFW-74	Protect wildlife under emergency conditions.	No <sup>c</sup>	\$0	Not adopted

<sup>a</sup> Continuation of existing measure; no incremental cost.

<sup>b</sup> Preliminary findings that recommendations found to be within the scope of section 10(j) are inconsistent with the substantial evidence standards of section 313(b) of the FPA are based on a lack of evidence to support the reasonableness of the recommendation or a lack of justification for the measure.

<sup>c</sup> Not a specific measure to protect, mitigate, or enhance fish and wildlife resources. This includes studies that could have been completed pre-licensing, research studies, personnel access, consultation, administrative conditions, or measures that lack specific details.

<sup>d</sup> Preliminary findings that recommendations found to be within the scope of section 10(j) are inconsistent with the comprehensive planning standard of section 10(a) of the FPA, including the equal consideration provision of section 4(e) of the FPA, are based on staff's determination that the costs of the measures outweigh the expected benefits.

<sup>e</sup> Cost estimate assumes a minimum bypass flow of 1,000 cfs to improve water quality.

<sup>f</sup> Cost estimate assumes that a downstream passage facility would be required at Hells Canyon dam.

<sup>g</sup> Cost estimate assumes 1,000 cfs bypassed flow and oxygenation supplementation.

<sup>h</sup> Cost estimate assumes upstream and downstream passage facilities would be installed at Hells Canyon and Brownlee dams.

Table 98. Interior and Forest Service preliminary 4(e) conditions for the Hells Canyon Project.  
(Source: Staff)

Recommendation	Agency	Annualized Cost	Included in Staff Alternative? <sup>a</sup>
1. Follow BLM requirements for Idaho Power activities on or affecting BLM-administered lands	Interior-1	\$4,400	Yes, except we limit the scope to activities on BLM land and permit more flexibility in timing.
2. Prepare a report documenting and/or evaluating measures for the protection and use of BLM lands	Interior-2	\$5,000	Yes, except we limit the scope to BLM land within the project boundary and limit Interior's right to require changes to project operations.
3. Develop and implement a Travel and Access Management Plan	Interior-3	\$15,100	No; project provides adequate public access without the specified trail system, and the applicant is not responsible for maintaining county and state roads outside the project boundary (see section 5.2.7.5).
4. Develop and implement a Law Enforcement and Emergency Services Plan	Interior-4	\$5,100	No; law enforcement is an agency responsibility (see section 5.2.8.2).
5. Review and adapt the Historic Properties Management Plan, with special conditions for BLM resources	Interior-5	Costs included in specific measures	No; finalized HPMP would provide adequate treatment and protection for resources in the area of potential effect affected by project operations (see section 5.2.6.1).
6. Develop and implement an integrated Comprehensive Recreation Management Plan	Interior-6	\$7,600	Yes, except that we do not include the Recreation Opportunity Spectrum system or Interior's specified decision-making structure that involves all stakeholders.
7. Develop and implement a Litter and Sanitation Plan	Interior-7	\$66,800	Yes, except we modify the service schedule and include floating restrooms only where the need is confirmed through consultation (see section 5.2.7.3).
8. Develop and implement a Project Boat Moorage Plan	Interior-8	\$5,000	Yes, except for moorage facilities for large boats.
9. Develop and implement a Site Enhancement Plan for BLM's Airstrip, Bob Creek section C, and Westfall sties	Interior-9	\$4,600	Yes, except that plan concepts are as described in Idaho Power's alternative condition.
10. Develop and implement a Swedes Landing Enhancement Plan	Interior-10	\$5,000	Yes, except for boating facilities.
11. Develop and implement a Spring Recreation Site Enhancement Plan	Interior-11	\$5,000	Yes
12. Develop and implement a Steck Recreation Site Enhancement Plan	Interior-12	\$3,800	Yes, as part of adaptive management plan and to address the need for upgraded communications.

Recommendation	Agency	Annualized Cost	Included in Staff Alternative? <sup>a</sup>
13. Develop and implement a Jennifer's Alluvial Fan Site Enhancement Plan	Interior-13	\$9,800	Yes, except Idaho Power and BLM would share costs.
14. Develop and implement an Idaho Dispersed Sites Plan	Interior-14	\$69,000	Yes
15. Develop and implement an Oxbow Boat Launch and Carter's Landing Enhancement Plan	Interior-15	\$10,000	Yes, except enhancement measures would be as described in Idaho Power's alternative condition.
16. Develop and implement an Oasis Site Enhancement Plan	Interior-16	\$4,400	Yes
17. Develop and implement a Copper Creek Site Enhancement Plan	Interior-17	\$5,000	Yes, with consultation approval procedures as described in Idaho Power's alternative condition.
18. Develop and implement a Low Water Boat Launch Plan for a facility at or near Swedes Landing	Interior-18	\$5,000	Yes, except we reduce the number of steps in the consultation process.
19. Obtain Forest Service approval of site-specific designs prior to start of Idaho Power activities on National Forest System lands	FS-1	\$1,000	Yes, except we limit scope to Forest Service lands in the project boundary.
20. Prepare and implement a Resource Coordination Plan	FS-2	\$6,100	Yes, except we limit scope to Forest Service lands in the project boundary.
21. Prepare and implement a Fire Prevention Plan	FS-3	\$2,000	Yes
22. Create a Sandbar Maintenance and Restoration Fund.	FS-4	\$534,100	No; the estimated cost for the large volumes of sand required to restore beaches would be considerable, and adverse environmental effects associated with sediment procurement and delivery would be substantial (see section 5.2.1).
23. Prepare an Integrated Wildlife Habitat Program and a Wildlife Mitigation and Management Plan	FS-5	\$150,000	Yes
24. Prepare and implement a Land Acquisition and Management Program	FS-6	\$1,681,500	Yes, except we do not include the acquisition of 56 acres downstream of Hells Canyon dam (see section 5.2.5.4).
25. Prepare an Integrated Weed Management Plan	FS-7	\$3,300	Yes, except we do not include creation of a Hells Canyon Cooperative Weed Management Area (see section 5.2.5.2).
26. Prepare a Threatened and Endangered Species Management and Monitoring Strategy	FS-8	\$2,200	Yes
27. Prepare and implement a Sensitive Species Management Plan	FS-9	\$11,100	Yes, except we include a more flexible survey interval (see section 5.2.5.1).

Recommendation	Agency	Annualized Cost	Included in Staff Alternative? <sup>a</sup>
28. Implement the Mountain Quail Habitat Enhancement Program	FS-10	\$9,600	Yes
29. Develop and implement a Transmission Line Operation and Maintenance Plan	FS-11	\$5,500	Yes
30. Finalize and implement the Hells Canyon Complex Comprehensive Recreation Management Plan	FS-12	\$46,500	Yes
31. Develop and implement a Big Bar Site Development Plan	FS-13	\$10,000	Yes
32. Implement the Eagle Bar Site Development Plan	FS-14	\$28,600	Yes
33. Implement the Eckels Creek Dispersed Site Development Plan	FS-15	\$5,700	Yes
34. Conduct condition and safety inspections of Deep Creek Stairway/Trail #218 and correct any deficiencies	FS-16	\$11,700	Yes
35. Improve and maintain parking and signage at four Forest Service roadside parking areas along the reservoir	FS-17	\$75,000	Yes
36. Operate and maintain Eagle Bar, Eckels Creek, Big Bar, Hells Canyon reservoir parking areas, Black Point Viewpoint, and dispersed areas pursuant to the Recreation Plan	FS-18	Costs included in site-specific measures	Yes, except clear standards would be developed to apply across the project.
37. Manage Hells Canyon reservoir during drawdown to minimize effects on recreation during the summer	FS-19	Not estimated	No; establishing Brownlee summer reservoir levels on the basis of recreation potential would conflict with aquatic resource protection measures that we have included in the Staff Alternative (see section 5.2.2.3).
38. Perform trail maintenance on specified trails	FS-20	\$10,000	No; no clear nexus between project operations and recreational use of Forest Service-managed trails outside of the project boundary (see section 5.2.7.5).
39. Design, construct, and maintain facility enhancements at the Hells Canyon Creek launch site and Visitor Center	FS-21	\$36,100	Yes
40. Develop and implement an aesthetic improvement plan for the upper deck, entrance, and egress areas of Hells Canyon dam	FS-22	\$0 <sup>b</sup>	Yes, except we limit measures to Forest Service lands and excludes restroom and measures that could compromise security.

Recommendation	Agency	Annualized Cost	Included in Staff Alternative? <sup>a</sup>
41. Finalize and implement the Comprehensive Management Plan relating to design standards and landscaping on Forest Service lands	FS-23	\$2,400	Yes, except we adopt standards developed by Aesthetics Subgroup.
42. Prepare and implement a Scenery Management Plan for Forest Service lands	FS-24	\$1,000	Yes, except we adopt standards developed by Aesthetics Subgroup.
43. Finalize and implement the Historic Properties Management Plan	FS-25	\$800	Yes
44. Obtain agreement from the Forest Service regarding Forest Service land within a modified project boundary and locate the land with monuments tied to a Public Land Survey System	FS-26	\$2,000	Yes, except we include alternative means of defining boundary on the ground.
45. Reserve authority by the Commission to require any additional measures necessary for protection and use of public land reservations under Forest Service authority	FS-27	\$0	Not applicable; would be addressed in license order.

<sup>a</sup> Measures noted as “Yes, except...” indicate that we include a modified version of the condition in the Staff Alternative. Modifications are based on our staff analysis, and may reflect points raised in Idaho Power’s alternative conditions (see table 99).

<sup>b</sup> Included in the Hells Canyon Resource Management Plan; no incremental cost.

EPAct provides parties to this licensing proceeding the opportunity to propose alternatives to preliminary conditions. Of the 23 alternative 4(e) conditions submitted by Idaho Power, we include in the Staff Alternative 19 conditions and do not include the remaining 4 conditions for reasons summarized in table 99 and discussed in more detail in section 5.2, *Discussion of Key Issues*.

Table 99. Idaho Power alternative 4(e) conditions for the Hells Canyon Project. (Source: Staff)

Recommendation	Alternative to Agency 4(e) Condition	Annualized Cost	Included in Staff Alternative?
1. Modifies Interior-1, related to BLM requirements for Idaho Power activities on or affecting BLM-administered lands, to limit the scope to BLM lands within the project boundary and permitting more flexibility in the timeline.	Interior-1	\$4,400	Yes
2. Modifies Interior-2 (preparation of a report documenting and/or evaluating measures for the protection and use of BLM lands) to limit the scope to BLM lands within the project boundary and limiting Interior’s right to require changes to project operations.	Interior-2	\$5,000	Yes, included as part of the Recreation Adaptive Management Plan.

<b>Recommendation</b>	<b>Alternative to Agency 4(e) Condition</b>	<b>Annualized Cost</b>	<b>Included in Staff Alternative?</b>
3. Modifies Interior-5, which specifies adoption of the Historic Properties Management Plan, with special conditions for BLM resources, to include data recovery under some conditions.	Interior-5	Costs included in specific measures	Yes
4. Modifies Interior-6 (development and implementation of an integrated Comprehensive Recreation Management Plan) by indicating specific potential parties to be included in the CRMP, requiring agreement of parties, limiting studies, and doing site monitoring via aerial surveys.	Interior-6	\$7,100	Yes
5. Modifies Interior-7, to develop and implement a Litter and Sanitation Plan, to provide a more flexible service schedule and include floating restrooms only where the need is confirmed through consultation.	Interior-7	\$66,800	Yes
6. Modifies Interior-8 (development and implementation of a Project Boat Moorage Plan) by eliminating the requirement for moorage facilities capable of accommodating larger (house) boats.	Interior-8	\$5,000	Yes
7. Modifies Interior-9 (development and implementation of Site Enhancement Plans for BLM's Airstrip, Bob Creek section C, and Westfall sties) by indicating that FERC retains authority over site plans and implementation of the CRMP, and modifies the plan contents.	Interior-9	\$4,600	Yes
8. Modifies Interior-10 (development and implementation of a Swedes Landing Enhancement Plan) by eliminating the provisions of boating facilities and the approval role of BLM, and retains decision making and approval authority for FERC.	Interior-10	\$5,000	Yes
9. Modifies Interior-13 (development and implementation of a Jennifer's Alluvial Fan Site Enhancement Plan) by indicating that Idaho Power and BLM would share costs associated with site enhancements.	Interior-13	\$4,800	Yes
10. Modifies Interior-14 (development and implementation of an Idaho Dispersed Sites Plan) to include installation of a floating toilet on Oxbow reservoir, instituting a plan for regular litter pickup at identified dispersed sites, and adding some sites not included in Interior's condition.	Interior-14	\$25,400	No, Interior's measure would be adequate.
11. Modifies Interior-15 (development and implementation of an Oxbow Boat Launch and Carter's Landing Enhancement Plan) by differentiating which enhancement measures should be taken at Oxbow boat launch and which at Carter's Landing.	Interior-15	\$10,000	Yes

<b>Recommendation</b>	<b>Alternative to Agency 4(e) Condition</b>	<b>Annualized Cost</b>	<b>Included in Staff Alternative?</b>
12. Modifies Interior-17, development and implementation of a Copper Creek Site Enhancement Plan, by clarifying consultation and approval procedures.	Interior-17	\$5,000	Yes
13. Modifies Interior-18, development and implementation of a Low Water Boat Launch Plan for a facility at or near Swedes Landing, to clarify consultation and approval procedures.	Interior-18	\$5,000	Yes
14. Modifies FS-1 concerning Idaho Power activities on National Forest System lands to limit the scope to activities on Forest Service lands within the project boundary	FS-1	\$1,000	Yes
15. Modifies FS-2 concerning preparation and implementation of a Resource Coordination Plan to limit the scope to activities on Forest Service lands within the project boundary	FS-2	\$6,100	Yes
16. Modifies FS-3 concerning preparation and implementation of a Fire Prevention Plan by limiting the scope to activities on Forest Service-administered lands within the project boundary.	FS-3	\$2,000	No; fire plan needs to cover more than just Forest Service land to be effective (see section 5.2.8.2)
17. Modifies FS-13 by stating that Idaho Power is not solely responsible for all costs associated with developing and implementing a Big Bar Site Development Plan	FS-13	\$9,800	No; licensee should be responsible for this project-related site
18. Modifies FS-16 by allocating to Idaho Power only a percentage of the cost of maintaining Deep Creek Stairway/Trail #218 and correcting any deficiencies	FS-16	\$3,800	No; licensee should be responsible for this project-related site.
19. Modifies FS-18 to include the development of clear standards, applicable throughout the project, for the operation and maintenance of Eagle Bar, Eckels Creek, Big Bar, Hells Canyon reservoir parking areas, Black Point Viewpoint, and dispersed areas pursuant to the Recreation Plan	FS-18	Costs included in site-specific measures	Yes
20. Modifies FS-22 (development and implementation of an aesthetic improvement plan for the upper deck, entrance, and egress areas of Hells Canyon dam) to remove Forest Service approval authority, limit activities to Forest Service lands, exclude measures that might conflict with the security plan for the dam, eliminate provision of restrooms at Hells Canyon dam, and apply Idaho Power's schedule for implementing the plan	FS-22	\$0 <sup>a</sup>	Yes

<b>Recommendation</b>	<b>Alternative to Agency 4(e) Condition</b>	<b>Annualized Cost</b>	<b>Included in Staff Alternative?</b>
21. Modifies FS-23, finalizing and implementing the Comprehensive Management Plan relating to design standards and landscaping on Forest Service lands, by recommending that the plan adopt the standards/guidelines for physical structures and landscaping previously developed by the Aesthetic Subgroup	FS-23	\$2,400	Yes
22. Modifies FS-24, preparation and implementation of a Scenery Management Plan for Forest Service lands, by giving more details of the plan and including a monitoring strategy that is similar to that recommended by the Forest Service. All established viewpoints, not just key observation points, would be used to consider compliance with visual quality objectives and/or scenic integrity level standards.	FS-24	\$1,000	Yes
23. Modifies FS-26, concerning the project boundary on NFS lands, by recommending that Idaho Power provide the Forest Service with aerial photos showing the approximate location of the project boundary throughout Forest Service-managed lands.	FS-26	\$250	Yes

<sup>a</sup> Included in HCRMP; no incremental cost.

## **5.4 CONSISTENCY WITH COMPREHENSIVE PLANS**

### **5.4.1 Section 10(a)(2) Comprehensive Plans**

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving waterways affected by the project. Under section 10(a)(2), federal, state and local agencies filed comprehensive plans that address various resources in Oregon and Idaho. The 44 plans listed below address resources applicable to the project. Based on our review and analysis, we conclude that the project as proposed by Idaho Power and as described in the Staff Alternative would be consistent with the plans.

#### **5.4.1.1 Plans Applicable to Both Idaho and Oregon**

Forest Service. 2003. Hells Canyon National Recreation Area comprehensive management plan. Department of Agriculture, Baker City, Oregon. June 2003.

Northwest Power and Conservation Council. 2000. Columbia River Basin fish and wildlife program. Portland, Oregon. Council Document 2000-19. (1984, 1987, 1994, 2000, amended 2003 as Council Document 2003-4).

Northwest Power and Conservation Council. 2005. The Fifth Northwest electric power and conservation plan. Portland, Oregon. Council Document 2005-07.

Northwest Power and Conservation Council. 1988. Protected areas amendments and response to comments. Document 88-22 (September 14, 1988).

Northwest Power and Conservation Council. 2003. Mainstem amendments to the Columbia River Basin fish and wildlife program. Portland, Oregon. Council Document 2003-11.

#### **5.4.1.2 Plans Applicable to Idaho**

Forest Service. 2003. Payette National Forest land and resource management plan. Department of Agriculture, McCall, Idaho. July 2003.

Forest Service. 1987. Nez Perce National Forest plan. Department of Agriculture, Grangeville, Idaho. October 1987. 171 pp. and appendices.

Idaho Department of Fish and Game. 2001. Idaho fisheries management plan, 2001-2006. Boise, Idaho.

Idaho Department of Fish and Game. 2003. Draft white sturgeon management plan: Status and objectives of Idaho's white sturgeon resources in the Snake River. Boise, Idaho. August 2003.

Idaho Department of Fish and Game. Bonneville Power Administration. 1986. Pacific Northwest rivers study. Final report: Idaho. Boise, Idaho. 12 pp. and appendices.

Idaho Department of Health and Welfare. Division of Environment. 1985. Idaho water quality standards and wastewater treatment requirements. Boise, Idaho. January 1985. 72 pp. and appendices.

Idaho Department of Parks and Recreation. Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan (SCORTP) 2003-2007. Boise, Idaho.

Idaho Water Resource Board. 1986. State water plan. Boise, Idaho. December 1986.

Bureau of Land Management. Forest Service. 1991. Snake River final activity/operations plan. Department of the Interior, Idaho Falls, Idaho. Department of Agriculture, Idaho Falls, Idaho. February 1991. 101 pp. and appendices.

#### **5.4.1.3 Plans Applicable to Oregon**

Bureau of Land Management. 1989. Baker resource management plan. Department of the Interior, Baker, Oregon. July 1989. 151 pp.

Bureau of Land Management. 1990. Resource assessment of the Powder River. Department of the Interior, Baker, Oregon. August 1990.

Bureau of Land Management. U.S. Forest Service. 1996. Status of the Interior Columbia Basin: Summary of scientific findings. Portland, Oregon. November 1996.

Forest Service. 1990. Wallowa-Whitman National Forest land and resource management plan. Department of Agriculture, Baker City, Oregon. April 1990.

Hydro Task Force and Strategic Water Management Group. 1988. Oregon comprehensive waterway management plan. Salem, Oregon.

Oregon Department of Environmental Quality. 1978. Statewide water quality management plan. Salem, Oregon. November 1978. Seven volumes.

Oregon Department of Fish and Wildlife. 1982. Comprehensive plan for production and management of Oregon's anadromous salmon and trout: Part I. General considerations. Portland, Oregon. June 1, 1982. 33 pp.

- Oregon Department of Fish and Wildlife. 1986. Oregon Bighorn sheep management plan. Portland, Oregon. November 1986. 17 pp.
- Oregon Department of Fish and Wildlife. 1987. The statewide trout management plan. Portland, Oregon. November 1987. 77 pp.
- Oregon Department of Fish and Wildlife. 1987. Warm water game fish management plan. Portland, Oregon. August 1987. 60 pp.
- Oregon Department of Fish and Wildlife. 2003. Oregon's elk management plan. Portland, Oregon. February 2003.
- Oregon Department of Fish and Wildlife. 1993. Oregon black bear management plan, 1993-1998. Portland, Oregon. 33 pp. and appendices.
- Oregon Department of Fish and Wildlife. 1993 (updated 1999). Oregon wildlife diversity plan. Portland, Oregon. November 1993 (updated January 1999).
- Oregon Department of Fish and Wildlife. 1993. Oregon cougar management plan, 1993-1998. Portland, Oregon. 31 pp. and appendices.
- Oregon Department of Fish and Wildlife. 2001. Oregon wildlife and commercial fishing codes: 2001-2002. Portland, Oregon.
- Oregon Department of Fish and Wildlife. 1995. Biennial report on the status of wild fish in Oregon. Portland, Oregon. December 1995. 217 pp. and appendix.
- Oregon Department of Fish and Wildlife. 1995. Comprehensive plan for production and management of Oregon's anadromous salmon and trout: Part III. Steelhead plan. Portland, Oregon. April 26, 1995. 118 pp. and appendices.
- Oregon Department of Fish and Wildlife. 1996. Species at risk: Sensitive, threatened, and endangered vertebrates of Oregon. Portland, Oregon. June 1996.
- Oregon Department of Fish and Wildlife. 1997. Oregon plan for salmon and watersheds: Supplement 1 Steelhead. Salem, Oregon. December 1997.
- Oregon Department of Fish and Wildlife. 1987. Trout mini-management plans. Portland, Oregon. December 1987. 58 pp.
- Oregon Department of Transportation. State Parks and Recreation Division. 1987. Recreational values of Oregon rivers. Salem, Oregon. April 1987. 71 pp.
- Oregon State Game Commission. 1963-1975. Fish and wildlife resources - 18 basins. Portland, Oregon. 21 reports.
- Oregon State Parks and Recreation Department. 2003. Oregon Outdoor Recreation Plan 2003-2007 (SCORP). Salem, Oregon. January 2003.
- Oregon State Parks and Recreation Division. No date. The Oregon scenic waterways program. Salem, Oregon. 75 pp.
- Oregon State Water Resources Board. 1973. Surface area of lakes and reservoirs. Salem, Oregon. 43 pp.
- Oregon Water Resources Commission. 1987. State of Oregon water use programs. Salem, Oregon. 295 pp.
- Oregon Water Resources Department. 1985. Biennial Report, 1985-1987.
- Oregon Water Resources Department. 1988. Oregon water laws. Salem, Oregon. 240 pp.

Department of the Army, Corps of Engineers. Portland District. 1993. Water resources development in Oregon. Portland, Oregon. 78 pp.

## **5.4.2 Other Plans**

Certain other plans do not qualify as comprehensive plans under section 10(a)(2) of the FPA, but were the subject of comments made during scoping or in response to the Commission's notice that the project was ready for environmental analysis. In the following sections, we discuss the consistency of Idaho Power's Proposed Operations and the Staff Alternative with those plans.

### **Umatilla, Warm Springs, and Yakama Tribes. 1995. Wy-Kan-Ush-Ma Wa-Kish-Wit: Spirit of the Salmon. The Columbia River Anadromous Fish Restoration Plan of the Nez Perce.**

We conclude that the measures proposed by Idaho Power and additional measures included in the Staff Alternative are consistent with *Wy-Kan-Ush-Ma Wa-Kish-Wit: Spirit of the Salmon* and would contribute to meeting the plan's objectives to halt declining trends and increase populations of anadromous fish to levels that support tribal harvest opportunities. Measures proposed by Idaho Power that would contribute to meeting these objectives include: (1) continuation of reservoir operations in the fall, winter, and early spring for protection of fall Chinook spawning and salmon incubation; (2) continuation of fall Chinook redd and temperature monitoring to avoid the risk of dewatering developing salmon embryos; and (3) installation of spillway flow deflectors at Hells Canyon dam and continued preferential use of the upper spillgates at Brownlee dam during spill periods to reduce total dissolved gas concentrations in the Snake River downstream of Hells Canyon dam. Additional measures included in the Staff Alternative that would contribute to meeting plan objectives include: (1) periodic review of water quality monitoring data to determine when conditions in the mainstem Snake River upstream of Brownlee reservoir have improved sufficiently to warrant restoration of fall Chinook salmon; (2) flow augmentation and ramping rate restrictions that should improve in-river juvenile salmon survival; and (3) implementation of a white sturgeon conservation aquaculture plan that would restore white sturgeon populations to levels that support tribal harvest opportunities.

### **Wallowa County Planning Department. Undated. Wallowa County Comprehensive Land Use Plan.**

We conclude that the measures proposed by Idaho Power and additional measures included in the Staff Alternative are consistent with Wallowa County Land Use Plan. The basic purposes of the Plan are to: (1) to protect the custom, culture, and community stability of the county; (2) maintain the agricultural and timber basis of the county; (3) accommodate anticipated development; and (4) make provisions for those uses that may be needed by the county, but that may have such undesirable characteristics as noise, smoke, and odor. The Staff Alternative includes measures that would improve protection of cultural resources, expand recreational opportunities in designated areas, and improve land use management on project lands.

## **5.5 RELATIONSHIP OF LICENSE PROCESS TO LAWS AND POLICIES**

### **5.5.1 Section 401 of the Clean Water Act—Water Quality Certification**

The status of the water quality certifications for the project is discussed in section 2.3.1.1.

### **5.5.2 Coastal Zone Management Act—Consistency Certification**

Section 307(c) of the Coastal Zone Management Act requires that all federally licensed and permitted activities be consistent with approved state Coastal Zone Management Programs. If the project

is located within a coastal zone boundary or if a project could affect resources located in the boundaries of the designated coastal zone, the applicant must certify that the project is consistent with the state Coastal Zone Management Program. The Hells Canyon Project is not located within the coastal zone boundary and would not affect resources located within the coastal zone boundary.

### 5.5.3 Section 18 of the Federal Power Act—Authority to Prescribe Fishways

Fishway prescriptions and recommendations for reservation of authority to prescribe fishways are discussed in section 2.3.1.2.

### 5.5.4 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 critical habitats of such species. Fourteen federally listed fish species (Snake River fall Chinook salmon, Snake River spring/summer Chinook salmon, Snake River sockeye salmon, Snake River steelhead, Upper Columbia River spring Chinook salmon, Columbia River steelhead, Lower Columbia River Chinook salmon, Upper Columbia River steelhead, Columbia River chum salmon, Lower Columbia River coho salmon, Lower Columbia River steelhead Upper Willamette River Chinook salmon, Upper Willamette River steelhead, and bull trout), one invertebrate (Idaho springsnail), three federally listed plant species (Howell’s spectacular thelypody, MacFarlane’s four-o’clock, and Spalding’s catchfly), and four federally listed wildlife species (gray wolf, Canada lynx, northern Idaho ground squirrel, and bald eagle) could occur in the project area or in downstream areas potentially affected by project operations. These species were identified as being likely to occur in the project area by the FWS in a letter dated November 28, 2005 and by NMFS in a letter dated February 9, 2006. In its letter, NMFS identified the four Snake River ESUs (fall Chinook salmon, spring/summer Chinook salmon, sockeye salmon, and steelhead) and portions of their designated critical habitat as being the most likely to be affected by the project.

Table 100 shows our determinations regarding the effect of relicensing the Hells Canyon Project on federally listed species. Table 100 also summarizes the basis for our effect determinations. We will request formal consultation with NMFS on the Snake River fall Chinook salmon, Snake River spring/summer Chinook salmon, Snake River sockeye salmon, Snake River steelhead, and their critical habitat, and with FWS on the bald eagle. We will also request concurrence with NMFS and FWS on our determinations that relicensing would be “not likely to adversely affect” other listed species or critical habitat. This DEIS will serve as our biological assessment.

Table 100. Summary of effect determinations for fish, plants, and wildlife.

Species	Species Status	Species Finding	Critical Habitat Finding	Basis for Determination
Snake River fall Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for stranding mortality, effects of gas supersaturation on fry and juveniles, reduced recruitment of spawning gravel
Snake River spring/summer Chinook salmon ( <i>O. tshawytscha</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for adverse effects of gas supersaturation on juvenile and adult fish

<b>Species</b>	<b>Species Status</b>	<b>Species Finding</b>	<b>Critical Habitat Finding</b>	<b>Basis for Determination</b>
Snake River sockeye salmon ( <i>O. nerka</i> )	Endangered	Likely to adversely affect	Likely to adversely affect	Continued potential for adverse effects of gas supersaturation on juvenile fish
Snake River steelhead ( <i>O. mykiss</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for adverse effects of gas supersaturation on juvenile and adult fish
Upper Columbia River spring Chinook salmon ( <i>O. tshawytscha</i> )	Endangered	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant
Middle Columbia River steelhead ( <i>O. mykiss</i> )	Threatened	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant
Upper Columbia River steelhead ( <i>O. mykiss</i> )	Threatened	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant
Lower Columbia River Chinook salmon ( <i>O. tshawytscha</i> )	Threatened	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant
Columbia River chum salmon ( <i>O. keta</i> )	Threatened	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant
Lower Columbia River coho salmon ( <i>O. kisutch</i> )	Threatened	Not likely to adversely affect	None designated	Effects are discountable or insignificant
Lower Columbia River steelhead ( <i>O. mykiss</i> )	Threatened	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant
Upper Willamette River Chinook salmon ( <i>O. tshawytscha</i> )	Threatened	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant
Upper Willamette River steelhead ( <i>O. mykiss</i> )	Threatened	Not likely to adversely affect	Not likely to adversely affect	Effects are discountable or insignificant

Species	Species Status	Species Finding	Critical Habitat Finding	Basis for Determination
Bull trout ( <i>Salvelinus confluentus</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Potential for stranding and turbine mortality, potential effects of gas supersaturation on juvenile and adult fish, impediments to migration, reduction in anadromous food base
Idaho springsnail ( <i>Pyrgulopsis idahoensis</i> )	Endangered	No effect	No effect	Does not occur within or downstream of the project
Howell's spectacular thelypody ( <i>Thelypodium howellii</i> ssp. <i>spectabilis</i> )	Threatened	No effect	None designated	No suitable habitat in the project area; no documented occurrences.
MacFarlane's four-o'clock ( <i>Mirabilis macfarlanei</i> )	Threatened	Not likely to adversely affect	None designated	Suitable habitat in the project vicinity, but no known occurrences on project lands. Project operations unlikely to affect, but surveys needed prior to ground-disturbance at high-probability sites.
Spalding's catchfly ( <i>Silene spaldingii</i> )	Threatened	Not likely to adversely affect	None designated	Suitable habitat in the project vicinity, but no known occurrences on project lands. Project operations unlikely to affect, but surveys needed prior to ground-disturbance at high-probability sites.
Gray wolf ( <i>Canis lupus</i> )	Endangered/Non-essential Experimental Population	Not likely to adversely affect	None designated	Suitable habitat occurs in the project area; confirmed sightings nearby, and populations anticipated to increase. May be observed more frequently in the future, but species generally avoids concentrated activity.
Canada lynx ( <i>Lynx canadensis</i> )	Threatened	No effect	No effect	No suitable habitat in the project area; one unconfirmed sighting 70 miles downstream of Hells Canyon dam. May occur as transient.

Species	Species Status	Species Finding	Critical Habitat Finding	Basis for Determination
Northern Idaho ground squirrel ( <i>Spermophilus brunneus brunneus</i> )	Threatened	Not likely to adversely affect	None designated	No suitable habitat occurs on project lands, but may be present on newly acquired lands, with potential for habitat enhancement.
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Threatened	Likely to adversely affect	None designated	Present in the project area, with increasing populations. Proposed and recommended measures including implementation of a management and monitoring plan, timing restrictions to minimize disturbance and review of measures to reduce risk of power line collision.

### 5.5.5 Essential Fish Habitat

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the Secretary of Commerce regarding all actions or proposed actions that are authorized, funded, or undertaken by the agency that may adversely affect EFH. The Snake River downstream of the project comprises EFH for Chinook and coho salmon.

Idaho Power proposes the following measures that should benefit Chinook EFH in the Snake River: (1) continue reservoir operations in the fall, winter, and early spring for protection of fall Chinook spawning and salmon incubation; (2) continue fall Chinook redd and temperature monitoring to avoid the risk of dewatering developing salmon embryos, but discontinue deep-water redd monitoring until fall Chinook escapement increases significantly; and (3) install spillway flow deflectors at Hells Canyon dam and continue preferential use of the upper spillgates at Brownlee dam during spill periods to reduce total dissolved gas concentrations in the Snake River downstream of Hells Canyon dam.

In section 5.2, *Discussion of Key Issues*, we discuss two additional measures that we include in the Staff Alternative that would benefit EFH: (1) a pilot gravel augmentation program; and (2) measures to increase dissolved oxygen levels downstream of Hells Canyon dam. We conclude that Idaho Power’s proposal and the measures that we include in the Staff Alternative would not adversely affect EFH.

### 5.5.6 National Historic Preservation Act

Relicensing is considered an undertaking within Section 106 of the NHPA, as amended (P.L.89-665; 16 USC 470). Section 106 requires that every federal agency “take into account” how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register. As the lead federal agency for issuing a license, the Commission is responsible for ensuring that the licensee will take all necessary steps to “evaluate alternatives or modifications” that “would avoid, minimize, or mitigate any adverse effects on historic properties” for the term of any license involving the project. The lead agency also must consult with the SHPO(s), as well as with other land management agencies where the undertaking may have an effect, and with Indian tribes that may have cultural affiliations with affected

properties involving the undertaking. The overall review process involving section 106 is administered by the Advisory Council, an independent federal agency.

To meet the requirements of section 106, the Commission would execute a Programmatic Agreement to take into account the effects on historic properties from the operation of the Hells Canyon Project (see section 5.2.6.1, *Finalization of the HPMP*). The terms of the Programmatic Agreement would ensure that Idaho Power would address and treat all historic properties identified within the areas of potential effect through the HPMP. The HPMP entails ongoing consultation involving historic properties for the entire term of any new license.

### **5.5.7 Pacific Northwest Electric Power Planning and Conservation Act, Columbia River Basin Fish and Wildlife Program, and Mainstem Amendments to the Columbia River Basin Fish and Wildlife Program**

Under section 4(h) of the Pacific Northwest Power Planning and Conservation Act, the Northwest Power Planning Council (now known as the Northwest Power and Conservation Council) developed the Columbia River Basin Fish and Wildlife Program (Program) to protect, mitigate, and enhance the fish and wildlife resources associated with development and operation of hydroelectric projects in the Columbia River Basin. Section 4(h) states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies should take the Program into account to the fullest practical extent. To mitigate harm to fish and wildlife resources, the Council has adopted specific provisions to be considered in the licensing or relicensing of non-federal hydropower projects (Appendix B of the Program).

We conclude that the measures described in the Staff Alternative are consistent with the Columbia River Basin Fish and Wildlife Program and would contribute toward achieving the program's objectives to halt declining trends in salmon and steelhead populations above Bonneville dam; to restore the widest possible set of healthy, naturally reproducing populations of salmon and steelhead; to reintroduce anadromous fish into blocked areas; to restore healthy ecosystems and watersheds; to provide abundant opportunities for tribal trust and treaty right harvest and for non-tribal harvest; and to allow for the recovery of fish and wildlife affected by the hydrosystem and listed under the Endangered Species act.

We conclude that the measures included in the Staff Alternative are also consistent with the mainstem amendments of the Columbia River Basin Fish and Wildlife Program and would contribute toward achieving the amendments' objective of assisting the recovery of federally listed species. The Staff Alternative also includes developing a plan in consultation with NMFS and BOR to evaluate the benefits of providing flow augmentation from Brownlee reservoir, which is consistent with provisions in the mainstem amendments that call for federal agencies to report annually on the benefits of flow augmentation; to evaluate the validity of flow targets and flow augmentation actions in the 2000 Biological Opinion on operation of the Federal Columbia River Power System; and to ascertain the nature, extent of, and reasons for a flow-survival relationship through the lower Columbia River System.

### **5.5.8 Wild and Scenic Rivers Act**

The Wild and Scenic River Act (P.L. 90-542) and its amendments protect, in their free-flowing conditions, designated rivers and their immediate environments that possess outstanding remarkable values (ORVs). ORVs may include scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Section 7 (a) of the act states that FERC shall not license the construction of any dam, water conduit, reservoir, powerhouse, transmission line, or other project works under the FPA on or directly affecting any river designated as a Wild and Scenic River. The Wild and Scenic Rivers Act specifically does not preclude licensing of developments upstream or downstream of designated wild, scenic, or recreational rivers if the development does not invade the area or unreasonably diminish the scenic, recreational and fish and wildlife values present in the designated reach.

Congress added 67.5 miles of the Snake River to the Wild and Scenic Rivers System in 1975. The river is designated in two segments: the wild segment from Hells Canyon dam north to Upper Pittsburg Landing (about 31.5 miles) and the scenic segment from Upper Pittsburg Landing to a point about 36 miles down river. Congress found that the wild portion of the river is free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Congress also found that the scenic portion of the river is free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. The ORVs for the Snake Wild and Scenic River are broad reaching and include scenery, recreation, geology, wildlife, fisheries, cultural resources, vegetation/botany, and ecology.

Current operations stop most sediment from moving through the project. This, in combination with variable releases from the Hells Canyon dam and powerboat wakes, appears to contribute to shoreline erosion downstream of the project. The seasonal restriction on ramping rates included in the Staff Alternative would help reduce project-related erosion compared to existing conditions. This flow regime would also improve conditions for riparian vegetation by reducing the magnitude and duration of flow fluctuations along the shoreline, creating better conditions for riparian vegetation to establish itself along the shoreline. Together, these measures would help improve these scenic and environmental resources in the Wild and Scenic reach.

The increased navigation flow included in the Staff Alternative would improve public access to the Wild and Scenic reach, allowing commercial power boaters to use the wild portion of the river more consistently when the summer augmentation flows are implemented. This may attract more users to the upper reaches during late summer months who would otherwise be stopped by difficult or impassable rapids. Increased recreational use associated with the increased minimum flows could add to recreational impacts along the river, including increased competition for shoreline campsites, increased damage to established and informal sites, and increased recreation-related impacts on cultural sites. Increased usage by commercial power boaters could contribute to beach erosion, but this effect would probably not outweigh the reduction in erosion from the reduced ramping rates discussed above.

Overall, the environmental measures included in the Staff Alternative would help improve water quality passing through the project by cooling inflow, allowing pesticides and other pollutants to break down in the upper reaches of Brownlee reservoir, and by improving dissolved oxygen concentrations downstream of the dams. These measures would help improve water quality in the Wild and Scenic reaches.

Several measures included in the Staff Alternative would benefit fisheries in the Snake River downstream of the project. The restrictive ramping rates and augmentation of summer migration flows would help improve anadromous fish returns, particularly for fall Chinook salmon. The improved water quality would also improve habitat conditions for native resident fish in the Snake River. Over time, improvements to the fishery could attract additional recreational users to the reach. However, we conclude that any increased recreational use associated with the improved fishery would be marginal and could not be distinguished from general increases in demand for boating and fishing in this section of the Snake River.

Implementing the Staff Alternative recreational measures within the project boundary would have negligible effects on recreational resources in the designated Wild and Scenic reaches. The recreational measures primarily address recreational needs within the project boundary and would neither attract additional visitors to the designated reaches nor affect scenic values or wildlife values of these reaches.

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