

## 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.

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

In this section, we outline Idaho Power's Proposal, the Staff Alternative, and the Staff Alternative with Mandatory Conditions, and summarize the key differences of the potential effects among 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 94 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, Interior's modified section 18 prescription (see section 5.2.4.4), some 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.

#### Project Operation

Under the Staff Alternative, the project would be operated as proposed by Idaho Power (see section 2.2.2, table 1), 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, (4) revised minimum flow during medium-high and extremely high flow years; and (5) warmwater fish spawning protection levels in Brownlee reservoir. The operational modifications included in the Staff Alternative are as follows:

1. Idaho Power would consult with the Corps to develop a flood control plan for operating Brownlee reservoir consistent with regional and local requirements. Consistent with the flood control plan, Idaho Power would refill Brownlee reservoir to a level between: (a) 1 foot below the April 15 and April 30 required flood control draft; and (b) the required flood control draft on those dates. After April 30, Idaho Power would coordinate the refill of Brownlee reservoir with the Corps, NMFS, ODFW, IDFG, and the interested tribes to ensure that the refill of Brownlee reservoir does not result in unnecessary reductions of spring flows as measured at Lower Granite dam. This measure would not in any way diminish the Corps' discretion over the project's flood control operation.

2. Consistent with flood control requirements, 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 thousand acre-feet of stored water from Brownlee reservoir (draft to elevation 2,059 feet msl) between June 21 and July 31, except as may be restricted by the Corps for system flood control between June 20 and July 1<sup>111</sup>. Idaho Power would release at least 150 kaf of this water (draft to elevation 2,066 feet msl) 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 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. From Memorial Day weekend to September 30 in medium-high and extremely high flow years, Idaho Power would provide an instantaneous minimum flow of 8,500 cfs upstream of the mouth of the Salmon River, as measured at the Hells Canyon dam gaging station.<sup>112</sup> If the 3-day moving average inflow to Brownlee reservoir is less than 8,500 cfs, the instantaneous minimum release required from Hells Canyon dam for the current day would be equal to the previous 3-day moving average.
5. 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>113</sup>

### **Measures Proposed by Idaho Power**

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. As noted in section 2.2.3, *Proposed Environmental Measures*, measures numbered 1P through 81P reflect Idaho Power's original proposal; measures 101P through 113P reflect changes to Idaho Power's proposal filed between the draft EIS and the final EIS.

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<sup>111</sup> Staff measure 8S would require Idaho Power to prepare a report 6 years after license issuance that summarizes available information on the effectiveness of this measure for improving the migration survival of juvenile salmon and steelhead, and evaluating whether any changes in the timing or quantity of flow augmentation water released from Brownlee reservoir are warranted.

<sup>112</sup> Staff measure 4S would require Idaho Power to install a new flow compliance gage within 5 miles downstream of Hells Canyon dam. Once it is operational, compliance for the minimum navigation flow would be measured at the new gage.

<sup>113</sup> The requirement for warmwater fish spawning protection (item 4, above) would be secondary to any conflicting operational requirement.

### *Sediment Supply and Transport*

- 101P. Develop and implement a program to monitor beach and terrace erosion, substrate, and gravel. *We modified Idaho Power's proposed measures to include development and implementation of a 5-year volumetric monitoring of sand and gravel.*
- 102P. Create a mitigation fund to be used by the Forest Service to restore and maintain 14 acres of sandbars on or adjacent to National Forest System lands between Hells Canyon dam and the confluence of the Snake and Salmon rivers.

### *Water Use and Quality*

- 1P. Continue 100-cfs minimum flow in Oxbow bypass to help maintain water quality in the bypassed reach.
- 2P. Continue recreation waste disposal to prevent waste from contaminating the river.
- 3P. Continue preferential use of the upper spillgates at Brownlee dam during spill periods to minimize elevated total dissolved gas as an interim measure until spillway flow deflectors are installed at Brownlee dam.
- 4P. Implement one of two measures (in-reservoir aeration or upstream phosphorus trading) to fully meet the Snake River-Hells Canyon TMDL Brownlee reservoir dissolved oxygen allocation (an average of 1,125 tons of oxygen during the summer into the transition zone of Brownlee reservoir). *We modified Idaho Power's proposed measure to include development and implementation of a dissolved oxygen enhancement plan that documents consultation with IDEQ and ODEQ regarding the appropriate dissolved oxygen load allocation for the project, documents efforts to identify upstream phosphorus trading partner(s), evaluates whether reservoir dissolved oxygen supplementation or phosphorus trading is the preferred method for meeting Idaho Power's Brownlee reservoir TMDL dissolved oxygen allocation, evaluates the feasibility and effectiveness of turbine aeration measures at Hells Canyon and Brownlee dams, evaluates the potential for each measure to elevate total dissolved gas to greater than the applicable water quality criterion (i.e., 110 percent of saturation); (2) monitoring the effectiveness of implemented measures; (3) holding annual meetings with ODEQ, IDEQ, ODFW, IDFG, FWS, NMFS, and interested tribes to evaluate whether measures need to be modified or additional measures implemented to meet the dissolved oxygen load allocation for the project; and (4) filing an annual monitoring and implementation report with the Commission that summarizes monitoring results and outlines any modifications or new measures that warrant consideration and/or are proposed for implementation*
- 103P. Aerate Hells Canyon outflows using a forced air (blower) system at Hells Canyon powerhouse that would add 1,500 tons of oxygen per year.
- 104P. Install and operate a destratification system in the Oxbow bypassed reach at the deep pool just upstream of the Indian Creek confluence to prevent anoxic conditions at this location.
- 5P. Install Hells Canyon dam spillway flow deflectors to reduce total dissolved gas levels in the tailrace of Hells Canyon dam and the Snake River downstream of the dam.
- 105P. Install Brownlee dam spillway flow deflectors to reduce total dissolved gas levels in Oxbow and Hells Canyon reservoirs and the Snake River downstream of Hells Canyon dam.

- 106P. Evaluate and implement measures on the Oxbow dam spillway or bypassed reach to reduce total dissolved gas levels as necessary to meet the Snake River-Hells Canyon TMDL load allocation.
- 107P. Adaptively manage total dissolved gas abatement measures to ensure that Idaho Power meets its total dissolved gas load allocation below each of the project dams. *We modified Idaho Power's proposed measure to include: (1) annual meetings with ODEQ, IDEQ, ODFW, IDFG, FWS, NMFS, and interested tribes to evaluate whether measures need to be modified or additional measures implemented to meet TDG responsibility for the project; and (2) filing of an annual report with the Commission that summarizes monitoring results and any modifications or new measures that warrant consideration and/or are proposed for implementation.*
- 108P. 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.
- 109P. Implement Idaho Power's Temperature Adaptive Management Plan, which would: (1) define the extent of appropriate project temperature responsibility; (2) include an evaluation of potential measures; and (3) identify an appropriate measure(s) for implementation. *We modified Idaho Power's proposed measure to include: (1) monitoring of the effectiveness of implemented measures; (2) annual meetings with ODEQ, IDEQ, ODFW, IDFG, FWS, and NMFS to evaluate whether measures need to be modified or additional measures implemented to meet the project's temperature responsibility; and (3) filing of an annual report with the Commission that summarizes monitoring results and any modifications or new measures that warrant consideration and/or are proposed for implementation.*

### *Fish and Snails*

- 6P. Continue the fall Chinook plan.
- 6Pa. Continue reservoir operations in the fall, winter, and early spring for protection of fall Chinook salmon spawning and salmon incubation. *We modified Idaho Power's proposed measure to indicate that the stable flows to be maintained below Hells Canyon dam during the fall Chinook spawning season must be between 8,500 and 13,500 cfs, at a level selected (based on runoff forecasts) to ensure that spawning fall Chinook salmon redds are created at elevations that are protected during the winter peak load period.*
- 6Pb. Measure 6b in the draft EIS (concerning fall Chinook salmon redd and temperature monitoring) has been replaced by measures 110P and 10S.
- 110P. Implement the Fall Chinook Salmon Spawning and Gravel Monitoring Plan described in appendix B of Idaho Power's comments on the draft EIS. *We supplemented this measure to include: (1) annual consultation with NMFS, Interior, IDFG, ODFW, and interested tribes to report on monitoring results to date and to guide monitoring efforts in the coming year; and (2) the development and implementation of a gravel augmentation program if monitoring results indicate that project-related effects on the quantity or quality of spawning habitat are adversely affecting the spawning or incubation success of fall Chinook salmon.*
- 7P. Implement the warmwater fish plan.

- 7Pa. Protect peak spawning periods for smallmouth bass and crappie by limiting Brownlee reservoir drafts to no more than 1 foot from the highest elevation reached during a 30-day period starting on May 21, and by maintaining an elevation of at least 2,069 feet msl from the end of the 30-day period through July 4.
- 7Pb. Continue warmwater fish population monitoring to detect long-term effects on fish populations. *We modified Idaho Power's proposed measure to include gill netting or other measures to monitor the abundance of channel catfish in project reservoirs; filing of an annual report on the results of warmwater fisheries monitoring including an assessment of any operational effects on warmwater fisheries; and consultation with ODFW, IDFG and BLM on any feasible means to minimize or avoid adverse effects on the warmwater fishery in Brownlee reservoir.*
- 8P. Implement the native salmonid plan.
- 8Pa. Conduct pathogen survey in the Pine-Indian-Wildhorse core area to support development of a pathogen risk assessment plan. *In the Staff Alternative, we incorporated this measure in the description of Idaho Power measure 8Pb.*
- 8Pb. 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 to year-round operation. 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. *We modified Idaho Power's proposed measure to incorporate the FWS modified fishway prescription, which prescribes that Idaho Power 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, and construction of the weir and trap fishway within 2 years of license issuance; (3) specific protocols for the period of operation,<sup>114</sup> 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.<sup>115</sup> Under this modified prescription, 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.*
- 8Pc. 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

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<sup>114</sup> The period of operation would be determined in consultation with the agencies and tribes, but may include year-round operation.

<sup>115</sup> The post-construction monitoring plan for the fish trap at Oxbow dam, if constructed, would include evaluation of flows needed to provide effective passage through the Oxbow bypassed reach.

Project reservoirs. *We modified Idaho Power's proposed measure to include enhancement measures to support redband and bull trout restoration in portions of the Powder and Burnt River basins where such measures would provide substantial benefits to native resident salmonids.*

- 8Pd. Supplement marine-derived nutrients to enhance the forage base within bull trout rearing areas (Pine, Indian, and Wildhorse core area).
- 8Pe. Conduct Eagle Creek presence/absence survey to determine, with statistical probability, the presence or absence of bull trout within the Eagle Creek Basin.
- 8Pf. Design, construct, and monitor a permanent monitoring weir at Pine Creek to establish a long-term monitoring program of fluvial fish migrating upstream and downstream in the Pine Creek System. *In the Staff Alternative, we incorporated this measure in the description of Idaho Power measure 8Pb.*
- 8Pg. Evaluate the feasibility of, and possibly implement, an experimental brook trout suppression program in Indian Creek. *We modified Idaho Power's proposed measure to include implementation of brook trout suppression in the Wildhorse River and possibly Pine Creek using techniques proven effective in Indian Creek.*
- 9P. Continue anadromous fish production at hatchery facilities. *This Idaho Power measure is modified to note that hatchery operations are to be in keeping with any hatchery and genetic management plans<sup>116</sup> that are developed for these hatcheries. We recommend that Idaho Power's obligation to fund the hatchery genetic management plans be based on continuation of current smolt production targets, but may include improvements that are needed to better attain goals for adult returns and societal use.*
  - 9Pa. Continue to operate the Oxbow fish hatchery.
  - 9Pb. Continue to operate the Rapid River fish hatchery.
  - 9Pc. Continue to operate the Niagara Springs fish hatchery.
  - 9Pd. Continue to operate the Pahsimeroi fish hatchery.
- 10P. Upgrade and enhance anadromous mitigation hatchery facilities.
  - 10Pa. Make improvements to the Pahsimeroi fish hatchery to control pathogens, develop a locally adapted steelhead broodstock, and monitor and evaluate hatchery performance.
  - 10Pb. 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.

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<sup>116</sup> Because the hatcheries are operated by IDFG, hatchery and genetic management plans would be developed by IDFG in consultation with NMFS.

- 10Pc. 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.
- 10Pd. 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.
- 11P. Implement Snake River White Sturgeon Conservation Plan.
- 11Pa. Assess water quality-related effects on early life stages of white sturgeon in the Swan Falls-Brownlee reach.
- 11Pb. 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. *We modified Idaho Power's proposed measure to be dependent upon the findings of an evaluation of alternative approaches for rebuilding white sturgeon populations in affected reaches (part of modified Idaho Power measure 11Pc).*
- 11Pc. 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. *We modified Idaho Power's proposed measure to include a feasibility assessment of alternative approaches for rebuilding sturgeon populations in reaches of the Snake River between Swan Falls and Hells Canyon dams, to include comparison of the risks and benefits of hatchery supplementation with the translocation of juvenile or adult sturgeon.*
- 11Pd. 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.
- 11Pe. Monitor genotypic frequencies of white sturgeon between Shoshone Falls and Lower Granite dams. *We modified Idaho Power's proposed measure to exclude genetics monitoring upstream of Swan Falls dam, which is addressed in the licenses for the mid-Snake and C.J. Strike projects.*

### *Wildlife*

- 12P. 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 to mitigate for the estimated effects of project operations on wildlife.
- 13P. 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. *We modified Idaho Power's proposed measure to include support for capital improvements needed to implement enhancement projects, as recommended by ODFW and IDFG.*
- 14P. 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. *We modified Idaho Power's proposed measure to include consultation with state and*

*federal wildlife management agencies to develop and implement habitat improvements or relocation projects.*

- 15P. Through an interdisciplinary team, develop and implement an Integrated Wildlife Habitat Program and a Wildlife Mitigation and Management Plan 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 implementing other measures to prevent wildlife disturbance.*
- 16P. 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. *In the Staff Alternative, we combined this measure with Idaho Power measure 20P and included it in staff measure 13S, below.*

### *Botanical Resources*

- 17P. Acquire, enhance, and manage upland and riparian habitat to mitigate for the estimated effects of project operations on botanical resources.
- 18P. Formalize cooperative relationships to accomplish noxious weed control and non-native invasive weed management, site monitoring, and re-seeding along the Snake River corridor from Weiser downstream to the confluence of the Salmon River. *In the Staff Alternative, we supplemented this Idaho Power measure to include agency consultation in the development and implementation of a project-wide integrated weed management plan to cover National Forest System and BLM-administered lands within the project boundary and lands affected by the project, as well as Idaho Power's ownership, and establishment of a Cooperative Weed Management Area as specified by the Forest Service. The plan would cover pesticide reporting to BLM.*
- 19P. 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. *In the Staff Alternative, we supplemented this Idaho Power measure 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-administered lands within the project boundary and lands affected by the project, as well as Idaho Power's lands, as described in staff measure 12S, below.*
- 20P. 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. *In the Staff Alternative, we combined this measure with Idaho Power measure 16P and included it in staff measure 13S, below.*
- 21P. Implement cooperative projects recommended by agencies and included in the Transmission Line Operation and Management Plan. *In the Staff Alternative, we clarified this measure to indicate that it includes agency consultation in the development of the operation and maintenance plan.*

### *Historical and Archaeological Resources*

- 22P. Monitor sites along transmission line 945 that are eligible for inclusion on the National Register.
- 23P. Monitor the known burial site on Oxbow reservoir.
- 24P. Monitor known eligible sites on Oxbow and Hells Canyon reservoirs. *In the Staff Alternative, we expanded this measure to include all known eligible resources in the areas of potential effect of these reservoirs.*
- 25P. Monitor known eligible sites on Brownlee reservoir. *In the Staff Alternative, we expanded this measure to include all known eligible resources within the area of potential effect of the reservoir.*
- 26P. Monitor known eligible sites downstream of Hells Canyon dam. *We expanded this measure to include all known eligible resources in the area of potential effect.*
- 27P. Stabilize approximately 20 archaeological sites below Hells Canyon dam after identifying sites requiring stabilization.
- 28P. Stabilize seven archaeological sites on Brownlee reservoir.
- 29P. Recover archaeological data at four archaeological sites on Brownlee reservoir to prevent possible damage by reservoir operations.
- 30P. Establish Native American interpretive sites on Brownlee reservoir to enhance visitors' awareness of Native American presence and land use in the project area.
- 31P. 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.
- 32P. Establish European-American interpretive sites on Brownlee, Oxbow, and Hells Canyon reservoirs to enhance visitors' awareness of European-American presence and land use in the project area.
- 33P. 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.
- 34P. Support European-American and Asian-American interpretive projects by assisting local community museums with collections acquisition, display, and curation related to Hells Canyon area trappers, miners, homesteaders, ranchers, and river runners of European and Asian descent.
- 35P-40P. 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. *We modified Idaho Power's proposed measure 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.*
- 41P. Fund additional section 106 projects to protect sites and mitigate for any unforeseen adverse effects attributed to Hells Canyon Project operations.

### *Recreational Resources*

- 42P. Continue to operate and maintain monitors to provide flow information about river flows downstream of Hells Canyon dam.
- 43P. Continue the Memorandum of Understanding between the Forest Service and Idaho Power with regard to staffing the Hells Canyon Visitor Center.
- 44P. Continue existing general measures for all zones.
  - 44Pa. Continue litter and sanitation program.
  - 44Pb. Continue public safety programs.
  - 44Pc. Continue aid to local law enforcement in Adams County.
  - 44Pd. Continue road maintenance.
  - 44Pe. Continue operation and maintenance of Idaho Power-managed parks and recreation facilities.
- 45P. Provide additional boat moorage on Hells Canyon Project reservoirs to improve angling access. *We modified Idaho Power's proposed measure to include details of the boat moorage plan as part of the final Recreation Plan.*
- 46P. Enhance the existing Litter and Sanitation Plan to improve litter cleanup and access to portable and vault toilets at dispersed recreational sites. *We modified Idaho Power's proposed measure 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.*
- 47P. Develop and implement an integrated Information and Education Plan to promote protection and preservation of cultural, natural, and historical resources through education. *We modified Idaho Power's proposed measure to have the I&E Plan indicate the location and type of information materials to be provided and include information about anadromous fish, invasive species, and sensitive wildlife.*
- 48P. Coordinate the prioritization of law enforcement resource use among appropriate law enforcement agencies to address public safety issues. *We modified Idaho Power's proposed measure 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.*
- 49P. 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. *In the Staff Alternative, we supplemented this measure to indicate that the recreation adaptive management plan should address dispersed site management and procedures for recreational use monitoring and reporting and should be part of the overall Recreation Plan.*
- 50P. 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.*

- 51P. Perform operation and maintenance at Idaho Power-enhanced BLM sites and all Forest Service reservoir-related recreation sites consistent with the settlement (FS modified 4(e) condition no. 18) 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 includes a safety review and improvements of the Deep Creek Trail (FS modified 4(e) condition no. 16), and brings the Deep Creek Trail into the project boundary. *We modified Idaho Power's proposed measure 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 and the trail to Deep Creek (see staff measure 23S below).*
- 52P. Enhance Eagle Bar dispersed recreation site and improve boat ramp access to Hells Canyon reservoir.
- 53P. Develop site plan for Big Bar recreation site consistent with the settlement (FS modified 4(e) condition no. 13).
- 54P. Measure 54 in the draft EIS (boat ramp and associated facilities at Big Bar section D) has been incorporated into Idaho Power measure 52P.
- 55P. Develop site plan and enhance Eckels Creek dispersed recreation site to benefit recreation and provide cultural and natural resource protection.
- 56P. Supplement the existing O&M budget to accommodate enhancements at Idaho Power-managed parks and recreational facilities.
- 57P. Develop and implement a site plan for the Copper Creek dispersed recreation site to benefit recreation and provide cultural and natural resource protection.
- 58P. Reconstruct Hells Canyon Park to benefit recreation, improve public access, and protect cultural and natural resources.
- 59P. Develop Airstrip A&B dispersed recreational site to benefit recreation, improve public access, and protect cultural and natural resources.
- 60P. 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.
- 61P. 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.
- 62P. 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.
- 63P. Develop and implement a site plan for Westfall dispersed recreational site to benefit recreation, improve public access, and protect cultural and natural resources.
- 64P. Enhance Copperfield boat launch area to benefit day-use activities.
- 65P. Implement a site plan for Oxbow boat launch to benefit recreation, improve public access, and protect cultural and natural resources.
- 66P. 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.
- 67P. Reconstruct McCormick Park to meet current standards of services, benefit recreation, improve public access, and protect cultural and natural resources.
- 68P. Develop and implement a site plan for Hewitt and Holcomb Parks to accommodate recreational use and provide cultural and natural resource protection.

- 69P. 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.
- 70P. Develop and implement a site plan for Swedes Landing to benefit recreation, improve public access, and protect cultural and natural resources.
- 71P. Develop and implement a site plan for Spring recreational site to enhance recreational facilities and improve boat ramp access to Brownlee reservoir.

### *Land Management and Aesthetics*

- 72P. 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. *In the Staff Alternative, we supplemented this measure to include clarifications regarding consultation, coordination, and reporting and to include resource maps, maps depicting road maintenance responsibilities, and maps for public use as part of the proposed GIS atlas of critical and sensitive resources.*
- 73P. Incorporate aesthetic concerns when upgrading or repairing the existing transmission line 945. *In the Staff Alternative, we supplemented this measure to include a monitoring strategy to analyze future modifications to the line, incorporating all viewpoints identified in the Technical Report on Aesthetics from which the line is visible, and a schedule for implementing aesthetic improvements on the line.*
- 111P. Implement the aesthetic improvements to the Hells Canyon dam site and recreational portal, consistent with the settlement (FS modified 4(e) condition no. 22).
- 112P. Implement the Scenery Management Plan, consistent with the settlement (FS modified 4(e) condition no. 24).
- 74P. Measure 74 in the draft EIS (standards and guidelines for physical structures) is incorporated in measure 112P.
- 75P. Measure 75 in the draft EIS (transmission line aesthetics) is incorporated in measure 112P.
- 76P. Measure 76 in the draft EIS (general aesthetic clean-up plan) is incorporated in measure 112P.
- 77P. Measure 77 in the draft EIS (guard rails and Jersey barriers) is incorporated in measure 112P.
- 78P. Measure 78 in the draft EIS (visual contrast) is incorporated in measure 112P.
- 79P. Cooperate with BLM and the 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).
- 80P. Provide signs and/or facilities that interpret some elements of the Hells Canyon Project that cannot be effectively modified to reduce their visual contrast.
- 81P. 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. *In the Staff Alternative, we supplemented this measure to address law enforcement, fire prevention, and road management in the Common Policies.*

113P. Provide the Forest Service with a map and aerial photos depicting the approximate location of the project boundary, together with GIS shapefiles with Metadata for the project boundary on National Forest System lands. The project boundary GIS data would be compatible with Forest Service GIS and would be positionally accurate to  $\pm 40$  feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. This measure is consistent with the settlement (FS modified 4(e) condition no. 26).

### **Additional Measures Proposed by Staff**

Finally, the Staff Alternative also includes the following additional measures identified by staff based on agency, tribal, and NGO recommendations and our analysis. Measures numbered 2S through 27S reflect original staff measures presented in the draft EIS; measures 101S through 108S reflect staff measures added between the draft EIS and final EIS.

#### *Sediment Supply and Transport*

1S. Staff measure 1 in the draft EIS (beach and terrace erosion, substrate, and gravel monitoring) has been incorporated into Idaho Power's proposal (measure 101P).

#### *Water Use and Quality*

2S. Staff measure 2 in the draft EIS (develop and implement a temperature management plan) has been incorporated in Idaho Power's proposal (measure 109P).

3S. Staff measure 3 in the draft EIS (develop and implement a total dissolved gas abatement plan) has been incorporated into Idaho Power's proposal (measure 107P).

4S. Develop and implement an operational compliance and water quality monitoring plan to monitor compliance with minimum flows, reservoir levels, and ramping rates specified in the license, and to monitor water quality downstream of Hells Canyon dams. Develop the plan in consultation with IDEQ, ODEQ, IDFG, ODFW, NMFS, FWS, USGS, and interested tribes. The plan should, at a minimum, include:

- Identification of an appropriate location for continuous monitoring of river flow, stage, water temperature, dissolved oxygen, and total dissolved gas within 5 miles downstream of Hells Canyon dam, preferably within 3 miles of the dam;
- A schedule for the construction of a flow measurement gage at the selected site, and for the installation of water quality monitoring equipment;
- A description of procedures that would be followed to determine a ramping rate at the new gage site that is equivalent to any ramping rate specified for other locations in the new license;
- A description of the method that would be used to measure water surface elevations at Brownlee, Oxbow and Hells Canyon reservoirs, as well as flow rates in the Oxbow bypassed reach; and
- The time steps for which real-time and historical flow, water surface elevation and water quality information from each location would be posted on the Internet and annually reported to the Commission.

5S. If requested by IDEQ or ODEQ, make available tissue samples from white sturgeon within and downstream of the project area and from Brownlee reservoir fish for the purpose of monitoring toxic bioaccumulants. These samples would be collected during the routine

population monitoring efforts proposed by Idaho Power (Idaho Power measures 7Pb and 11Pd).

### *Aquatic Resources*

- 6S. 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.
- 7S. Staff measure 7 in the draft EIS (gravel augmentation pilot program) has been deleted.
- 8S. Six years after license issuance, prepare a flow augmentation evaluation report that evaluates the efficacy of flow augmentation water provided from Brownlee reservoir for aiding the downstream migration of juvenile salmon and steelhead; to include consideration of how these releases are coordinated with flow augmentation water contributed from the Snake River basin upstream from Brownlee dam and from Dworshak reservoir; and to include any recommendations, for Commission approval, for modifying flow augmentation releases from Brownlee reservoir.
- 9S. Develop and implement a stranding and entrapment monitoring plan to evaluate, and if needed develop and implement approaches to protect and enhance rearing juvenile fall Chinook salmon and bull trout downstream of Hells Canyon dam.
- 101S. Develop and implement an invertebrate monitoring plan to evaluate trends in the abundance and distribution of rare and sensitive species of mollusks, as well as to evaluate the effects of load following operations on rare and sensitive mollusks and the food supply available to fall Chinook salmon and to bull trout. As part of the plan, prepare annual monitoring reports and provide for updates to the monitoring plan every 5 years, addressing the need to alter project operations or implement other measures to address project effects based on monitoring results.
- 10S. 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 salmon spawning and incubation season. The plan would be developed in consultation with NMFS, FWS, IDFG, ODFW, and the interested tribes.
- 102S. Fund the development and implementation of a hatchery and genetics management plan for each mitigation hatchery, including establishment of mitigation goals, but retaining current smolt production targets. As part of the plan, prepare annual reports on the hatchery program, including data on adult returns, to ensure the goals and objectives of the plan are being met.
- 103S. Develop a plan, in consultation with the Shoshone-Bannock Tribes, IDFG, NMFS, and FWS, to design, construct, and operate facilities on the Yankee Fork to collect, spawn and incubate 1,000,000 steelhead or Chinook salmon eggs to support the Shoshone-Bannock Tribe's existing streamside incubator program. The facilities would need to be operated in compliance with a Hatchery and Genetic Management Plan<sup>117</sup> approved by NMFS.

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<sup>117</sup> Because the facilities would be operated by the Shoshone-Bannock Tribes, the HGMP would be developed by the tribes in consultation with NMFS.

Production numbers from the Yankee Fork hatchery should be included in the annual reports on the hatchery program prepared by Idaho Power (102S).

- 104S. In consultation with ODFW, IDFG, FWS, NMFS, and interested tribes, develop and implement a plan to use surplus adult hatchery spring Chinook salmon and steelhead to: (1) provide marine nutrients and improve forage for bull trout in tributaries within the project area; (2) facilitate the evaluation of spawning success, egg viability and survival, and smolt outmigration and survival in Pine Creek; and (3) support ceremonial, subsistence, and recreational fisheries in select tributaries to the Snake River, including the Salmon River basin where appropriate.
- 105S. Participate in regional forums on lamprey restoration in the Snake River basin, file a summary of the activities with the Commission every 3 years, and identify and implement any feasible measures to address project effects on Pacific lamprey.
- 106S. Hold annual meetings of the White Sturgeon Technical Advisory Committee to review the results of past monitoring and enhancement efforts, and to guide such efforts in the upcoming year, and file with the Commission an annual report on the results from the previous year of monitoring and enhancement efforts, and any recommendations for revising the monitoring or enhancement measures.

#### *Wildlife and Botanical Resources*

- 11S. Develop and implement a plan to assess the feasibility of stabilizing/revegetating erosion sites around project reservoirs and along the river downstream of Hells Canyon dam; implement a pilot project and monitor results to determine the feasibility of implementing a long-term stabilization/revegetation program; and, if erosion predicted to occur during the new license period cannot be stabilized, acquire up to 70 acres of riparian habitat in coordination with Idaho Power measure 12P.
- 12S. Develop and implement a project-wide Threatened, Endangered, and Sensitive Species Management Plan to address plants (in coordination with Idaho Power measure 19P, above) and animals, including bald eagles, southern Idaho ground squirrel, bats, amphibians, and reptiles.
- 13S. 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 operation and maintenance to minimize disturbance to wintering mule deer.
- 14S. In coordination with Idaho Power measure 12P, above, acquire 13.2 acres of riparian habitat to mitigate for the loss of riparian habitat predicted to occur as the result of implementing the staff's alternative flow measures; and 49 acres of riparian habitat to address the loss of suitable substrate for native willows along the Snake River downstream of Hells Canyon dam.
- 15S. 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*

- 16S. Renew the licensee's offer to arrange for oral histories for the Shoshone-Bannock and Shoshone-Paiute Tribes.
- 17S. Develop and implement a monitoring plan for archaeological sites, rock art, and traditional cultural properties.
- 18S. Develop a plan to implement Idaho Power's deferred monitoring program concerning effects of reservoir water level fluctuations on cultural resources.
- 19S. Staff measure 19 in the draft EIS (file the final Historic Properties Management Plan within 1 year of license issuance) has been dropped because the Commission has ordered the plan filed by August 3, 2008.
- 20. Develop and implement a program to re-evaluate buildings and structures within the project boundary as they reach 50 years old.

### **Recreational Resources**

- 21S. Finalize the proposed Recreation Plan to add specificity to implementation standards and expand the scope of the plan to address the following additional elements:
  - 21Sa. Oasis recreation site improvements;
  - 21Sb. Improved Brownlee reservoir communication system and, if recreational use demonstrates the need, expand Steck Park;
  - 21Sc. Control and removal of sediment accumulation at Farewell Bend State Park;
  - 21Sd. Improvements at Jennifer's Alluvial Fan, including toilet facilities, vehicular barriers, signage, and regular maintenance;
  - 21Se. Staff measure 21e in the draft EIS (Deep Creek Trail improvements and incorporation in the project boundary) has been included in Idaho Power's proposal (measure 51P);
  - 21Sf. Improvements at Hells Canyon launch to enhance access and safety, provide potable water, and provide a portable human waste disposal system; and
  - 21Sg. O&M at primary recreational sites within the project boundary and clarification of O&M standards and responsibilities.
- 107S. Consult with ODFW to coordinate and provide form 80 recreational use data on recreational fishing effort in the project vicinity.
- 108S. As part of the Recreation Plan, consult with the Corps, NPPVA, the Forest Service, and other interested parties to prepare a navigation plan that addresses non-flow measures that could be implemented to improve boating safety downstream of Hells Canyon dam, including the installation of additional stream gages.

### *Land Management and Aesthetics*

- 22S. Develop an Aesthetics Management Plan as part of 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 Idaho Power’s proposed aesthetic measures, items 73 through 80 above), a monitoring strategy for all viewpoints established in the Technical Report on Aesthetics, and an estimated maintenance schedule and schedule for implementing aesthetic improvements.

- 23S. Include within Idaho Power’s proposed boundary modification to include dispersed recreation sites that are within 200 yards of project waters; Airstrip, Steck Park, Swedes Landing, and Westfall recreational sites; Hells Canyon Creek launch area; Deep Creek trail; and all lands acquired for wildlife mitigation.
- 24S. 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.
- 25S. Coordinate with BLM and the Forest Service concerning activities on lands managed by those agencies.
- 26S. Staff measure 26 in the draft EIS (aesthetics improvement plan for the upper deck, entrance, and egress of Hells Canyon dam) has been included in measure 111P, above.

#### *Oversight and Adaptive Management*

- 27S. 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.

#### **5.1.1.3 Staff Alternative with Mandatory Conditions**

The Department of Commerce (for NMFS) has filed preliminary fishway prescriptions for the project and Interior (for FWS) has filed preliminary and modified fishway prescriptions (see section 2.3.1.2, *Section 18 Fishway Prescriptions*) which, when finalized, the Commission may need to include in a new license for this project. Similarly, Interior (for BLM) and the Forest Service have specified preliminary and modified 4(e) conditions (see section 2.3.1.3, *Section 4(e) Federal Land Management Conditions*) which, when finalized, the Commission may also need to include in a new license for this project. Incorporation of these mandatory conditions into a new license would add three measures that are not included in the Staff Alternative, as follows (see section 2.3.1.3 for the numerical designation of these measures):

- Interior-3—Development and implementation of a Travel and Access Management Plan;
- Interior 4—Development and implementation of a Law Enforcement and Emergency Services Plan; and
- FS-20—Trail maintenance on nine specified trails.

Except for these three measures, all of the mandatory conditions are included in the Staff Alternative.

#### **5.1.2 Summary of Effects**

We summarize distinguishable differences between Idaho Power’s Proposal and the Staff Alternative in table 105, and briefly note the differences associated with the Staff Alternative with Mandatory Conditions. 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.

Table 105. Summary of effects of Idaho Power’s Proposal and Staff Alternative. (Source: Staff)

Resource	Idaho Power’s Proposal	Staff Alternative <sup>a</sup>
<b>Power Benefits</b>		
Annual generation (MWh)	6,562,244	6,549,344
Net annual benefits	\$297,050,500	\$283,876,800
<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	<ul style="list-style-type: none"> <li>• The quantity, quality, and usage of spawning gravels downstream of Hells Canyon dam would be monitored.</li> <li>• Restoration of 14 acres on sandbar downstream of Hells Canyon dam would help mitigate for reservoir trapping of sand and gravel.</li> </ul>	<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> <li>• Gravel augmentation program would be developed if a reduction in the quantity or quality of spawning gravel is shown to adversely affect production of fall Chinook salmon.</li> <li>• Restoration of 14 acres of sandbar would have the same beneficial effect as Idaho Power’s proposal.</li> </ul>
<b>Water Quality</b>		
Effects of Operations	<p>Compared to without project 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 viability of fall Chinook salmon eggs and reduced growth potential of fry.</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</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 during the</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
Effects of Environmental Measures	<p>critterion when spill exceeds 3,000 cfs.</p> <ul style="list-style-type: none"> <li>• Total dissolved gas levels downstream of Oxbow dam would continue to exceed the 110-percent of saturation criterion coinciding with most Brownlee spill events of more than 3,000 cfs and independent spills at Oxbow dam.</li> <li>• Total dissolved gas levels downstream of Hells Canyon dam 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 would improve dissolved oxygen levels in the immediate vicinity of the proposed oxygen diffuser system in Brownlee reservoir or upstream phosphorus trading would improve water quality in affected tributaries and downstream reaches.</li> <li>• Hells Canyon turbine aeration would increase summer/fall dissolved oxygen levels downstream of the dam and thereby improve conditions for fall Chinook salmon.</li> <li>• Destratification of the deep pool in the Oxbow bypassed reach would increase dissolved oxygen levels in this pool and thereby improve native resident salmonid habitat.</li> <li>• Installation of spillway flow deflectors at Brownlee and Hells Canyon dams combined with total dissolved gas abatement measures at Oxbow dam, and an adaptive total dissolved gas abatement program would reduce the frequency and magnitude of total dissolved gas levels exceeding the 110 percent of saturation criterion and thereby reduce the potential for gas bubble trauma in Oxbow and Hells Canyon reservoirs, Oxbow bypassed reach, Hells Canyon tailrace, and the Snake River</li> </ul>	<p>flow augmentation period in extremely low flow years.</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>• Monitoring the effectiveness of measures implemented under the dissolved oxygen enhancement plan, annual meetings with agencies and interested tribes, and filing of monitoring and implementation reports should improve the decision-making process for addressing project effects on dissolved oxygen and expedite implementation of associated measures.</li> <li>• Establishing a flow and water quality monitoring site within 5 miles downstream of Hells Canyon dam would improve monitoring of project effects on water quality.</li> <li>• Collection of tissue samples from white sturgeon and other fish species in Brownlee reservoir for monitoring of bioaccumulation of contaminants could lead to improved protection of public health and protection of bald eagles.</li> <li>• Monitoring the effectiveness of measures implemented under the Temperature Adaptive Management Plan, annual meetings with agencies and interested tribes, and filing of monitoring and implementation reports should improve the decision-making process for addressing project effects on water temperature.</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<p>downstream of Hells Canyon dam.</p> <ul style="list-style-type: none"> <li>Implementation of a Brownlee bubble upwelling system or watershed measures as part of a Temperature Adaptive Management Plan would reduce water temperatures early in the fall Chinook salmon spawning period and improve production potential.</li> </ul>	
<b>Aquatic Resources</b>		
Effects of Operations	<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 favorable than conditions in most of the past 14 years when flows were voluntarily augmented.</li> </ul>	<ul style="list-style-type: none"> <li>More restrictive ramping rates during the rearing period, as well as provisions for monitoring and adaptive management based on monitoring results, could substantially reduce fall Chinook salmon mortalities due to stranding and entrapment and improve the food base during the fall Chinook rearing season.</li> <li>Invertebrate monitoring would help determine the extent that peaking operations affect rare and sensitive species of mollusks and invertebrate production, and could assist in identifying operational modifications to reduce adverse effects through adaptive management.</li> <li>Most available information supports a conclusion that flow augmentation should enhance migration conditions for juvenile fall Chinook salmon in the Snake and the lower Columbia rivers, likely increasing adult returns. Review of new information on the efficacy of flow augmentation 6 years after license issuance would allow the timing and quantity of water delivered from Brownlee reservoir to be adjusted, if warranted.</li> <li>A fall Chinook spawning flow management plan, flow augmentation evaluation report, and monitoring of fall Chinook salmon entrapment and stranding should improve the flow management decision process and the overall survival of fall Chinook salmon in the Snake River downstream from Hells Canyon.</li> </ul>
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>Consulting with the fisheries management agencies and interested tribes to define appropriate goals and objectives of its hatchery program would help ensure that</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
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, if implemented, in the upper end of Brownlee reservoir.</li> <li>• Phosphorus trading and watershed measures, if implemented, would provide broad benefits to water quality and habitat conditions for resident fish species within and downstream of the project, and in the tributaries where measures are implemented.</li> <li>• Hells Canyon turbine aeration would increase summer/fall dissolved oxygen levels downstream of the dam, improving habitat conditions for aquatic resources, including fall Chinook salmon.</li> <li>• Reductions in total dissolved gas exceedances</li> </ul>	<p>Hatchery and Genetic Management Plans are consistent with Idaho Power's responsibilities under the new license, as well as reflect the management goals of the agencies and tribes.</p> <ul style="list-style-type: none"> <li>• Constructing and operating facilities to spawn and incubate steelhead and Chinook salmon on the Yankee Fork would (1) help rebuild, and facilitate the delisting of, listed ESUs, and (2) support ceremonial, subsistence, and recreational fisheries in the project area and Snake River basin.</li> <li>• Developing and implementing a plan to transport and distribute surplus anadromous fish that return to Idaho Power's hatchery system or the Hells Canyon trap to project reservoirs and tributaries in the project area, as well as other select tributaries in the Snake River basin, would provide several resource benefits because distributing surplus fish would (1) provide a source of marine nutrients for the system; (2) improve forage for bull trout; (3) provide an opportunity to evaluate spawning success, egg viability and survival, as well as smolt outmigration and survival in Pine Creek; and (4) support ceremonial, subsistence, and recreational fisheries in the project area and Snake River basin.</li> <li>• Potentially greater temperature and habitat benefits would be provided if additional watershed or phosphorus reduction measures are implemented based on monitoring results.</li> <li>• Annual meetings with agencies and interested tribes and filing of monitoring and implementation reports should expedite the implementation of additional measures to reduce gas supersaturation, if needed, and reduce the likelihood of gas bubble trauma within, and downstream from, the project.</li> <li>• Implementation of upstream and downstream passage for native resident salmonids would increase connectivity and gene flow among populations in Pine Creek, Indian</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<p>downstream of Brownlee, Oxbow, and Hells Canyon dams, at low and moderate spill rates, would benefit aquatic resources by reducing gas bubble trauma.</p> <ul style="list-style-type: none"> <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 with the proposal.</li> <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>• Implementation of 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>Creek, and the Wildhorse River.</p> <ul style="list-style-type: none"> <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>• Construction of the Pine Creek weir to operate year-round would improve monitoring of bull trout movements and would enable assessment of spawning success of surplus adult steelhead and spring Chinook salmon released into Hells Canyon reservoir.</li> <li>• Benefits of Hells Canyon trap modifications, pathogen risk assessment, and nutrient supplementation would be the same as Idaho Power's Proposal.</li> <li>• Additional tributary enhancement measures would benefit native resident salmonids in the Powder and Burnt River basins.</li> <li>• Brook trout suppression efforts, if successful, would be expanded to include the Wildhorse River and Pine Creek using methods proven to be successful in Indian Creek.</li> <li>• Sturgeon stocking, if determined to be feasible, could augment white sturgeon populations in all reaches between Swan Falls and Hells Canyon dams, benefiting tribal and recreational fisheries.</li> </ul>
<p><b>Terrestrial Resources</b></p> <p>Effects of Operations</p>	<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</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</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<p>Hells Canyon and Oxbow reservoirs by &lt;1 acre and by about 15 acres downstream of Hells Canyon dam.</p> <ul style="list-style-type: none"> <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>	<p>Hells Canyon dam.</p> <ul style="list-style-type: none"> <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 weeds.</li> <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>• Coordination with agencies to enhance mountain quail habitat and/or participate in relocation projects would benefit 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</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 Proposal, with some additional measures to improve efficiency and coordination and increased emphasis on surveys prior to implementation of ground-disturbing activities.</li> <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 ongoing effects on sandbar willow establishment; erosion anticipated to occur during new license period; and the loss of riparian habitat resulting from implementation of staff flow alternative.</li> <li>• Provision of funding for capital improvements and implementation of habitat enhancements to four Snake River islands would yield greater habitat improvement than Idaho Power's Proposal.</li> <li>• Improvements to mountain quail habitat and/or participation in relocation projects would be about the</li> </ul>

<b>Resource</b>	<b>Idaho Power's Proposal</b>	<b>Staff Alternative<sup>a</sup></b>
	continue to be managed on a case-by-case basis.	<p>same as Idaho Power's Proposal.</p> <ul style="list-style-type: none"> <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>		
Effects of Operations	<ul style="list-style-type: none"> <li>• Restoration of 14 acres of sandbar downstream of Hells Canyon dam would help protect some cultural sites from erosion damage.</li> <li>• Beach and terrace erosion would continue to put some cultural sites at risk.</li> </ul>	<ul style="list-style-type: none"> <li>• Restoration of 14 acres of sandbar would have the same beneficial effect as Idaho Power's proposal.</li> <li>• More restrictive ramping rates during the spring would provide a minor increase in cultural resource protection compared to Idaho Power's Proposal.</li> </ul>
Effects of Environmental Measures	<ul style="list-style-type: none"> <li>• Site monitoring would improve protection of monitored sites.</li> <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, European-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> <li>• Measures to improve the condition of aquatic resources would benefit culturally important species, including</li> </ul>	<ul style="list-style-type: none"> <li>• Development of site monitoring plan would improve efficiency and consistency of monitoring efforts.</li> <li>• Site stabilization, data recovery, and establishment of interpretive sites would achieve the same benefits as Idaho Power's Proposal.</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> <li>• Continuation of flow augmentation, expansion of tributary habitat improvements to the Powder and Burnt</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<p>white sturgeon and native resident salmonids.</p> <ul style="list-style-type: none"> <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>	<p>River basins, implementation of the FWS fishway prescription, consultation with agencies and tribes to determine the best use of surplus adult hatchery steelhead and spring Chinook salmon, and potential expansion of white sturgeon measures to include stocking in project reservoirs would provide additional benefits to tribal fisheries and to culturally important species.</p> <ul style="list-style-type: none"> <li>Revision of the HPMP to meet Forest Service 4(e) condition no. 25 would improve the plan overall, including provision for an adaptive management strategy to accommodate unforeseen challenges and conditions, and also provisions for determining when and under what circumstances new survey, or resurvey of previously examined areas, may be required.</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>Implementing an 8,500-cfs minimum flow downstream from Hells Canyon dam in medium-high and extremely high flow years would increase boaters' certainty of having those flows available.</li> <li>Flow augmentation would slightly 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 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</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, Deep Creek, and the Hells Canyon launch would provide additional recreation benefits compared to Idaho Power's Proposal.</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<p>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> <li>• Implementation of the White Sturgeon Conservation Plan should lead to an improved sturgeon fishery in the Swan falls to Brownlee Reach.</li> <li>• Implementation of the native salmonid plan and tributary enhancements should improve redband trout fisheries in the Pine, Indian and Wildhorse basins.</li> </ul>	<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>• Preparing and implementing the navigation plan would increase the benefits of the flow information system by increasing the amount and timeliness of flow information.</li> <li>• 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> <li>• Expanded tributary enhancement measures would benefit redband trout fisheries in the Powder and Burnt River basins.</li> <li>• Sturgeon stocking, if determined to be feasible, would improve the sturgeon fishery between Swan Falls and Hells Canyon dams more rapidly than under Idaho Power's proposal.</li> </ul>
<p><b>Land Management and Aesthetics</b></p> <p>Effects of Operations</p>	<ul style="list-style-type: none"> <li>• The adverse visual effects of Brownlee reservoir drawdown would continue to occur from about July</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 Brownlee</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
Effects of Environmental Measures	<p>through October.</p> <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>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 of the Hells Canyon Resource Management Plan, based on previously developed, project-wide standards and</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
		<p>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>
<b>Socioeconomics</b>		
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 within and upstream of the project could lead to greater benefits to tribal cultures compared to Idaho Power's Proposal.</li> <li>• Constructing and operating facilities to spawn and incubate steelhead and Chinook salmon on the Yankee Fork and implementing a plan to transport and distribute surplus anadromous fish would provide ceremonial and subsistence fisheries for the tribes.</li> </ul>

<sup>a</sup> The Staff Alternative with Mandatory Conditions is not listed in this table, and differs from the Staff Alternative only by the inclusion of three measures related to trail development and maintenance, road maintenance, and law enforcement

Notes: BLM – U.S. Bureau of Land Management  
DO – dissolved oxygen  
Forest Service – U.S. Forest Service  
GBT – gas bubble trauma  
HCRMP – Hells Canyon Resource Management Plan  
IWHP – integrated wildlife habitat program

MOU – memorandum of understanding  
MWh – megawatt hours  
O&M – operation and maintenance  
TDG – total dissolved gas  
TMDL – total maximum daily load  
WMMP – Wildlife Mitigation and Management Plan

## 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, and 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, but within the levels of flows with annual recurrence frequencies of approximately 2.3 to 30 years. 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 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. We also note that implementing the measure has some potential to disrupt eagle nesting activity and to interfere with or present a hazard to recreational boaters if sand placement occurs in an inappropriate season. 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 2,500 cubic yards of sand per year. In the draft EIS, we did not include this measure in the Staff Alternative because of these potential negative effects on boating and wildlife and because we estimated that the proposed 25,000 cubic yards of sand (2,500 cubic yards per year for 10 years) would replace less than 1 percent of the total volume of sand retained annually in the three project reservoirs.

However, comments on the draft EIS led us to conclude that 25,000 cubic yards of sand would actually represent approximately 7 to 24 percent of the average annual rate of sand loss that was estimated by Wilcock et al. (2002) for all sandbars below Hells Canyon dam between 1964 and 1990. We conclude that the benefits of the sand augmentation and beach restoration program would be worth the cost, and that risks associated with potential adverse effects could be satisfactorily addressed. For these reasons, we include the sand augmentation and beach restoration fund in the Staff Alternative.

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. NMFS-7 recommends that Idaho Power evaluate fall Chinook salmon egg-to-fry survival in at least two representative spawning areas downstream of Hells Canyon dam in 2015 and every 5 years thereafter.

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 (AR/IRU-21) recommend 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.

Idaho Power filed a Fall Chinook Spawning and Gravel Monitoring Plan with its draft EIS comments, and during the 10(j) meeting, Idaho Power stated that the plan should be considered part of its relicensing proposal. The plan includes the following elements: (1) continuation of aerial redd surveys from Hells Canyon dam to Asotin, Washington (RM 145), and deep-water redd surveys at approximately 35 sites; (2) high resolution bathymetry monitoring to estimate bed scour or deposition at selected reaches every 3 to 5 years; (3) ground surveys to cover shallow areas at the selected sites that are not covered by bathymetry monitoring; (4) reach-scale mapping of spawning substrate in potential high-use spawning index sites upstream of the Salmon River every 5 years; (5) substrate classification by photography at approximately 650 locations between Hells Canyon dam and the Salmon River every 3 to 5 years and after high runoff events; (6) assessment of gravel quality by monitoring incubation and emergence at four sites between Hells Canyon dam and the Salmon River at 5-year intervals; and (7) the use of scour chains or sliding bead monitors to assess gravel movement or displacement at selected known and potential spawning areas.

In the draft EIS, we concluded that the number of fall Chinook salmon spawning in the Hells Canyon reach may be approaching the capacity of available spawning and rearing habitat, and we recommended that Idaho Power undertake a pilot study to assess the potential benefits of gravel augmentation. Comments received from the resource agencies questioned whether the volume of gravel

that we recommended would provide a detectable increase in spawning habitat. Also, in its comments on the draft EIS, Idaho Power questioned the need for even a pilot scale gravel augmentation program. Idaho Power reported that in each year of spawning surveys, it finds new areas being used for spawning that were not used in previous years, and also some areas that were used heavily in previous years that are receiving little or no use. It also notes that neither Idaho Power nor FWS has observed significant redd superimposition during their weekly aerial and ground surveys of spawning sites.

Based on the Idaho Power and FWS observations from redd surveys, we conclude that it is unlikely that spawning habitat is currently limiting fall Chinook salmon production, and that implementing a gravel augmentation program at this time would be premature. However, given recent increases in the number of fall Chinook salmon spawning in the Hells Canyon reach, it is possible that the quantity of spawning habitat could constrain production in the near future if the increasing trend continues. Accordingly, we conclude that the benefits of the Fall Chinook Spawning and Gravel Monitoring Plan proposed by Idaho Power warrants the estimated annualized cost of \$280,000. However, we recommend modifying Idaho Power's proposal to include annual consultation with NMFS, Interior, IDFG, ODFW, and the interested tribes to report on monitoring results to date, guide monitoring efforts in the coming year, and determine whether gravel augmentation is warranted.

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

### **5.2.2.1 Flood Storage**

From December 1 to June 30, the Corps directs flood control operations of Brownlee reservoir as part of system flood control operations for the Columbia River projects to contain winter, spring, and early summer flood waters from inundating the main downstream flood damage center located in the Portland-Vancouver metropolitan area. Under the current license, Brownlee reservoir may be drawn down to elevation 2,034 feet msl by February 28 to provide a maximum storage space of 500,000 acre-feet for system flood control. By April 30, Brownlee reservoir may be drawn down further to elevation 1,976 feet msl to provide an additional storage space of 480,000 acre-feet to contain flood waters. This maximum draft of 980,000 acre-feet of storage space pertains to the most severe combination of forecasted hydrologic conditions for the Columbia River at The Dalles and Snake River above Brownlee reservoir. 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, interested 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 for all of the boats currently using 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<sup>118</sup> (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 occur during July, August, and September, and Idaho Power would not 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, the Corps suggests that Idaho Power would not have to meet these minimum flows. Instead, the Corps recommends that Idaho Power 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 much lower than 8,500 cfs. It is the larger (40-foot) power boats, fully loaded, that require flows in the 8,500-cfs range. In its comments on the draft EIS, NPPVA makes this same point, stating that 7,500 cfs does not provide an adequate margin of safety for fully loaded larger boats, but that 8,500 cfs is adequate for all boating.

With Idaho Power's proposed operations, modeled flows downstream of Hells Canyon dam routinely fall below the 8,500-cfs boating target from early June through late September under extremely low and medium-low water conditions and from late July through early September under medium water conditions. Flows seldom or never fall below the 8,500-cfs target under medium-high or extremely high water conditions (section 3.3.2.7, *Downstream Flows Important to Navigation*).

With the Staff Alternative, which includes 237 kaf of flow augmentation for salmon, Brownlee reservoir storage water would be released downstream starting in mid-June. Supplemental CHEOPS model data filed by Idaho Power in its comments on the draft EIS indicate that flow augmentation at the 237-kaf level would have little effect on navigation flows. For the June 1 through September 30 122-day period, Idaho Power's model simulations show that, even with the 237-kaf flow augmentation, there would still be 40 days with flows below 8,500 cfs in medium water years, 120 days in medium-low water years, and 116 days in extremely low water years.

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<sup>118</sup> Idaho Power does not explicitly propose 13,000 cfs at Lime Point, but this value is consistent with the flow releases from Hells Canyon dam assumed by Idaho Power for modeling purposes. In the absence of an explicit alternative proposal, we consider it part of Idaho Power's proposed operation. Idaho Power proposes that any navigation flow requirement for the Snake River reach from the Salmon River confluence to Lewiston be measured at McDuff Rapids (RM 175.5), 4 miles upstream of Lime Point.

In contrast, adding the Corps' navigation minimum flow recommendation (described above) to the flow augmentation scenario included in the Staff Alternative would reduce the frequency of occurrences when flows downstream of Hells Canyon dam fall below the 8,500-cfs boating target, thereby increasing the margin of safety at critical rapids and providing increased predictability for boat operators. Based on Idaho Power data, the incremental effect of adding the Corps' minimum flow recommendation to the Staff Alternative would result in zero days below 8,500 cfs under medium water conditions, 32 days under medium-low water conditions, and 100 days under extremely low water conditions.

These improved frequencies of meeting desirable boating flow levels would come with substantial costs, however. We estimate the cost of adding the Corps' recommended minimum flow requirement to the Staff Alternative, in terms of foregone power benefits, at \$12.5 million annually. Of this loss in power benefits, \$11.4 million is accounted for by the reduction in peaking capacity and the need to replace it. Losing this peaking capability would likely result in Idaho Power's having to construct replacement capacity using either simple cycle or combined cycle combustion turbines.

Currently, by reducing releases overnight at the Hells Canyon development during non-peak periods, Idaho Power is able to increase releases, and hence generation, during critical daytime hours. Due to the travel time of the peaking releases, however, the higher flow periods do not coincide with boating needs at downstream locations. Higher minimum flows provided for boating would constrain the ability of the Hells Canyon development to peak in response to high summertime power demands. Augmenting flows by 2,000 cfs (that is, going from a 6,500-cfs minimum flow to 8,500 cfs) in a medium-low water year, for example, would limit peaking capability for most of the period from June through September. July is the critical period for dependable capacity in Idaho Power's system, although similar needs can also exist in August and September, and the medium-low water year is the type of year (70<sup>th</sup> percentile water condition) used in Idaho Power's integrated resource planning to define dependable capacity requirements. Thus, application of Idaho Power's standard integrated resource planning strategy would require the replacement of any dependable capacity lost due to a higher minimum flow requirement.

During the past 20 years, project operations have included a minimum release (when inflows allowed) of 6,500 cfs, augmented in some years by a program of pulses, or timed releases, as described in section 3.3.1.3, *Navigation*. Over that time, boating accidents have occurred at multiple locations for many reasons, including low flows, high flows, operator inexperience, inappropriate watercraft size and weight for the flow levels, and, possibly, weather or other environmental conditions. Despite these potential risks, a very robust private and commercial outfitting industry has evolved, with advanced boat designs that allow for larger and heavier watercraft. We recognize that flow levels are just one aspect of overall boater safety, and acknowledge that without higher flows some boating companies may choose not to operate during low flows or may choose to adjust operations through use of smaller boats or reduced passenger loads. We conclude that improving boating conditions by imposing the Corps' minimum flow recommendation is not worth the substantial reduction in power benefits. Accordingly, we do not include the Corps' navigation flow recommendation in the Staff Alternative. However, to ensure that the Corps' recommended navigation flow is provided in a way that would not reduce the project's dependable capacity, we include in the Staff Alternative a recommendation that the minimum flow be set at 8,500 cfs from the start of Memorial Day weekend to September 30 in medium-high and extremely high water years. We also recommend that, if the 3-day moving average inflow to Brownlee reservoir is less than 8,500 cfs, the instantaneous minimum release required from Hells Canyon dam for the current day would be equal to the previous 3-day moving average.

Additionally, we recommend that Idaho Power consult with the Corps, NPPVA, the Forest Service, and other interested parties to prepare a navigation plan that addresses non-flow measures that could be implemented to improve boating safety downstream of Hells Canyon dam. This navigation plan would be a component of Idaho Power's proposed Recreation Plan. In a letter to the Corps dated June 26,

2007, and filed with the Commission on July 3, 2007, Idaho Power outlined a number of non-flow measures that it is currently investigating and that we recommend be included in the navigation plan. They include: (1) signage/navigation aids/channel markings to help boaters identify the best course through difficult stretches of the river; (2) training opportunities where boaters could learn the best route through specific river reaches; and (3) the potential for rock movement and other in-river channel modifications.

We also recommend that the plan include several measures that Idaho Power is pursuing with respect to improved flow information, including: (1) emphasizing the importance of the Hells Canyon discharge information that is posted on flow monitors located at 6 sites (Hells Gate Marina in Lewiston, Idaho; the Forest Service office in Clarkston, Washington; Heller Bar in Washington; the Cache Creek HCNRA portal in Oregon; Pittsburg Landing in Idaho; and the Hells Canyon Launch site in Oregon); (2) ensuring the accuracy of information posted on Idaho Power's web site and 1-800 phone number; (3) providing timely and accurate press releases; (4) providing a common data source for the flow monitors, website, and 1-800 number to ensure that accurate and timely information is provided via all three media and that the information is consistent among the three media; (5) continuing to evaluate the feasibility of developing a text messaging system that would send the current Hells Canyon discharge each hour to a list of subscribers with satellite phones that could be reached on the river; (6) evaluating the feasibility of installing additional stream flow gaging facilities on the river or important tributaries so that boaters would have access to additional real time information regarding measured flows, in addition to the information already provided on dam releases; and (7) developing a forecasting method for determining when monthly flow conditions in May, June, July, August, and September are likely to be in the medium-high range or greater.

We recommend that under the plan and in consultation with the other parties, Idaho Power evaluate the pulsing flow program that it has followed in the recent past. The program should have a sound basis in the underlying hydraulics/hydrology of the river with respect to the lag time between flow releases at Hells Canyon dam and flow response at key points along the river. Because Idaho Power has the necessary models and has done a significant amount of hydraulic modeling on the river already, primarily to address aquatic resource issues, it should be able to adapt the models to evaluate the attenuation effects of different navigation flow scenarios. Hydraulic or hydrologic factors to be considered in developing a flow regime and navigation flow plan should account for: (1) the travel time of flow from Hells Canyon dam to points downstream as far as just above the Salmon River confluence with the Snake River; (2) the attenuation effect on flow between Hells Canyon dam and points downstream as far as just above the Salmon River confluence with the Snake River; and (3) tributary inflow downstream of Hells Canyon dam; and (4) should include maintaining accurate stream gage rating curves of the relationship between flow and stage.

Because we conclude that development of a navigation plan that includes these elements is essential to providing a safe boating environment on the Snake River downstream of Hells Canyon dam, we consider the preparation and implementation of a navigation plan to be worth the estimated cost of \$36,300, including the installation and maintenance of two additional stream gages.

### **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 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, which contributed to 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. Flows from 1996 through 2000 were made as part of an energy exchange agreement between Idaho Power and BPA. That agreement expired in April 2001 and was not renewed by BPA. For the period 2002 through 2004, at the request of the Idaho Governor, Idaho Power cooperated with a rental program initiated by BOR to assist BOR in meeting its commitment to provide 427 kaf of water for flow augmentation purposes. Idaho Power leased the natural flow water rights that were acquired by BOR from the state water bank for power purposes to ensure that BOR rentals complied with state law and passed that water through the project. BOR and BPA were responsible for these costs. Additional augmentation flows were resumed in 2005 as part of an interim agreement to protect federally listed fall Chinook salmon (see figure 70).

In its license application, 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, and the Nez Perce Tribe recommends that Brownlee reservoir be managed to maximize flow augmentation during the spring and summer smolt migration seasons, including the use of real-time adjustments to account for changes in runoff forecasts.

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 77). We note that many other factors influence the number of adult salmon that return to the Snake River, especially a substantial increase in the number of hatchery fall Chinook salmon that have been released from acclimation sites in the Salmon and Snake rivers upstream from Lower Granite dam.

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 in the following spring, 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. In section 3.6.2.1, *Effects of Project Operations on Aquatic Resources*, we discuss how the weak relationship between flow and survival at higher flows (for both the spring and summer smolt outmigrations) described by the ISAB suggests that increasing the amount of flow augmentation water released in moderate and high water years, as recommended under measures recommended by the Nez Perce Tribe (NPT-7), may provide little survival benefit. We note, however, that the recent advent of 24-hour summer spills at the downstream federal Columbia River mainstem and Lower Snake River projects may alter the flow/survival relationships at higher flows, and that this relationship may warrant re-evaluation of the benefits of increased augmentation in medium and high flow years.

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 on juvenile fall Chinook salmon 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. In the draft EIS, we concluded 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. Comments received on the draft EIS reflected a consensus that it is unlikely that there would be sufficient information to allow the benefits of flow augmentation to be reevaluated in 2009, and that the evaluation that we proposed would be impeded by the wide range of factors that can affect adult returns. In addition, NMFS expressed concern that the measure introduced uncertainty about whether the measure would be continued beyond 2008, which it indicated would impede consultation on effects to federally listed ESUs of salmon and steelhead.

Although we understand the concerns expressed in these comments, we also conclude that it is likely that additional information will become available over the next license term that will improve our understanding of the effects of flow augmentation, and of how water contributed from Brownlee reservoir can be managed to maximize benefits to outmigrating juvenile salmon and steelhead. Therefore, we include in the Staff Alternative a measure that would require Idaho Power to prepare a flow augmentation evaluation report 6 years after license issuance, in consultation with the fisheries management agencies and treaty tribes, that evaluates available information on the benefits of providing flow augmentation water from Brownlee reservoir and whether any changes in the timing or amount of water delivered from Brownlee reservoir is warranted. The report should 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. We conclude that in the interim, Idaho Power should continue to release 237 kaf from Brownlee reservoir as it did 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. To address the concern expressed by NMFS regarding introducing uncertainty into the section 7 consultation, prior to implementing any changes in Idaho Power's participation in the flow augmentation program, we would consult with NMFS regarding the need to re-initiate formal consultation on potential effects on listed ESUs of salmon and steelhead.

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 \$9.0 million, and the annualized cost of preparing the flow augmentation evaluation report would be \$1,800. 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 recreation access sites 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) specifies that Idaho Power manage the Hells Canyon reservoir level 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 concluded in the draft EIS that establishing Brownlee summer reservoir levels to support levels in Hells Canyon reservoir on the basis of recreation potential alone would conflict with aquatic resource protection measures that we have included in the Staff Alternative. However, in its comments on the draft EIS, the Forest Service clarified that the primary purpose of measure FS-19 would be to extend boat ramps on Hells Canyon reservoir if proposed operations interfere with a reasonable level of boat access. We now agree with the Forest Service on the need for this measure, as clarified, and recommend it as part of the Staff Alternative.

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>119</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. This effect may 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. However, as we note in section 3.6.2.1, *Effects of Project Operations on Aquatic Resources*, a recent study funded by BPA (Cook et al., 2006) indicates that releasing too large a volume of water from Brownlee reservoir may reduce stratification in Lower Granite reservoir, which would increase water temperatures in the hypolimnion and affect the temperature of outflows from Lower Granite reservoir. Because of this potential adverse effect on rearing and migration conditions within and downstream of Lower Granite reservoir, and its slightly higher annualized cost (\$9.7 million for a 350-kaf release versus \$9.0 million for the 237-kaf release), we do not include the 350-kaf release in the Staff Alternative. However, we note that our

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<sup>119</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.

recommended flow augmentation evaluation report would allow the amount and timing of flow augmentation releases from Brownlee reservoir to be re-evaluated 6 years after license issuance.

#### **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 Measures**

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.

In its license application, Idaho Power proposed to install an oxygen diffuser system in the transition zone of Brownlee reservoir to meet its TMDL obligation for Brownlee reservoir, which was estimated at 1,450 tons per year at that time but was revised to 1,125 tons oxygen per year in the final TMDL. Because of the significant annual variability in Brownlee water quality conditions, Idaho Power proposed to maximize benefits of the aeration system by varying injection rates and periods depending on conditions. Idaho Power also 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, but later withdrew this proposal.

The agencies, tribes, and NGOs made numerous recommendations to increase dissolved oxygen levels in the project reservoirs and in the Snake River downstream of Hells Canyon dam. 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 on the units at Hells Canyon dam. NMFS-12 recommends that Idaho Power evaluate and design the most effective means of increasing late summer and fall dissolved oxygen levels in outflows of the Hells Canyon Project to exceed 6 mg/L 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 inject oxygen in Brownlee reservoir to meet the 6.5-mg/L dissolved oxygen target designated in the Snake River-Hells Canyon TMDL. AR/IRU-17 recommend an adaptive

management approach using real-time monitoring results to trigger aeration/oxygenation of reservoir outflows. ODFW-55 recommends that Idaho Power consult with ODEQ to develop and implement a plan to ensure that the project does not contribute to violation of Oregon's dissolved oxygen standard within or downstream of the project. 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. Interior also recommends that Idaho Power be required to meet water quality standards in Oxbow and Hells Canyon reservoirs (Interior-42), and monitor water quality twice per month at six locations downstream of Hells Canyon dam (Interior-67). AR/IRU-16 recommend 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, in lieu of Idaho Power's dissolved oxygen supplementation proposal for Brownlee reservoir.

In the draft EIS, we concluded that Idaho Power is responsible for addressing the project's contribution to degraded water quality, although there was considerable uncertainty about the cost effectiveness of both reservoir dissolved oxygen supplementation and potential turbine aeration measures. Therefore, we recommended that Idaho Power develop a dissolved oxygen supplementation plan in consultation with IDEQ, ODEQ, tribes, and federal and state agencies responsible for managing fish and wildlife to reduce the uncertainty associated with potential measures to increase dissolved oxygen levels prior to implementing any of them. Our concept was that during development of this plan, the project's dissolved oxygen load allocation beyond that set in the TMDL would be determined and practical measures for meeting all of the project's load allocations would be selected. These measures would be implemented following approval by the Commission and a monitoring program would be implemented to aid in selecting appropriate times for reservoir oxygen supplementation, if appropriate, and to document the effectiveness of measures aimed at improving dissolved oxygen in the lower river.

As part of the water quality certification process, Idaho Power focused considerable effort on reducing uncertainty associated with its proposed measures to address low dissolved oxygen levels and increasing the environmental benefits of meeting its TMDL dissolved oxygen allocation, as well as adding a measure to address low dissolved oxygen levels in the Oxbow bypassed reach. Based on the reduced uncertainty associated with the measures now being proposed by Idaho Power and the potential for greater environmental benefits, we have revised our draft EIS recommendation as described below.

In its April 26, 2007, filing with the Commission and its January 31, 2007, application for water quality certification (Idaho Power, 2007a), Idaho Power now proposes measures that supersede the measures proposed in the license application. This includes a proposal to meet its TMDL dissolved oxygen load allocation in Brownlee reservoir either by installing an oxygen diffuser system in Brownlee reservoir as it proposed in its license application, or through upstream phosphorus trading.<sup>120</sup> Because phosphorus trading offers the potential for enhanced resource benefits over an oxygen diffuser system, Idaho Power proposes to devote a limited period of time (i.e., up to 1 year after license issuance) to identifying appropriate trading partner(s) first and, if that fails, to proceed with design and installation of the reservoir diffuser system. In its application for water quality certification, Idaho Power also proposes to aerate Hells Canyon outflows using a forced air (blower) system at the Hells Canyon powerhouse to add 1,500 tons per year of dissolved oxygen downstream during summer and fall, or to install a similar

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<sup>120</sup> Phosphorus trading refers to Idaho Power developing/implementing a legal agreement in lieu of supplementing oxygen in Brownlee reservoir to meet its TMDL dissolved oxygen allocation. This agreement would be made with a party located upstream of Brownlee reservoir that has accumulated phosphorus credits by providing benefits beyond what is required under that party's phosphorus load allocation (refer to section 3.5.2.2, *Dissolved Oxygen, Upstream Watershed Phosphorus Trading*, for further details).

system or aerating runners at Brownlee dam if it can provide reasonable assurance that the dissolved oxygen targets downstream from Hells Canyon dam would be met. Idaho Power's preliminary evaluations indicate that measures at Brownlee dam may be feasible to meet the proposed 1,500 tons per year below Hells Canyon dam. In its application for water quality certification, Idaho Power also proposes to install and operate a destratification system in the Oxbow bypassed reach at the deep pool just upstream of the Indian Creek confluence to prevent anoxic conditions that were found to occur in the deeper portions of the pool.

Our analysis indicates that the approach proposed by Idaho Power in its January 31, 2007 application for water quality certification has the potential to provide substantive benefits to water quality conditions within and downstream of the project. Phosphorus inputs to Brownlee reservoir could be reduced by Idaho Power's implementation of phosphorus trading, if an appropriate trading partner can be found. To accomplish this, another party would need to reduce its point and/or nonpoint loadings beyond its allocated level so that it could accumulate pollutant trading credits, which it could "trade" with Idaho Power to meet the TMDL allocation set for Brownlee reservoir. This reduction in phosphorus loads could provide environmental benefits that extend to all three project reservoirs and to the Oxbow bypassed reach. Our analysis indicates that an oxygen diffuser system in Brownlee reservoir would provide only localized benefits. If aeration measures at Brownlee dam can meet Idaho Power's responsibility for improving dissolved oxygen levels downstream of Hells Canyon dam without violating the 110-percent of saturation total dissolved gas criterion, this approach would provide additional benefits in the Oxbow reservoir and bypassed reach, as well as in Hells Canyon reservoir. Implementation of phosphorus trading and aeration measures at Brownlee dam would also be consistent with recommendations by the agencies and tribes to improve water quality conditions both within and downstream of the project. Our analysis indicates that destratifying the deep pool in the Oxbow bypassed reach would reduce anoxic conditions that currently occur in the pool, and has the potential to benefit aquatic resources that use the bypassed reach, including bull trout and redband trout.

Although we recognize that a phosphorus trading arrangement would address project effects on nutrients and dissolved oxygen only indirectly, this measure has the potential to provide a greater overall benefit than the reservoir oxygen diffuser system proposed in the application. Therefore, we conclude that this approach warrants further evaluation before an approach for meeting TMDL targets and applicable dissolved oxygen standards within Brownlee reservoir and downstream of Hells Canyon dam is selected. Such an approach would be in keeping with the adaptive approach reflected in many of the agency and tribal recommendations. Accordingly, we recommend that Idaho Power develop a dissolved oxygen enhancement plan, including appropriate provisions for monitoring, in consultation with IDEQ, ODEQ, NMFS, Interior, IDFG, ODFW, and interested tribes. The plan should document the process of identifying appropriate upstream phosphorus trading partner(s), document whether reservoir supplementation is cost effective, and provide a mechanism to evaluate the effectiveness and feasibility of alternative or additional measures. Such alternative measures should, at a minimum, include reducing nutrient and organic matter loadings from tributaries, injecting atmospheric air or oxygen into forebay waters or turbines, and installing/using aerating runners to increase dissolved oxygen in Brownlee turbine flows. We recommend that the plan be filed for approval with the Commission within 1 year of license issuance.

During development of this dissolved oxygen enhancement plan, Idaho Power would consult with IDEQ and ODEQ on the estimate of project effects that contribute to low dissolved oxygen levels in the Snake River downstream of Hells Canyon dam. Once the appropriate dissolved oxygen load allocation for the project has been determined, Idaho Power would evaluate the feasibility of implementing its proposed turbine aeration measures and assess the potential for the measures to cause total dissolved gas to exceed the 110-percent of saturation criterion. This evaluation would be conducted for installing forced-air systems at Hells Canyon and Brownlee, aerating runners at Brownlee, and implementing other measures if necessary. The dissolved oxygen enhancement plan would include a monitoring provision to:

(1) evaluate the quality of inflows to the project; (2) confirm that Idaho Power is meeting its obligations for aeration and phosphorus trading if appropriate; (3) evaluate the effectiveness of the measures implemented; and (4) evaluate any adverse effects of the aeration on total dissolved gas downstream of Brownlee, Oxbow or Hells Canyon dams. As a provision of the dissolved oxygen enhancement plan, we recommend that Idaho Power annually develop and file a draft monitoring and implementation report, which would include monitoring results and describe actions taken in the past year along with actions proposed for the coming year. The report would also be provided to the agencies for comment.

We estimate the annualized cost of developing the dissolved oxygen enhancement plan through the evaluation phase at \$2,200. Because of its potential substantive benefits to aquatic resources, 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 mechanical measures to address the low dissolved oxygen levels in the three project reservoirs and the river downstream of Hells Canyon dam likely would total \$648,500. This is based on our estimated annualized costs of \$447,800 for a Brownlee reservoir oxygen diffuser system, \$184,700 for a forced air system at the Hells Canyon powerhouse, and \$16,000 for a destratification system at the deep pool just upstream of the Indian Creek confluence. Although we do not directly include in the Staff Alternative Interior-61, the recommendation that Idaho Power install and operate a turbine-venting system at Brownlee units 1, 2, 3, 4, and possibly Brownlee unit 5 and the three Hells Canyon units, our recommended dissolved oxygen enhancement plan may determine that all or part of this recommendation would provide a reasonable approach for Idaho Power to meet its obligation to improve water quality. Therefore, Interior-61, for which we estimate an annualized cost of \$17,000, could eventually be implemented under the Staff Alternative.

We do not fully 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. In the draft EIS, we concluded 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. During the 10(j) meeting, Interior indicated that its intent was to collect sufficient data to determine the downstream extent of water quality effects, but that the frequency, timing and location of measurement sites could be developed in consultation with Idaho Power. We recommend that these aspects of monitoring be developed during consultation on the dissolved oxygen enhancement plan.

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. As discussed above, Idaho Power is not solely responsible for dissolved oxygen deficits that occur within and downstream of the project, so it is not appropriate to hold Idaho Power responsible for addressing impacts that are beyond its responsibility as determined through the TMDL process and in its water quality certificate. Idaho Power's plan to evaluate phosphorus trading, as described above, would be limited to addressing Idaho Power's nutrient responsibility under the TMDL.

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 Measures

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. This seasonal shift in water temperature may adversely affect fall Chinook salmon by causing water temperatures to be above optimal while adults are holding prior to and during the spawning period, and by causing juvenile fish to emerge into a cooler environment with reduced growth potential (see section 3.6.2.4, *Water Temperature*). High water temperatures immediately before and during the spawning season are of particular concern because they may lead to higher levels of pre-spawning mortality and reduced egg viability. However, later in the spring and early summer, juvenile fall Chinook salmon and other aquatic resources actually may benefit from delayed warming, which delays the onset of stressfully high water temperatures.

Idaho Power's proposed operations would be the same as the current operations, resulting in thermal regimes similar to current regimes within and downstream of the project. In its license application, Idaho Power did not propose any measures to modify the existing temperature regime. However, in its April 26, 2007, filing with the Commission and its application for water quality certification (Idaho Power, 2007a), Idaho Power proposed to implement a Temperature Adaptive Management Plan (through the implementation of appropriate measures) to meet the project's temperature responsibility under the TMDL. Under this plan, Idaho Power would: (1) define the extent and nature of the project's temperature responsibility; (2) evaluate potential measures; and (3) identify any appropriate measure(s) for implementation. The potential measures identified by Idaho Power include a bubble upwelling system that would be designed to lift cool water from the depths of Brownlee reservoir to be entrained into the project intake and implementing watershed measures to reduce the temperature of inflows to the project (e.g., increasing stream shading, restoring channels, increasing streamflows or groundwater inflows, or reducing heat loads contributed from agricultural return flows and other point sources).

ODFW-56 recommends that Idaho Power consult with ODEQ to develop and implement a temperature management plan to be approved by ODEQ as part of its section 401 certification for the project. This plan would include implementing measures, a timeframe for implementing measures, and an effectiveness monitoring plan. 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 interested tribes, investigate the installation of a temperature control structure at Brownlee reservoir to meet Clean Water Act numeric and narrative criteria to support the beneficial use of fisheries. They also recommend 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.

Based on our analysis in section 3.6.2.4, *Water Temperature*, we conclude that increased temperatures in the fall that are attributable to the project likely cause reduced survival of fall Chinook salmon eggs that are spawned in the early part of the spawning season. We further conclude that this effect could be reduced with the implementation of watershed measures (e.g., temperature trading), through the installation of a bubble upwelling system in Brownlee reservoir, or through the installation of a temperature control structure in Brownlee reservoir. Notwithstanding those results, we also conclude that the latter two approaches involve potential adverse effects from releasing hypolimnetic water that is low in dissolved oxygen and may have elevated concentrations of ammonia, mercury, and organochlorine compounds. Using a temperature control structure to reduce water temperatures in the fall could also cause adverse effects by warming water temperatures during the summer outmigration period. Storing cool water for release in the fall would require summer releases to be drawn from higher elevations in the reservoir, which would increase the temperature of outflows from the project during the summer months. Such an outcome may adversely affect migration survival through Lower Granite reservoir.

Our analysis in section 3.6.2.4, *Water Temperature*, shows that releasing warm water via a temperature control structure has the potential to benefit fall Chinook salmon by counteracting delayed warming caused by the project, thereby increasing growth rates in the spring. This outcome may improve outmigration survival by fostering early outmigration or attainment of a larger size prior to outmigration. However, the modeling conducted by Idaho Power indicates that the ability to increase temperatures in the spring is limited in average and high water years, and there would be little effect prior to mid-March in all water years. Our review of Idaho Power's modeling results indicates that this finding is due to the limited degree of stratification that occurs in Brownlee reservoir in the early spring in low flow years, and that stratification is delayed until the late spring in higher flow years. Furthermore, increasing water temperatures in the spring could reduce the migration survival of yearling spring Chinook salmon and steelhead emigrating from tributaries downstream of the project.

Our evaluation of the preliminary simulation results for the bubble upwelling system leads us to conclude that the upwelling system, by itself, may not be sufficient to meet the project's temperature load allocation. While implementing watershed measures, such as increasing stream shading, would address project effects on water temperature only indirectly, this approach has the potential to provide a greater overall benefit than a bubble upwelling system. Such benefits could include improving water quality conditions within, and downstream from, the tributary streams where the watershed measures are implemented. This would provide benefits to native resident salmonids, white sturgeon, and other aquatic species. Accordingly, we conclude that watershed measures show substantial promise as a highly beneficial means for addressing the project's temperature responsibility, either alone or in combination with a bubble upwelling system.

We estimate that the annualized cost of developing and implementing Idaho Power's proposed Temperature Adaptive Management Plan would be \$452,000, based on the costs for a Brownlee bubble upwelling system. Because the watershed measures and a bubble upwelling system could provide substantial benefits to fall Chinook salmon and other aquatic resources, we conclude that Idaho Power's proposed Temperature Adaptive Management Plan is warranted and would be worth the cost. Therefore, we include it as part of the Staff Alternative.

With regard to the temperature control structure, we continue to conclude that installing such a structure is not warranted. We base our conclusion on the high cost of this measure,<sup>121</sup> as well as the potential adverse effects on (1) fall Chinook salmon from increased water temperatures downstream of the project during the summer outmigration season, and (2) other water quality parameters including reduced dissolved oxygen and increased concentrations of ammonia, mercury, and organochlorine compounds in waters downstream from Brownlee reservoir.

In addition to the Temperature Adaptive Management Program, we recommend that Idaho Power: (1) monitor the effectiveness of implemented measures; (2) hold annual meetings with ODEQ, IDEQ, ODFW, IDFG, FWS, NMFS, and interested tribes to evaluate whether measures need to be modified or additional measures implemented to meet the project's temperature responsibility, and (3) file an annual monitoring and implementation report with the Commission that summarizes monitoring results and outlines any modifications or new measures that warrant consideration and/or are proposed for implementation. These steps would provide better information on the effectiveness of implemented measures and provide a greater level of assurance that the implemented measures meet the project's temperature responsibility.

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<sup>121</sup> In its response to AIR WQ-2, Idaho Power (2005e) estimated that the annualized cost for the construction and operation of five alternative water temperature control structures at the Brownlee intake ranged from \$3.7 million for an overflow stoplog weir in the existing intake channel to \$40.6 million for a new 35,000 cfs capacity variable-height-gated intake tower.

### 5.2.3.3 Total Dissolved Gas Abatement

Water flowing through dam spillways and plunging to depth in pools below dams causes air to be driven into solution, resulting in supersaturation of gasses in the water. Total dissolved gas levels above 110 percent of saturation can be injurious to fish by causing gas bubble trauma. Sampling conducted by Idaho Power in the project reservoirs and in the Oxbow bypassed reach found evidence of gas bubble trauma in some fish when total dissolved gas levels exceeded 120 percent of saturation. In addition, a wide range of fish species showed evidence of gas bubble trauma when total dissolved gas levels exceeded 125 percent (see section 3.6.2.3, *Total Dissolved Gas*). Gas bubble trauma causes increased stress in fish and other aquatic organisms, and severe gas bubble trauma can cause substantial levels of mortality.

Spills greater than 3,000 cfs at Brownlee dam currently result in total dissolved gas levels that exceed the 110-percent of saturation criterion downstream of the Brownlee dam spillway, and have substantial effects on total dissolved gas levels in 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 this criterion. Limited sampling at Oxbow dam indicates that spills at this facility also cause total dissolved gas to exceed 110 percent of saturation, independent of spills at Brownlee dam. 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.

In its license application, Idaho Power proposed to continue preferential use of crest (upper spillway) gates for passing spills at Brownlee dam. It also proposed 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. In addition, Idaho Power proposed to develop a schedule for constructing and installing flow deflectors and an effectiveness monitoring plan in consultation with ODEQ and IDEQ.

ODFW-54 recommends that Idaho Power develop and implement a plan, in consultation with and approved by ODEQ, to satisfy 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. Under this plan, Idaho Power would develop and monitor measures to assure compliance with Oregon's total dissolved gas standard below all three dams as required by the TMDL, Oregon water quality standards, and the Clean Water Act.

NMFS (NMFS-10 and NMFS-11), Interior-62, the Umatilla Tribes (CTUIR-20), and the Nez Perce Tribe (NPT-15) recommend that Idaho Power design and install gas abatement structures at Hells Canyon and Brownlee dams. 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 in the free-flowing Snake River downstream of Hells Canyon dam.

AR/IRU (AR/IRU-18) recommend 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 water quality certificate once it is issued to detect and quantify total dissolved gas violations below each of the project dams.

Comments on the draft EIS emphasized the adverse effects of total dissolved gas on aquatic resources (Interior, AR/IRU), and included recommendations for additional evaluation of the effects of

Oxbow dam spills on total dissolved gas (ODEQ), clarification of the staff-recommended total dissolved gas measures (Interior and AR/IRU), development of a monitoring plan (ODEQ), and refinement of an adaptive approach to manage total dissolved gas (ODEQ, Forest Service, Umatilla Tribes, and Nez Perce Tribe).

In its April 26, 2007, filing with the Commission and its January 31, 2007, application for water quality certification, Idaho Power (2007a) now proposes to: (1) continue preferential use of crest gates for passing spills at Brownlee dam as an interim measure until the Brownlee spillway deflectors are constructed; (2) install flow deflectors at both the Hells Canyon and Brownlee dam spillways; (3) evaluate total dissolved gas reduction structures for Oxbow dam and install the most effective, safe, and economically feasible measure designed to reduce total dissolved gas at the dam; (4) adaptively manage uncertainties associated with its proposed total dissolved gas-abatement measures to ensure that it satisfies its total dissolved gas load allocation; (5) 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; and (6) if monitoring indicates that the implemented measures fail to meet the TDG criterion or protect aquatic life, adaptively manage TDG in the project through evaluation and implementation of additional measures designed to further reduce TDG levels.

In section 3.5.2.3, *Total Dissolved Gas*, we conclude that Idaho Power's proposal to continue preferential use of the upper spillway gates at Brownlee dam, along with the proposed installation of deflectors at Hells Canyon and Brownlee dams, would reduce the frequency of spill events that exceed the total dissolved gas standard. The 110-percent of saturation criterion would be exceeded less frequently, and the magnitude of exceedances would be reduced at flows up to at least the 10-year, 7-day average flood flow at Brownlee and Hells Canyon dams. This would reduce the potential for fish and other aquatic organisms to be exposed to high total dissolved gas levels in Oxbow and Hells Canyon reservoirs, as well as downstream of Hells Canyon dam. We estimate the annualized cost of Idaho Power's proposed total dissolved gas abatement measures at Hells Canyon at \$182,700 and the additional annualized cost of deflector installation at Brownlee at \$197,500. We include these measures in the Staff Alternative because the reduced frequency of elevated total dissolved gas would reduce the risk of gas bubble trauma in fish, especially to federally listed fall Chinook salmon.<sup>122</sup>

Since issuance of the draft EIS, monitoring conducted by Idaho Power indicates that spills at Oxbow dam, which do not coincide with Brownlee dam spills, can elevate total dissolved gas above allowable limits. Monitoring conducted by Idaho Power also determined that gas bubble trauma occurs in fish collected below the Brownlee and Oxbow spillways when total dissolved gas levels exceed 120 percent, and severe gas bubble trauma was observed when total dissolved gas levels exceeded 125 percent of saturation. Idaho Power is currently evaluating total dissolved gas reduction structures for Oxbow dam, and proposes to install the most effective, safe, and economically feasible measure to reduce total dissolved gas at the dam. Based on these recent study results, we have amended the Staff Alternative to include Idaho Power's proposed evaluation of total dissolved gas abatement measures for Oxbow dam and implementation of the most effective, safe and economically feasible measure for reducing total dissolved gas below the dam. Assuming that spillway deflectors would be installed, we estimate that the annualized cost of Oxbow dam total dissolved gas abatement measures would be \$278,200. Because this measure could substantially reduce adverse effects on aquatic resources downstream of Oxbow and Hells Canyon dams, we conclude that the cost is warranted and include this measure in the Staff Alternative.

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<sup>122</sup> In the draft EIS, we based our annualized cost estimates of \$407,600 for Hells Canyon spillway deflectors and \$354,700 for Brownlee spillway deflectors on the contracted cost for construction of spillway deflectors at Ice Harbor dam. In this final EIS, we revised these estimates based on site-specific information that Idaho Power filed with the Commission on April 26, 2007.

Because the effects of the deflectors cannot be accurately predicted, and the specific measure to be implemented at Oxbow dam has yet to be determined, it is not known to what extent the combination of Idaho Power's proposed operational changes and the installation of Brownlee and Hells Canyon spillway deflectors would satisfy the applicable total dissolved gas standards downstream of each of the project dams. Measures included in Idaho Power's application for water quality certification to monitor total dissolved gas levels and adaptively manage uncertainties associated with its proposed total dissolved gas-abatement measures would help ensure that it satisfies its total dissolved gas load allocation and minimizes adverse effects on aquatic resources. We estimate that the total dissolved gas monitoring effort proposed by Idaho Power would have an annualized cost of \$37,200. The cost of adaptive management depends on whether additional measures are required, but we estimate that consultation with the agencies would have an annualized cost of \$2,000. Because high total dissolved gas levels can cause substantial adverse effects on aquatic resources, monitoring and adaptive management would help ensure that adverse effects on aquatic resources are reduced. We further recommend that the monitoring effort include the development of an annual monitoring and implementation report, which would include monitoring results and describe actions taken in the past year along with actions proposed for the coming year. The report would be developed in consultation with IDEQ, ODEQ, NMFS, Interior, IDFG, ODFW, and interested tribes. Idaho Power would provide a draft of the report to the consulted parties for comment; and subsequently file the report with the Commission.

#### **5.2.3.4 Water Quality Monitoring**

Although several of Idaho Power's proposed water quality measures include monitoring components, Idaho Power does not propose to develop or maintain any permanent water quality monitoring stations.

NMFS (NMFS-14) recommends that Idaho Power fund and maintain six permanent water quality monitoring stations in the mainstem Snake River to document trends in water quality (temperatures, dissolved oxygen, total dissolved gas, and pH) and collect additional water quality samples twice each month to assess progress in reducing nutrient and fine sediment loads in the Snake River. Water quality monitoring stations would be located below Hells Canyon dam, below Brownlee dam, between Brownlee reservoir and the Weiser River confluence, below Swan Falls dam, below C.J. Strike dam, and below Bliss dam.

In the draft EIS, we did not adopt the NMFS recommendation to install monitoring stations upstream of the project because these gages would be located upstream of the influence of the project and would not provide data relevant to Idaho Power's management of the Hells Canyon Project. In its comments on the draft EIS, however, NMFS expressed interest in developing a permanent flow and water quality monitoring site downstream of Hells Canyon dam that would allow for a common monitoring platform by which to more realistically evaluate operations, flows, and their interactions with measures to improve important water quality parameters.

During the 10(j) meeting, Idaho Power indicated that the installation of spillway deflectors at Hells Canyon dam would direct more energy downstream during spill periods and would likely cause inaccurate flow and stage measurements at the former USGS gage site located 0.6 miles downstream of the dam. However, Idaho Power also indicated that it had identified several potentially feasible flow measurement sites located between 2.5 miles and 5 miles downstream of Hells Canyon dam. We conclude that establishing a new gage site closer to Hells Canyon dam would provide more useful data on water quality, as well as flow. We also conclude that measuring flow and water quality conditions at the same site would improve the evaluation of any relationship between flow and water quality parameters, which would be useful for evaluating and refining measures implemented to improve dissolved oxygen and to manage total dissolved gas levels. Therefore, we include within the Staff Alternative the development of an operational compliance and water quality monitoring plan, which would encompass

the development of a new flow gaging and water quality monitoring site within 5 miles downstream of Hells Canyon dam.

Idaho Power should develop the plan in consultation with IDEQ, ODEQ, IDFG, ODFW, NMFS, FWS, USGS, and interested tribes. The plan should, at a minimum, include:

- Identification of an appropriate location for continuous monitoring of river flow, stage, water temperature, dissolved oxygen, and total dissolved gas downstream of Hells Canyon dam, preferably within 5 miles of the dam;
- A schedule for construction of a flow measurement gage at the selected site, and installation of water quality monitoring equipment;
- A description of the procedures that would be followed to determine a ramping rate at the new gage site that is equivalent to any ramping rate specified in the new license for other locations;
- A description of the method that would be used to measure water surface elevations at Brownlee, Oxbow and Hells Canyon reservoirs, as well as flow rates in the Oxbow bypassed reach; and
- The time steps for which real-time and historical flow, water surface elevation and water quality information from each location would be posted on the Internet and annually reported to the Commission.

We estimate that the annualized cost of developing and implementing the operational compliance and water quality monitoring plan, including establishing a new flow gaging site, would be \$30,500. The plan would include provisions for making water quality, flow data, and reservoir levels available on the Internet to facilitate verification of compliance with operational conditions specified in the new license and to facilitate adaptive management.

## **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.

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. Flow fluctuations may also affect the available food supply and has the potential to cause mortality due to stranding and entrapment of other fish species, including bull trout and redband trout.

Although 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), and at other times of the year, when bull trout and redband trout may be present. Idaho Power proposes to continue its current maximum up- and down-ramping rate of 12 inches per hour as measured at Johnson Bar, 17.6 miles downstream of Hells Canyon dam. This ramping rate causes stage fluctuations of about 16 inches per hour below Hells Canyon dam. Under typical operating conditions, Idaho Power proposes to limit the maximum daily change in flow to 10,000 cfs, and to maintain a minimum flow of 6,500 cfs from June 1 through September 30, and to maintain a minimum flow of 5,000 cfs for the remainder of the year.

NMFS, Interior, the Forest Service, ODFW, IDFG, the Nez Perce Tribe, the Umatilla Tribes, and AR/IRU recommend measures 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 ODFW (ODFW-33), 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, and reduce mortalities due to stranding and from entrapment. Data from Idaho Power's 2005 entrapment surveys indicate that 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 percent, 92.9 percent, and 95.4 percent, respectively (see table 50). We conclude that both the 2- and 4-inch-per-hour ramping rates 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 were warranted to account for differences in seasonal flows or in channel topography between years.

Idaho Power identifies the primary fall Chinook salmon rearing season to be from March 15 to June 15, although ramping rate restrictions recommended by other stakeholders to protect rearing fall Chinook salmon would apply from 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.

In its response to AIR OP-1, Idaho Power estimated the annualized cost of changing the ramping rate compliance point from Johnson Bar to Hells Canyon dam, as recommended by NMFS-15, in conjunction with a reduced ramping rate from March 15 to May 31, would range from \$6.6 million for a seasonal 6-inches-per-hour limit to \$6.9 million for a seasonal 2-inches-per-hour limit. In the draft EIS, we adopted a provision that the maximum variation in river stage, as measured at the Snake River at Johnson Bar gaging station, not exceed 4 inches per hour during the March 15 to June 15 fall Chinook salmon rearing period. This measure would have a much lower cost than the scenarios evaluated by Idaho Power and the measures recommended by the agencies because the existing ramping rate and compliance point would be maintained outside of the March 15 to June 15 period, and would not affect the generating capacity available during high demand periods of the year. In the draft EIS, we concluded that this seasonal ramping rate limitation, implemented in conjunction with monitoring to adaptively manage stranding and entrapment losses of fall Chinook salmon, would provide a substantial level of protection for this threatened species, and we include this measure in the Staff Alternative.

In its comments on the draft EIS, NMFS expressed concern that imposing a fixed ramping rate would not take into account prevailing flow levels in a given year, and as a result may not reconnect some pools where substantial levels of entrapment and mortality could occur. Interior also expressed concern over the lack of information and the potential for stranding impacts on bull trout, another federally listed threatened species. During the 10(j) meeting, Idaho Power indicated that it had developed a draft stranding and entrapment management plan to address stranding risks to fall Chinook salmon, and that it was in the process of developing a stranding and entrapment management plan to address effects on bull trout.

We continue to conclude that available information indicates that a seasonal 4-inch-per-hour ramp rate would provide substantial benefits to rearing fall Chinook salmon compared to current operations. At an annualized cost of \$2.07 million, we conclude that these benefits would be worth the cost and retain this measure in the Staff Alternative. However, we recognize that the effectiveness of this seasonal ramp rate for preventing losses of juvenile fall Chinook salmon may vary between years, depending on differences in hydrologic and meteorological conditions, and that there is little information available on the potential for losses of bull trout from stranding and entrapment. Accordingly, we expand our recommended monitoring study to address potential effects on bull trout, which would require monitoring to be expanded to include the winter season when fluvial bull trout are present in the mainstem Snake River. We recommend that Idaho Power consult with NMFS, Interior, IDFG, ODFW,

and the interested tribes to develop a stranding and entrapment management plan. The plan would include a detailed description of how entrapment and stranding of juvenile fall Chinook salmon and bull trout would be monitored, any studies that are needed to quantify mortality or assess sublethal adverse effects, and provisions for implementing salvage operations or modifying project operations as needed to minimize losses from stranding and entrapment. We estimate that the annualized cost of implementing the expanded stranding and entrapment management plan would be \$107,000. We conclude that its potential to improve flow management to protect fall Chinook salmon and bull trout warrant the costs of developing and implementing the plan.

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 47). 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's studies focused on entrapment in pools, and did not address fish stranding in dewatered cobble bars, where it is difficult to detect small fish between or under cobbles. As a result, the mortality from stranding may be higher than it appears from the 2005 study results, and this risk could be increased by implementing the NMFS recommendation, which would cause more cobble bars to be dewatered on a daily basis. We conclude that the 4-inch-per-hour ramping rate that we include in the Staff Alternative, in conjunction with monitoring to determine whether additional measures are necessary, would be more effective in reducing potential losses from stranding and mortality. Additional measures could include implementing a higher minimum flow under certain conditions. However, we conclude that the available information is insufficient to support NMFS's proposed temperature-dependent minimum flow of 11,500 cfs.

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, the additional ramp rate restriction of 4 inches per hour during the fall Chinook rearing period, and the stranding and entrapment plan in the Staff Alternative discussed above. 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. To facilitate adaptive management of flows, if needed to support the food supply available to juvenile fall Chinook salmon, we adopt an invertebrate monitoring plan in the Staff Alternative. We discuss this plan in section 5.2.4.11, *Invertebrate Monitoring*.

We also 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.

In the draft EIS, we did not adopt recommendations made by ODFW (ODFW-33), Interior (Interior-65) and NMFS (NMFS-15) that river flow and ramping rates be monitored within 1 mile downstream of Hells Canyon dam. We based this decision on the difficulty of monitoring compliance at that point due to a reactive relationship between stage and discharge near the dam, and the fact that the existing monitoring location at Johnson Bar was used as the reference point in Idaho Power's licensing studies, which form the basis for the ramping rate restriction that we have included in the Staff Alternative. During the 10(j) meeting, however, the agencies expressed interest in identifying a single site for collecting flow and water quality information closer to the dam, where the influence of the project on dissolved oxygen and total dissolved gas levels could be monitored more effectively. Idaho Power indicated that the installation of spillway deflectors at Hells Canyon dam would direct more energy downstream during spill periods and would likely cause inaccurate stage and flow measurements if the gage used to monitor compliance were located too close to the dam. Idaho Power also stated that it had identified several potentially feasible flow measurement sites located between 2.5 miles and 5 miles downstream of Hells Canyon dam.

We conclude that establishing a new monitoring site closer to the dam would provide more useful data on water quality and that measuring flow and water quality conditions at the same site would improve evaluation of the relationship between flow and water quality parameters. This information would be useful for evaluating and refining measures implemented to address the dissolved oxygen deficit that currently extends for several miles downstream of the dam during the summer. It would also be more useful for measuring and managing total dissolved gas levels, which are more likely to exceed state standards in areas that are closer to the dam. Therefore, as part of the Staff Alternative, we recommend that Idaho Power develop an operational compliance and water quality monitoring plan. The plan, which we describe further in section 5.2.3.4, *Water Quality Monitoring*, should include an evaluation and development of a new flow gaging and water quality monitoring site within 5 miles downstream of Hells Canyon dam. The plan should also include provisions for determining a ramping rate at the new gage site that is equivalent to any ramping rate specified in the new license that is based on measurements at the existing compliance point at Johnson Bar. We estimate that the annualized cost of developing and implementing the flow compliance and water quality monitoring plan, including establishing a new flow gaging site, would be \$30,500. Also, the plan should include provisions for making water quality, flow data, and reservoir levels available on the Internet, as well as through other appropriate reporting mechanisms, to facilitate verification of compliance with operational conditions specified in the new license and to facilitate adaptive management.

### **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>123</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 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 59) 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 historical fall Chinook production area between Swan Falls and Brownlee dams 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 will gradually 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-14), and the Nez Perce Tribe (NPT-8b) recommend that the condition of historical 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. In the draft EIS, we concluded that substantial water quality improvement would be required before reintroduction of fall Chinook salmon to the Swan Falls to Brownlee reach proceeds, and 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.

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<sup>123</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-14, 16 and 17; NPT-8; and ODFW-1 through 17, 22, 24 and 40, is provided in table 56 in section 3.6.2.6, *Anadromous Fish Restoration*.

Comments from agencies and tribes on the draft EIS outlined their view that conditions in the water column are a poor predictor of water quality conditions within the intragravel incubation environment, which is influenced by other factors such as the amount of fine sediment that is present in the substrate. Comments filed by the Shoshone-Bannock Tribes also pointed to a study (Keller-Bliesner Engineering, 2005) that indicates water quality conditions in the Snake River upstream of Brownlee reservoir have not deteriorated substantially since the 1960s when fall Chinook salmon were successfully spawning upstream of Brownlee reservoir. This study also suggests that water quality may already be improving in the reach between C.J. Strike and Swan Falls dams.

We agree that the amount of sediment in the substrate affects dissolved oxygen levels within the gravel by affecting the flow of water through the substrate and through biological oxygen demand from decomposing organic material. Also, we point out that a reduction in seasonal peak flows caused by water storage at upstream reservoirs operated by the Bureau of Reclamation has likely contributed to the build-up of fine sediment in the intragravel environment and the establishment of rooted aquatic vegetation. Because of these factors, we conclude that, in addition to a substantial improvement in overall water quality (i.e., reduced nutrient and silt loading), substantial improvements in the condition of the intragravel incubation environment in the upstream Swan Falls to Brownlee reach would require one or more substantial high flow events to dislodge rooted aquatic vegetation and cleanse fine sediments from potential spawning areas. This same conclusion applies to the reach between C.J. Strike and Swan Falls dam, although the Keller-Bliesner report cited above suggests that less time may be required to restore spawning habitat in this reach. It is important to understand that Idaho Power's upstream projects on the mid-Snake have little if any effect on the nutrient loading that occurs upstream of the project, and unlike the Bureau of Reclamation projects, they have almost no effect on the magnitude of spring flushing flows due to their limited storage. Based on the discussion above and our analysis of the issue, we maintain that the nexus to project effects for the artificial redd studies proposed by the agencies is not sufficient, and we do not adopt this measure in the Staff Alternative. Restoring fall Chinook salmon to areas upstream of Swan Falls or C.J. Strike dams would require that downstream passage be implemented at those dams. Accordingly, the potential for restoration of fall Chinook salmon to areas upstream of either dam would need to be addressed through the upcoming Swan Falls relicensing proceeding for the C.J. Strike reach or through re-opening the C.J. Strike license for the Bliss reach.

As a means to improve water quality in the Brownlee to Swan Falls reach and other mainstem reaches, NMFS (NMFS-14) 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. Providing \$5 million to \$6 million annually to fund TMDL implementation as recommended by NMFS and the Nez Perce Tribe would likely expedite improvements in water quality. These improvements would help to create conditions in the historical fall Chinook spawning habitat upstream of the project that would be suitable for reintroduction, and would have ancillary benefits to other aquatic species including resident native salmonids and white sturgeon. However, nutrient loads delivered from sources upstream of the project are not related to the continuing operation of the Hells Canyon Project or to the operation of Idaho Power's upstream hydroelectric projects. In addition, the funding levels proposed by the agencies appear to go far beyond the amount that would be required to meet Idaho Power's nutrient responsibility under the TMDL. Because of this lack of nexus to project effects, we do not include Idaho Power funding of TMDL implementation in upstream reaches as part of the Staff Alternative. We note that Idaho Power has committed to the removal and disposal of aquatic vegetation that accumulates on the trashracks of its upstream Upper Salmon Falls, Lower Salmon Falls and Bliss projects,<sup>124</sup> which would help reduce

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<sup>124</sup> Idaho Power's proposal to remove and dispose of aquatic vegetation that gathers at the project intake was incorporated into the licenses issued for these projects.

nutrient loads delivered to downstream areas. Additionally, we note that unlike the rather broad TMDL funding measure recommended by the agencies, the evaluation of phosphorus trading included in Idaho Power's application for water quality certification, which we adopt as part of the Staff Alternative, would be specifically designed to meet the project's nutrient responsibility determined under the TMDL.

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 historical 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 historical 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 many 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. In their draft EIS comments, ODFW, IDFG, and the Shoshone-Bannock Tribes filed information indicating that several other tributaries show potential for anadromous fish restoration or expansion of populations of native resident salmonids. Accordingly, we have expanded Idaho Power's proposed plan to include suitable tributaries in the Powder and Burnt River basins (see section 3.6.2.10, *Tributary Habitat Improvements*).

In the draft EIS, we expressed concern about the apparent lack of comprehensive planning that would be required to reintroduce anadromous fish into the upper Snake River basin. We noted that no resource agency had provided us with any comprehensive resource or recovery plan that clearly defined management goals and strategies, similar to the plan developed for reintroduction of Atlantic salmon into the rivers and streams of New England. We concluded that such a planning effort would be key to the success of a fish reintroduction program of this magnitude, and to fully weigh the costs and benefits of such an undertaking on all stakeholders, including the land owners and water users in the basin.

Numerous parties objected to this rationale for deferring the restoration of anadromous fish to areas upstream of the project. The Forest Service commented that in other proceedings, the utility involved has recognized the lack of passage as being a major project effect, and has worked with the other parties to develop a fish passage plan that is acceptable to all those involved. ODFW commented that the reintroduction of salmonids into Pine, Eagle, Goose, and Daly creeks is of a much smaller scale and scope than the restoration of Atlantic salmon in the northeast, and should not require an extensive, comprehensive reintroduction plan that has region-wide consensus. They further recommended that

Idaho Power be required to develop a fish reintroduction plan with clearly defined management goals and strategies as an article in the new license. NMFS stated that rather than developing a comprehensive reintroduction plan, NMFS did what it typically does in FERC relicensing proceedings by providing its resource management goals and objectives for this relicensing. These include the general goals of avoiding extinction and fostering the long term survival and recovery of Columbia River basin salmon and steelhead and other species, and conserving the ecosystems upon which salmon and steelhead depend, including watershed health. NMFS also offered its specific goals for this relicensing proceeding, including the goal to improve water quality to restore spawning and rearing habitat in historically accessible areas as a vital step toward successfully restoring salmon and steelhead to historically important spawning and rearing habitat upstream of the project.

We recognize that a comprehensive plan is not always needed before implementing measures to restore anadromous fish to areas upstream of a project, and that a proposal to restore passage to a small number of tributaries would not require regional consensus. We also recognize that applicants and stakeholders are often able to attain some degree of consensus and address restoration issues as part of the licensing process. However, we maintain that in this case, there is substantial uncertainty regarding the feasibility of restoring anadromous fish to areas upstream of the project, and that there are substantial stakeholder concerns that would need to be considered and addressed before even a limited reintroduction program could be undertaken. Accordingly, we maintain that 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.

We note that many of the measures that we include as part of the Staff Alternative could help lay the groundwork for the eventual restoration of anadromous fish to areas upstream of the project by: (1) providing relevant information; (2) improving habitat conditions in potential restoration areas; (3) constructing facilities that could be used to pass anadromous fish; and (4) increasing the number of fish available for restoration efforts. Measures in the first category include establishing a water quality monitoring station at the head of Brownlee reservoir; compiling water quality data from upstream parts of the basin; monitoring tributary habitat enhancements in the Burnt, Powder, Wildhorse, Indian, and Pine basins; monitoring habitat use by surplus hatchery steelhead and spring Chinook salmon in Pine and Indian creeks; and observing behavior and habitat use, as well as reproductive success, of surplus adult salmon and steelhead released in tributaries to support tribal and recreational harvest fisheries. Measures in the second category include tributary enhancements in the five basins listed above and dissolved oxygen enhancement measures that are implemented upstream of Hells Canyon dam. Measures in the third category include improvement of the adult trapping facility at Hells Canyon dam; installation of a trap and weir (operable year-round) in Pine Creek; and eventual installation of additional passage facilities at Oxbow dam, Indian Creek, and the Wildhorse River. Measures in the fourth category include flow augmentation, continuation of the fall Chinook spawning and incubation flow program, measures to improve dissolved oxygen and total dissolved gas levels, implementation of seasonal ramp rate restrictions, and construction of a new spawning and incubation facility for steelhead and Chinook salmon on the Yankee Fork in the Salmon River basin.

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>125</sup> We received

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<sup>125</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.

few comments on the approach that we described. ODFW commented that the timeline for restoring anadromous fish to the Powder River tributaries was too long. ODFW and other parties also provided information indicating that habitat within some tributaries, especially in Pine Creek and some tributaries to the Powder River, currently support native resident salmonids and are currently suitable to support anadromous fish. However, given the potential effects of anadromous fish restoration on other water users in these tributaries, we maintain that the concerns of these stakeholders would need to be addressed before restoration of anadromous fish to project tributaries is undertaken. This effort would also need to include consideration of the number of adult salmon and steelhead that such an effort would be likely to produce, given current or future survival rates that can be expected to occur in the migratory corridor downstream of Hells Canyon dam. Although efforts to improve the downstream migration survival of anadromous salmonid smolts through the lower Snake and Columbia rivers are ongoing, mortality during migration would likely continue to affect the potential benefits of undertaking a restoration, even in streams where habitat is in relatively good condition. Accordingly, we do not include this phased fish passage plan in the Staff Alternative.

Many agencies, tribes, and NGOs also 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 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). Although we recognize that the counting stations at downstream fish ladders are not fully effective for monitoring lamprey abundance, it appears that very few Pacific lamprey succeed in migrating upstream past the Lower Columbia River and Lower Snake River dams to reach the project area. Accordingly, 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.

We consider the effects of the Hells Canyon Project on the population size of Pacific lamprey to be limited. However, it is clear that the project blocks access to a substantial amount of habitat that was historically used by this species, and because larval lamprey burrow in fine sediment deposits, trapping of fine sediments in the project reservoir likely reduces the quantity and quality of rearing habitat downstream of the project. Accordingly, we consider it to be appropriate for Idaho Power to participate in regional forums on Pacific lamprey restoration to keep abreast of new information on the number of lamprey that are returning to use rearing habitat downstream of the project, and information on methods and approaches being developed to conserve and enhance this culturally and ecologically important species. In addition, we recommend that Idaho Power file a report with the Commission every 3 years summarizing the results of research activities that may affect the future potential for implementing measures to benefit Pacific lamprey in habitat that is blocked by the project or that is affected by its operation. The report should include information on the number of Pacific lampreys that have been collected in the Hells Canyon fish trap over the past 5 years and a description of any studies or measures to benefit Pacific lamprey that Idaho Power proposes to undertake in the next 5 years. We estimate the annualized cost of participation in regional forums and the recommended reporting effort to be \$5,000, and recommend this measure in the Staff Alternative.

#### 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 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) prescribed 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: (1) include 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.

Interior incorporated the trigger elements from Idaho Power's alternative section 18 prescription in its modified fishway prescription filed with the Commission on January 3, 2007. The three primary differences from Idaho Power's alternative and Interior's modified prescription that remain are: (1) Interior's modified prescription maintains language regarding the need for appropriate attraction flows in the Oxbow bypassed reach when the Oxbow dam fish passage facility is constructed; (2) the modified prescription specifies that the Pine Creek weir and fish trap would be constructed within 2 years of license issuance; and (3) Interior states that the period of operation for downstream passage facilities would be developed based on further monitoring efforts.

We agree with the approach identified by Idaho Power and included in Interior's modified 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. In addition, we agree that there is a need to ensure that flows in the Oxbow bypassed reach are sufficient to allow upstream migrating bull trout to access the upstream passage facility at Oxbow dam after it has been constructed. We agree with Interior that there is no need to delay construction of the Pine Creek weir beyond 2 years after license issuance, and that information on the timing of bull trout movements gained from monitoring at the Pine Creek weir would help determine appropriate periods of operation for the facilities that would be constructed later based on the trigger criteria. Finally, we note that there is insufficient information at this time about the migration timing of bull trout to identify the period of operation prior to construction of the Pine Creek weir and trap fishway.

Interior's modified prescription includes a provision that the licensee employ all measures necessary and appropriate to facilitate effective upstream and downstream fish passage over the full range of river flows for which the project maintains operational control. However, it is unclear what flow range the weir and trap fishway on Pine Creek would be designed under, since Idaho Power does not have operational control over the flows in Pine Creek. Because there is limited information available on the timing of bull trout movements into and out of Pine Creek, we recommend that the Pine Creek weir and trap fishway be designed to provide effective downstream passage over a wide range of flows (encompassing the range of flows that occur at least ninety percent of the time in an average water year). This would also allow monitoring of the reproductive success of surplus hatchery steelhead and spring Chinook that enter Pine Creek, which would help to evaluate the efficacy of this measure for improving forage for bull trout.

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 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 Interior's modified 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. 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, radio telemetry studies conducted by Idaho Power found that dam passage was not observed for any of the six radio-tagged bull trout that were released into the project reservoirs, and all six of the redband trout that passed a project dam did so during periods when the project was spilling.<sup>126</sup> Nonetheless, we add the cost of additional radio telemetry studies as a component of the post-construction facility evaluations and trigger-related monitoring associated with Interior's modified fishway 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 modified fishway prescription to be \$1,974,300, and the cost of Idaho Power's alternative fishway prescription to be \$1,464,900.<sup>127</sup> The cost of the FWS modified prescription is greater than Idaho Power's alternative because we have assumed that the Pine Creek weir and trap fishway would be designed to function over a wider range of flows than the weir that would be constructed under Idaho Power's alternative prescription. Constructing the Pine Creek weir and trap to function at a greater range of flows would enable monitoring of bull trout emigration to occur over most of the year, and would also enable the weir to be used to evaluate the reproductive success of any surplus hatchery steelhead and spring Chinook that enter Pine Creek to spawn. We conclude that these benefits would warrant the cost difference of \$509,400 in annualized costs, so we include Interior's modified fishway prescription in the Staff Alternative.

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<sup>126</sup> In the final EIS, we expanded the text of section 3.6.1.4, *Native Resident Salmonids*, to include the results of this study.

<sup>127</sup> For Idaho Power's alternative condition and Interior's modified prescription, we assume that the Pine Creek weir and trap fishway would be constructed 2 years after license issuance, that the Indian Creek weir and trap fishway would be constructed 10 years after license issuance, and the Oxbow adult trap and the Wildhorse River weir and trap fishway would all be constructed 20 years after license issuance.

#### 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 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.

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 include the Pine, Powder and Burnt river basins, and IDFG (IDFG-16) recommends that tributary habitat enhancement measures 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, Powder or Weiser river basins.

In the draft EIS, we adopted Idaho Power's proposed Tributary Enhancement Plan, on the basis 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 did not recommend that the measure extend into the Weiser, Powder, or Burnt River basins based on our understanding of a limited potential for restoring connectivity among bull trout populations and the more limited effect of the project on habitat in tributaries upstream of the project.

During the 10(j) meeting, ODFW expressed strong interest in the restoration of redband trout in the Burnt and Powder River basins, and stated that they anticipate bull trout would be found in Eagle Creek (a Powder River tributary) during Idaho Power's proposed presence/absence survey. Also, a tribal representative present at the meeting outlined the cultural importance of native resident salmonids, including redband trout, which were relied on by the tribes when anadromous fish were not available. Impacts of the project on redband trout in the Powder and Burnt rivers are similar to the impacts on bull trout in the Pine, Indian and Wildhorse basins, through inundation of part of each stream and reduced connectivity between populations due to poor water quality conditions in Brownlee reservoir. Based on these considerations, we revised the Staff Alternative to include enhancement efforts in portions of these river basins where there is strong potential for rebuilding populations of redband and/or bull trout. We recognize that streams upstream of Brownlee reservoir, including the Weiser River, have been affected by the loss of anadromous fish, but the physical habitat in these streams has not been directly affected by project construction. Consequently, we find that there is less justification to include the Weiser River in the program.

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. To estimate the cost of staff's recommendation, which would include enhancement efforts in the Pine, Indian, Wildhorse, Powder, and Burnt river basins, we used Idaho Power's proposed funding level to estimate an average cost per square mile of drainage area for the Pine, Indian and Wildhorse basins, and for the Powder River we applied that cost per square mile to the drainage area of key tributaries identified by the agencies for restoration efforts (Eagle, Goose and Daly Creeks). We assumed that enhancement efforts in the Burnt River basin would be focused in tributaries with a similar drainage area as the Powder River tributaries. For five basins we assumed that expenditures would be spread out over a 10 year period, resulting in a total annualized cost of \$1,466,700. We have also assumed that this funding level would encompass a level of monitoring appropriate for guiding future enhancement efforts.

Implementing staff's recommended tributary habitat enhancement program would help reestablish connectivity among redband and bull trout populations, increase available habitat and population sizes, and increase the viability of subpopulations of native resident salmonids within the Pine, Indian, Wildhorse, Powder and Burnt river basins. Because of the substantial benefits that would be provided to these valuable resources, we conclude that the benefits of implementing the staff-developed measure would justify its costs.

Idaho Power proposes to assemble an interagency and landowner team to help identify opportunities to enhance bull and redband trout populations within these basins, prioritize measures, develop an implementation plan, and monitor the effectiveness of implemented measures. The committee should include landowners and representatives from any state or federal agencies involved in the management of areas selected for enhancement, fisheries management agencies (ODFW, IDFG, FWS and NMFS), interested tribes, and a representative from the conservation groups.

Idaho Power's proposed bull trout presence/absence survey in Eagle Creek would have an annualized cost of \$42,700. Such a measure would further bull trout conservation efforts by improving knowledge of the species distribution and assist with identifying appropriate enhancement measures that could be implemented through the Tributary Enhancement Plan. We conclude that the benefits of the survey would justify its cost.

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. 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 restoration of steelhead, spring Chinook salmon, or fall Chinook salmon populations upstream of the Hells Canyon Project.

As discussed in section 5.2.4.8, *Hatchery Production*, and section 5.2.4.3, *Anadromous Fish Restoration*, we recommend that Idaho Power consult with the agencies and tribes to determine how to make the best use of surplus hatchery steelhead and spring Chinook salmon, which may include transporting fish for release into the project reservoirs to improve forage opportunities for bull trout, to evaluate anadromous fish production potential in Pine Creek, and to support tribal and recreational harvest fisheries.

Idaho Power's proposal and the resource agency recommendations to supplement nutrients in tributaries using spawned salmon carcasses or nutrient analogs would serve to replace much needed nutrients lost from the system and would increase growth rates, and consequently fecundity, of bull trout and redband trout. Idaho Power's proposed plans for nutrient enhancement would have an annualized cost of \$40,000. Because the measure would provide substantial benefits to bull trout at a reasonable cost, we include this measure in the Staff Alternative. Also, carcass plants could be included in the tributary enhancement program for Eagle Creek if bull trout are found there during the proposed presence/absence survey.

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. Idaho Power's proposed brook trout eradication effort could 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 benefits of providing passage. Idaho Power's proposed plans for brook trout eradication in Indian Creek would have an annualized cost of \$51,700. Because of the benefits to be derived by the federally listed bull trout at a reasonable cost, we include Idaho Power's proposed brook trout suppression efforts 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 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 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. As part of Interior's modified fishway prescription, which we include in the Staff Alternative, 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. 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 Interior's modified prescription, and we conclude that the increased cost is justified by the expected benefits.

#### **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 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) recommend 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 effect of providing Interior's recommended bypass flows to include a reduction in power benefits of \$1.6 million per year.<sup>128</sup> The annualized cost of providing oxygen supplementation, as recommended by Interior, would be \$447,800. The overall net power benefit reduction would be \$2.05 million. We do not include Interior's recommendation in the Staff Alternative because the limited benefits to native resident salmonids do not warrant the high cost of this measure.

We also conclude that increasing flows in the Oxbow bypassed reach would be unlikely to substantially improve water temperatures for native resident salmonids during the summer months. Also, based on the habitat modeling results from the instream flow study conducted by Idaho Power, we conclude 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. There is no incremental cost of this measure because it is part of the current operation.

As we discuss in section 5.2.3.1, *Dissolved Oxygen Measures*, we adopt the installation and operation of a destratification system to reduce anoxic conditions that currently occur in a deep pool in the Oxbow bypassed reach. Although bull trout are unlikely to use the bypassed reach when temperatures become warm, it is possible that they could hold in deeper areas of the pool and be subjected to mortality when anoxic conditions occur. Destratifying the pool would reduce this potential source of mortality at a low annualized cost of \$16,000. Accordingly, we adopt this measure in the Staff Alternative. As part of its modified 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, 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 Interior's modified prescription, which we include in the Staff Alternative. Interior also expressed 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 Settlement 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 pounds 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*.

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<sup>128</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.

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.

In the draft EIS, we recommended that Idaho Power develop a hatchery management plan. In final EIS section 3.6.2.12, *Hatchery Production*, we note that to conform with the requirements of the ESA, Idaho Power's hatcheries need to be operated in compliance with Hatchery and Genetic Management Plans that would be developed by IDFG and NMFS. Under NMFS's final 4(d) rule, the plans are required to include clearly stated goals, performance objectives, and performance indicators that define the purpose of the program, its intended results, and measurement of performance in achieving those results. Consultation among Idaho Power, the fisheries management agencies, and interested tribes to outline the goals and objectives for each hatchery would help ensure that such goals and objectives are accurately reflected in the Hatchery and Genetic Management Plans. This consultation also would help ensure that the Hatchery and Genetic Management Plans are consistent with Idaho Power's responsibilities under a new license, as well as reflect the management goals of the agencies and tribes. Accordingly, we recommend that Idaho Power consult with these parties to define the goals and performance objectives for the plans that would govern operation of Idaho Power's hatchery program. We also recommend that Idaho Power file the results of this consultation, annual reports on the hatchery program (including adult returns), as well as the draft and final Hatchery and Genetic Management Plans, with the Commission so that we can ensure that the plans and the overall hatchery program conform to license requirements. Because the 4(d) rule requires that hatcheries be operated in compliance with the plans approved by NMFS, we conclude that funding the implementation of measures included in the Hatchery and Genetic Management Plans is an appropriate component of Idaho Power's responsibility. We estimate the incremental annualized cost of funding the development and implementation of the four Hatchery and Genetic Management Plans at \$66,700. This would be in addition to the estimated \$2.33 million annual cost of Idaho Power's hatchery proposals. We include Idaho Power's hatchery proposals in the Staff Alternative, along with funding for the development and implementation of the Hatchery and Genetic Management Plans.

We do not include recommendations made by 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 Interior or ODFW's recommended measures.

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. Although the cost of these facilities would depend upon their size and production capacity, we concluded in the draft EIS that the 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 salmon. 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. Although we concluded in the draft EIS that habitat in the Yankee Fork and Panther Creek has not been directly affected by construction or operation of the Hells Canyon Project, we did not consider the fact that the project affects river flows and water quality conditions in the migratory corridor of Yankee Fork and Panther Creek salmonids downstream of the confluence of the Salmon and Snake rivers. These effects

include elevated total dissolved gas levels during high spill periods and reduced flows during the smolt outmigration period caused by flood control operations.

During tribal consultation meetings held in March 2007 with the Shoshone-Bannock Tribes, the tribes indicated that they have been involved in extensive habitat restoration work on the Yankee Fork, including some out-planting of steelhead and Chinook salmon using streamside incubation boxes. The tribes also indicated that the state and federal hatcheries frequently do not have eggs available to support these efforts. They stated that of the two streams, the Yankee Fork is the stream where enhancement efforts would be most important to them. They also clarified that the focus of their program is on rebuilding the ESU, using low-tech techniques such as stream-side egg incubators to rebuild the number of wild-reared fish that return to the stream. We estimate that constructing and operating the facilities needed to spawn and incubate 1,000,000 salmon and steelhead eggs per year on the Yankee Fork would have an annualized cost of approximately \$89,600.<sup>129</sup> Based on survival rates estimated by Galindo and Rinehart (1998) for steelhead produced by the streamside incubator program, 1,000,000 eggs would result in the return of 2,060 adult salmon or steelhead to the Yankee Fork, contributing to rebuilding the ESU.

In section 3.6.2.12, *Hatchery Production*, we discuss some of the benefits of the tribes' streamside incubator program, which takes advantage of available instream habitat to cost-effectively rear smolts that are hardier and more fit to survive outmigration. Because of this improved migration survival and the relatively low cost of streamside incubators, the tribes' program is likely to produce adult returns more cost-effectively than a program that produces hatchery-reared smolts. The fish that are produced through the tribes' program are also more suitable for rebuilding the listed ESUs, and may contribute to their eventual delisting. Providing facilities for spawning and incubating eggs to the eyed stage would provide a more reliable source of eggs than existing sources, and thus improve the success of the tribes' existing streamside incubator program. Because of the project's effects on the migratory corridor, the cost-effectiveness of the measure, its potential for rebuilding the listed ESUs, and the cultural benefits to the Shoshone-Bannock Tribes, we conclude that construction and operation of low-tech spawning and incubation facilities on the Yankee Fork is warranted, and we include it in the Staff Alternative.<sup>130</sup> We also recommend that Idaho Power include Yankee Fork hatchery production numbers in the annual report on its hatchery program.

During tribal consultation meetings held on March 29 and March 30, 2007, the Burns Paiute and Shoshone-Paiute tribes expressed concern about the long-time line associated with restoration of anadromous fish to their ancestral fishing grounds upstream of the project. The Burns Paiute are particularly interested in anadromous fish restoration efforts on the Malheur River, and the Shoshone-Paiute are interested in restoration efforts in the Owyhee River to establish subsistence and ceremonial fisheries.

In the past, surplus adult spring Chinook salmon and steelhead returning to Idaho Power's hatchery system have been used to support tribal and recreational fisheries. Between 1985 and 1990, a total of 6,617 surplus adult spring Chinook salmon were released into tributaries in the Salmon River basin including the Yankee Fork, Panther Creek, and the Lemhi River (Abbott and Stute, 2003). Between 1966 and 2000, IDFG released a total of 45,588 surplus adult steelhead to support recreational fisheries in Hells Canyon reservoir and in the Boise and Payette rivers (Abbott and Stute, 2003). We have found no

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<sup>129</sup> The \$1 million cost estimate that we provided in the draft EIS was an order-of-magnitude estimate for a traditional hatchery that includes facilities for adult collection and holding, incubation, and concrete raceways for rearing fish to smolt size. Our revised cost does not include the facilities or operational costs associated with rearing, which occurs in the stream environment in the tribe's streamside incubator program.

<sup>130</sup> We note that like Idaho Power's other mitigation hatcheries, the Yankee Fork facilities would need to be operated in compliance with a NMFS-approved HGMP.

information in the record that indicates whether these practices have continued since 2000, or whether Idaho Power has borne the cost of transporting and releasing surplus hatchery spring Chinook salmon and steelhead in the past. Using surplus hatchery fish to provide fisheries to the tribes that historically fished in areas upstream of Hells Canyon dam would allow the tribes to resume subsistence and ceremonial fisheries that are clearly of substantial cultural importance.<sup>131</sup> Idaho Power has indicated that it is prepared to make fish available, based on consensus reached among agencies and the tribes. We estimate that developing and implementing a plan to collect surplus anadromous fish that return to Idaho Power's hatchery system or the Hells Canyon trap and to transport and distribute them to select tributaries in the project area and Snake River basin would have an annualized cost of \$80,900.<sup>132</sup>

Given the reasonable cost of the measure and the substantial benefits to be derived, we conclude that a plan to distribute surplus hatchery fish is warranted. Moreover, we realize there are many demands for these fish. In the draft EIS, we recommended that the hatchery management plans, as described above, address the distribution of surplus fish. We now recommend the development of a separate plan that addresses the use of surplus fish, and include the measure in the Staff Alternative. We recommend that the plan be developed in consultation with the Shoshone-Paiute, Burns Paiute, Shoshone-Bannock, and Nez Perce tribes. ODFW, IDFG, NMFS and Interior should also be consulted to ensure that actions implemented through the plan are consistent with fisheries management objectives, bull trout recovery, and other ongoing restoration efforts.

#### **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. Idaho Power also proposes to continue warmwater fish population monitoring to detect long-term effects on fish populations, including annual electrofishing surveys in all three project reservoirs and surveys in the Swan Falls-to-Brownlee reach every fifth year.

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. 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).

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<sup>131</sup> As identified in section 3.6.2.12, *Hatchery Production*, there are likely to be other benefits to out-planting surplus hatchery fish, including those associated with (1) adding marine nutrients to the system; (2) improving foraging opportunities for bull trout; (3) evaluating spawning success, egg viability and survival, and smolt outmigration and survival in Pine Creek; and (4) supporting recreational fishing opportunities in the project area.

<sup>132</sup> This estimate was based on the delivery of up to 30 truck loads of 50 to 300 adult spring Chinook salmon or steelhead to select tributaries in the project area from the Hells Canyon dam fish trap or from other traps that are part of Idaho Power's hatchery system in the Salmon River basin.

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.

Because 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 to 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.

In its comments on the draft EIS, ODFW expresses support for staff's recommendation for warmwater fish monitoring, as long as Idaho Power coordinates annually with ODFW and includes appropriate sampling techniques for monitoring the abundance of channel catfish, a species identified in Idaho Power's angler survey effort as important for anglers. During the 10(j) meeting, Idaho Power indicated that its sampling effort could be modified to include gill netting to sample catfish at minimal additional cost. This is a minor adjustment in staff's recommendation for warmwater fish monitoring that would yield valuable information on the project's fisheries. The measure could be implemented at little additional expense.

In its comments on the draft EIS, Interior reiterates its recommendation (which we discuss in section 3.10.2.11, *Warmwater Fisheries Management Plan*) that Idaho Power be required to: (1) implement an adaptive management program to identify impacts of project operations on the warmwater fishery; (2) develop a mitigation plan for any impacts as the result of project operations; and (3) consult with BLM to ensure that recreational fisheries are provided wherever possible. Based on our analysis in sections 3.6.2.1, *Effects of Project Operations on Aquatic Resources*, and 3.10.2.1, *Effects of Project Operations on Recreation Resources*, we conclude that the warmwater fishery (especially for crappie) is affected primarily by the type of water year due to flushing of fish from the reservoirs in high flow years. In addition, our analysis indicates that drawdowns for flow augmentation and power generation purposes have only a minor effect on the warmwater fishery. Moreover, our analysis shows that drawdowns for power generation purposes are relatively minor compared to those that occur for flood control, flow augmentation, or for the fall Chinook salmon spawning flow program. Drawdowns for each of these

purposes are necessary to support important project functions, including the protection and enhancement of federally listed fall Chinook salmon downstream of Hells Canyon dam. As noted above, we adopt in the Staff Alternative Idaho Power's proposal to limit drawdowns during the crappie spawning period to avoid nest dewatering. We conclude that limiting drawdowns during the crappie spawning period appears to be the only feasible operational measure that could improve the warmwater fishery without adversely affecting other major project purposes. However, annual consultation with the agencies on the results of warmwater fisheries monitoring efforts would provide a forum for the effects of project operations on the warmwater fishery to be considered, and may identify opportunities for reservoir levels to be managed in ways that reduce adverse effects on the warmwater fishery.

#### **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 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 require 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, which identified measures that would be implemented as part of Idaho Power's mid-Snake projects. The Commission accepted the plan on May 31, 2006, with the addition of a requirement for filing annual reports on activities undertaken in the previous year. Accordingly, we do not include any measures associated with the upstream projects in the Staff Alternative.

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 and appropriate spawning habitat 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.

In section 3.6.2.13, *Sturgeon Conservation Measures*, we conclude that implementation of a conservation hatchery program has the potential to rebuild sturgeon populations in the reaches between Swan Falls and Hells Canyon dams more rapidly than the translocation program proposed by Idaho Power. In the draft EIS, we did not include Idaho Power's proposed translocation plan in the Staff Alternative. However, based on their comments on the draft EIS, we recognize that IDFG and ODFW have concerns about potential genetic implications of stocking hatchery fish. Thus, so that both approaches are fully considered, we include in the Staff Alternative a measure that would require Idaho Power to conduct a feasibility assessment to assess the risks and benefits of both the translocation and conservation aquaculture approaches, and to select the most appropriate approach for restoring white sturgeon populations in the reaches between Swan Falls and Hells Canyon dams. The feasibility assessment would be prepared in consultation with IDFG, ODFW, FWS and interested tribes, and would be filed with the Commission for approval. We estimate that the annualized cost of preparing the feasibility assessment would be \$2,200. Because the aquaculture approach has the potential to provide greater benefits to tribal and recreational fisheries, we conclude that the cost of preparing the feasibility assessment is justified. If an aquaculture program appears feasible, Idaho Power would develop an aquaculture implementation plan that describes: (1) a schedule and an approach for broodstock collection; (2) rearing facilities and rearing methods; and (3) a release schedule. If the translocation approach appears to be more feasible, Idaho Power would develop a translocation implementation plan that describes the schedule and details of the program, including the number, size, and source of sturgeon to be translocated between reaches. In either case, the implementation plan would be developed in consultation with the fisheries management agencies and interested tribes, and would be filed with the Commission for approval.

We estimate the annualized costs of implementing a sturgeon aquaculture plan to be between \$28,000 and \$42,000, depending on whether stocking is focused on the Swan Falls to Brownlee reach, or whether stocking in Oxbow and Hells Canyon reservoirs is included. We estimate the annualized cost of implementing Idaho Power's proposed sturgeon translocation program to be \$20,600. Implementing either approach would assist with rebuilding sturgeon populations in the reaches between Swan Falls and Hells Canyon dams, where populations are currently depressed. Because rebuilding sturgeon populations in these reaches would contribute to restoring valuable sturgeon fisheries, we conclude that implementing the approach that is selected based on a feasibility study is warranted. Therefore, we include such measures in the Staff Alternative. Idaho Power proposes to conduct population monitoring in each of the reaches between Swan Falls and Lower Granite dams at 10-year intervals. The population monitoring effort proposed by Idaho Power would help determine the effectiveness of implemented measures, as well as facilitate an assessment of whether any changes in approach are warranted for rebuilding populations of white sturgeon in reaches affected by the Hells Canyon Project. Accordingly, we conclude that the sturgeon population monitoring effort proposed by Idaho Power, which would have an estimated annualized cost of \$95,900, is warranted, and we include it in the Staff Alternative.

Idaho Power also proposes to assess the effects of water quality conditions on the early lifestages of sturgeon and to monitor the genetic makeup of sturgeon sampled during population monitoring. In the draft EIS, we concluded that these measures would not be needed if Idaho Power were to proceed directly with an aquaculture program. However, these studies would help to determine the feasibility, and guide the implementation, of a translocation approach for rebuilding white sturgeon populations. The water quality study would help Idaho Power, the resource agencies, and tribes assess the potential for achieving successful reproduction in the Swan Falls to Brownlee reach. Genetic monitoring would aid in assessing any effects of translocation on the genetics of sturgeon populations in each reach, and guiding any

adjustments that are needed. Although we typically view genetic studies to be a responsibility of the management agencies, in this case we recognize that genetic monitoring is an integral component of Idaho Power's proposal, and would help guide the implementation of measures to address project effects on white sturgeon. We estimate that the annualized cost of conducting the study of water quality effects on early lifestages of sturgeon would be \$24,000. The annualized cost of genetic monitoring would add \$2,300 to the cost of the proposed population monitoring effort. Because these measures would assist with implementing and guiding measures designed to rebuild sturgeon populations and their cost would be relatively minor, we conclude that these measures are warranted and include them 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, as discussed above, we recommend that Idaho Power prepare a feasibility assessment to assess the risks and benefits of translocation and conservation aquaculture approaches for restoring white sturgeon populations in the reaches between Swan Falls and Hells Canyon dams. We also recommend that as part of the sturgeon monitoring effort, Idaho Power hold annual meetings of the white sturgeon Technical Advisory Committee to review the results of monitoring and enhancement efforts, which we expect would guide future management efforts. Also, we recommend that Idaho Power file with the Commission an annual report on the approved monitoring and enhancement efforts, as well as any recommendations for revising the monitoring or enhancement measures, based on monitoring results. We conclude that these annual meeting and reporting efforts would be sufficient to guide and coordinate the implementation of appropriate sturgeon conservation measures at the Hells Canyon Project. Accordingly, we do not recommend that the white sturgeon conservation plan be updated or an action plan be developed at this time.

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. Installing a fish screening system that provided sufficiently low velocities to limit the impingement of juvenile sturgeon would involve modifications with costs on the order of tens of millions of dollars for each development. We conclude that the conservation aquaculture program would provide 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 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 of 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.

In the draft EIS, we did not adopt ODFW's recommendation (ODFW-43) that Idaho Power evaluate bioaccumulation of contaminants in white sturgeon in Hells Canyon and Oxbow reservoirs and between Brownlee and Swan Falls dams. We concluded that determining whether bioaccumulants are likely to inhibit sturgeon reproduction was not needed if sturgeon populations were to be rebuilt by stocking. We also concluded that monitoring contaminants in shorter-lived species would provide a better means of monitoring contaminant levels in the environment and assessing risks to the angling public and fish-eating wildlife. During the 10(j) meeting, however, the agencies and tribes noted that contaminant levels in sturgeon are a concern because the Nez Perce Tribe has a consumptive fishery, and

the potential effects on reproduction are important if a translocation approach for restoring sturgeon is considered.

Although we acknowledge the potential benefits of monitoring bioaccumulants in sturgeon and warmwater fish species in Brownlee reservoir, we note that Idaho Power should not bear the full cost of this monitoring effort because they are not responsible for the introduction of these contaminants into the environment. However, it would require minimal effort for Idaho Power to collect tissue samples for analysis during its proposed monitoring of white sturgeon populations and warmwater fish species in Brownlee reservoir. Accordingly, we recommend that Idaho Power, if requested by IDEQ or ODEQ, collect tissue samples during the proposed sturgeon population monitoring efforts and make the samples available to the state agencies for their use in analyzing contaminant bioaccumulation.

#### **5.2.4.11 Invertebrate Monitoring**

The invertebrate community downstream of Hells Canyon dam includes a number of special status mollusk species. The composition of the aquatic invertebrate, periphyton and macrophyte communities serve as an indicator of water quality conditions as well as a food resource that is 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) recommend 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.

In the draft EIS, we concluded that Idaho Power had provided sufficient information to allow us to assess the effects of load following and other operations on aquatic resources, so we did not include Interior's recommended multi-year study of operating modes in the Staff Alternative. However, comments received on the draft EIS include information suggesting the shallow water habitats that are most affected by load following operations may include areas that are especially important for some rare and sensitive species of mollusks and for invertebrate production. This information also suggests that dewatering of these areas may have a disproportionately large effect on the food supply that is available to fall Chinook salmon juveniles and bull trout.

Idaho Power's studies did not evaluate the effects of project operations on invertebrates in shallow areas along the Snake River downstream from Hells Canyon dam. If exposure of these shallow areas during load following operations adversely affects invertebrate production, as available literature suggests, this would affect the food supply for rearing fall Chinook salmon and other fish species including redband and bull trout. The reduction in growth rates of fall Chinook salmon observed in the Hells Canyon reach in recent years suggests that any reduction in the available food supply is likely to affect growth rates and survival of fall Chinook salmon. In addition, flow fluctuations could adversely affect habitat conditions for several sensitive species of mollusks. For these reasons, we recommend, as part of the Staff Alternative, that Idaho Power develop and implement an invertebrate monitoring plan.

The plan should be developed in consultation with state and federal fisheries agencies, and should include annual monitoring efforts in order to encompass a wide range of hydrologic and operating conditions. The plan should include annual reporting of the results of monitoring efforts, a description of any recommended adjustments to the monitoring effort, and a description of any measures that are identified by Idaho Power, the resource agencies, or tribes to address project effects on invertebrates, including sensitive mollusks. We estimate that the annualized cost of implementing the staff-recommended invertebrate monitoring plan would be \$57,000. Because implementing the plan would improve our understanding of project effects and could lead to improved management of project operations in a way to benefit important natural resources, we conclude that the benefits of implementing the invertebrate monitoring plan warrants its cost.

We do not concur, however, with the Interior and the Forest Service recommendations (Interior-44 and -66 and FS-30) to establish specific study durations for baseline invertebrate sampling and for sampling with dissolved oxygen enhancement measures in place and with run-of-river operations. We conclude that a well-designed study program, with a year or more of baseline data, should be sufficient to document changes in the invertebrate community prior to dissolved oxygen implementation, and we expect that the schedule for implementing dissolved oxygen enhancement measures would be established in the 401 water quality certificate. We also conclude that a well-designed monitoring program could assess the effects of load following operations without imposing a multi-year test period of run-of-river operations. This can be accomplished by comparing and evaluating species composition and abundance in areas that have been dewatered at different frequencies over a range of hydrologic year-types, as part of the invertebrate monitoring plan included in the Staff Alternative.

We 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 is premature and would not be an effective or efficient way to monitor trends in habitat condition over time. However, staff's recommended invertebrate monitoring plan could include provisions for the reintroduction of rare and sensitive mollusks if the results of water quality monitoring indicate that habitat downstream of Hells Canyon dam has improved to a point where it is likely to support their reintroduction.

## **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>133</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

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<sup>133</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.

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 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 Program 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 Program 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 modified 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 in the draft EIS 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.

In the draft EIS, we recommended that Idaho Power consult with FWS, the Forest Service, IDFG, ODFW, the tribes, and other interested parties to develop and implement a Threatened, Endangered, and Sensitive Species Management Plan. Our recommendation remains the same in this final EIS. The purpose of the plan would be to protect and manage threatened, endangered, and sensitive species and their habitats that may be affected by project operation or project-related activities. Idaho Power has already completed a literature review, including searches of agency databases; compiled a large amount of information about threatened, endangered, and sensitive species in the vicinity; conducted extensive field surveys; analyzed and rated threats to threatened, endangered, and sensitive species resulting from a variety of factors; developed preliminary recommendations for many project-wide BMPs and site-specific protective measures; and is in the process of developing a GIS database to track threatened, endangered, and sensitive species and habitat in relationship to project facilities and activities. The Threatened, Endangered, and Sensitive Species Management Plan should bring this information together to serve as a foundation for future monitoring and management efforts.

In their comments on the draft EIS, several agencies requested that we clarify the nature of the plan envisioned in the Staff Alternative and indicate which species we intend for the plan to address. The paragraphs below respond to these comments, providing additional framework and detail for the plan. At a minimum, we recommend that the plan include the following elements:

- Initial species list—The initial list should include threatened, endangered and sensitive species that occur within the project boundary or on lands affected by project operation or project-related activities, as shown in table 106. For each species, the list should reference

the relicensing studies that documented occurrence and/or evaluated project effects. The list should be accompanied by maps showing locations of threatened, endangered, and sensitive species and habitats in relation to project features.

- Updating the species list—The plan should provide for annual consultation, review, and updating of the list. Species would be added or removed according to changes in their status or changes in the potential for project effects (e.g., construction of new facilities).
- Conducting baseline surveys—The plan should provide for baseline surveys of species currently on the list if no surveys have been completed at sites where project operations or project-related activities could affect them. Baseline surveys should also be conducted for species that may be added to the list if they occur at sites where the project could affect them.
- Preparing biological evaluations—Where Forest Service Sensitive species may be affected, Idaho Power should consult with the Forest Service to prepare a draft biological evaluation, in accordance with modified 4(e) condition no. 1 (*Implementation of Activities on National Forest System Lands*).
- Monitoring project effects—For Forest Service Sensitive species, the plan should include monitoring to identify project effects at confirmed sensitive species sites every 2 years for 6 years following license issuance and at 3-year intervals thereafter, unless a determination can be made at year 6 that no additional monitoring is necessary. For bald eagles, Idaho Power should conduct annual nesting, productivity, and winter surveys. For other threatened, endangered, and sensitive species, Idaho Power should consult with the agencies and tribes to determine an appropriate monitoring frequency, based on site-specific conditions.
- Implementing protective measures—The plan should provide for designing and implementing protection, mitigation, enhancement or restoration measures if monitoring results show project-related effects.
- Effectiveness monitoring and adaptive management—The plan should include follow-up monitoring to measure the effectiveness of any protective measures that are implemented, and use of this information to modify and improve the Threatened, Endangered, and Sensitive Species Management Plan.
- Consultation, reporting, and updating the Threatened, Endangered, and Sensitive Species Management Plan—The plan should provide for annual reporting and consultation, with updates to the plan as needed.
- Coordination and cooperation—We anticipate that many measures identified as being necessary for species or habitat protection would involve not only Idaho Power, but also adjacent land owners and managers, and the plan should include a mechanism for formalizing coordination and cooperation between the Forest Service, BLM, and private landowners. We recommend Idaho Power establish an advisory board, like the rare plant advisory board, to help implement cooperative wildlife measures.

The Staff Alternative calls for Idaho Power to address all the special status species for which agencies or tribes filed recommendations, with the exception of osprey and peregrine falcon. Species included in the Staff Alternative are shown in tables 106 and 107.

Table 106. Special status and rare endemic plants identified for inclusion in management and monitoring plans by agencies, tribes, or staff in relation to Staff Alternative.

Species	Staff Alternative
American wood sage ( <i>Teucrium canadense</i> var. <i>occidentale</i> )	For Forest Service Sensitive species, monitor known sites every 2 years for the first 6 years following license issuance; determine after year 6 whether surveys should continue at 3-year intervals. For other species, consult with agencies, tribes, and other stakeholders to determine a monitoring schedule, based on site-specific information (i.e., risk of disturbance). For all species, identify and implement protective measures, as needed, and monitor effectiveness. For all species, survey if new ground-disturbance is proposed in suitable habitat.
Bartonberry ( <i>Rubus bartonianus</i> )	
Hazel’s prickly phlox ( <i>Leptodactylon pungens</i> ssp. <i>hazeliae</i> )	
MacFarlane’s four-o’clock ( <i>Mirabilis macfarlanei</i> )	
Membrane-leaved monkeyflower ( <i>Mimulus hymenophyllus</i> )	
Oregon bolandra ( <i>Bolandra oregana</i> )	
Porcupine sedge ( <i>Carex hystricina</i> )	
Schweinitz flatsedge ( <i>Cyperus schweinitzii</i> )	
Shining flatsedge ( <i>Cyperus rivularis</i> )	
Spacious monkeyflower ( <i>Mimulus ampliatus</i> )	
Spalding’s catchfly ( <i>Silene spaldingii</i> )	
Stalk-leaved monkeyflower ( <i>Mimulus patulus</i> )	

Table 107. Special status wildlife identified for inclusion in monitoring and management plans, or for which agencies, tribes or staff recommended specific management measures, in relationship to Staff Alternative.

Species	Staff Alternative
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Develop and implement cooperative nest site management plans for nests associated with project reservoirs; conduct 1 annual nesting (March/April) and 1 annual productivity (June/July) survey at these nest sites. Conduct 1 annual fall (October/November) and 1 annual winter (February/March) roost survey and develop cooperative roost site management plans. Conduct 1 annual winter survey to cover all project reservoirs, timed to match regional surveys. Use existing information (GIS overlays of project facilities, project-related activities, nest sites, and HCRMP protective designations) to evaluate whether new protective measures are needed, and re-evaluate when activities are planned that would affect habitat or cause noise disturbance. Habitat enhancement is not necessary because HCRMP BMPs would protect nest sites, and no evidence has been filed that habitat is limiting.
Mountain quail ( <i>Oreortyx pictus</i> )	Implement cooperative management measures identified by Interior, ODFW and IDFG.
Great blue heron nesting ( <i>Ardea herodias</i> )	Design and implement site-specific protective measures as part of Powder River Wildlife Management Area Plan.
Columbia spotted frog ( <i>Rana luteiventris</i> )	Monitor known site; develop and implement site-specific protection, management, enhancement, restoration measures as needed; monitor effectiveness.
Other special status amphibians and reptiles	Implement Interior-85 regarding mapping and protection of snake dens as encountered; continued protection of springs and seeps; acquisition

Species	Staff Alternative
	of wetlands and springs as part of riparian habitat; mapping of bullfrogs encountered; bullfrog management on a site-specific basis.
Townsend's big-eared bat ( <i>Corynorhinus townsendii pallascens</i> )	Survey project facilities, develop and implement site-specific protection, management, enhancement, restoration measures as needed, including Interior-82; monitor effectiveness.
Spotted bat ( <i>Euderma maculatum</i> )	Survey project facilities, develop and implement site-specific protection, management, enhancement, restoration measures as needed; monitor effectiveness.
Other special status bats	Survey project facilities, develop and implement site-specific protection, management, enhancement, restoration measures as needed; monitor effectiveness.
Northern Idaho ground squirrel ( <i>Spermophilus brunneus brunneus</i> )	Survey if suitable habitat occurs on lands acquired for wildlife habitat mitigation; if present, implement protective measures.
Southern Idaho ground squirrel ( <i>Spermophilus brunneus endemicus</i> )	Survey if suitable habitat occurs on lands acquired for wildlife habitat mitigation; monitor known sites; implement Interior-83.

We incorporated most aspects of the recommendations into the Staff Alternative's more comprehensive plan, but rejected a few.

Our review of federal and state databases does not indicate any special status designation for osprey. Surveys found them to be uncommon in the project area (Turley and Holthuijzen, 2003b), and osprey were not identified as being of concern in evaluations of project operations and project-related activities (Dumas et al., 2003b; Edelman et al., 2003b). This species would continue to be protected by the Migratory Bird Treaty Act. Also, Idaho Power's HCRMP includes BMPs and habitat designations that would protect habitat for the osprey.

One peregrine falcon eyrie is located in the vicinity of the Hells Canyon boat launch (Akenson, 2000), but no project effects were identified (Dumas et al., 2003b; Edelman et al., 2003b). Like the osprey, existing laws would continue to apply to this species.

In the draft EIS, we rejected elements of Forest Service preliminary 4(e) condition no. 9, which specified that Idaho Power should conduct surveys for sensitive species on all National Forest System lands within one-fourth mile of the project boundary and within 50 meters of the shoreline along the Snake River between Hells Canyon dam and the confluence of the Salmon River. The preliminary condition specified that Idaho Power conduct the surveys annually for the first 5 years of any new license and at 2-year intervals thereafter. We also rejected the specification for development of a separate plan for the Forest Service. The Forest Service subsequently submitted modified 4(e) condition no. 9. While still calling for a separate plan for Forest Service Sensitive species, modified FS-9 specifies surveys on National Forest System lands affected by the project only if activities are proposed that could adversely affect sensitive species, without specifying an arbitrary distance. It also reduces the survey schedule, calling for surveys of confirmed Forest Service Sensitive species sites every 2 years for the first 6 years of any new license period, and then every 3 years thereafter, with a determination after year 6 of whether surveys need to be continued. We now include FS-9 in the Staff Alternative because it would benefit Forest Service sensitive species, could be accomplished at a reasonable cost, and would ensure consistency with the HCNRA Comprehensive Management Plan and Wallowa-Whitman and Payette National Forest Land and Resource Management Plans.

For non-National Forest System lands and other special status species, we recommend that Idaho Power consult with the agencies to determine appropriate monitoring schedules.

We do not include in the Staff Alternative ODFW-64, which recommends bald eagle habitat enhancement, because we could find no evidence in the record that habitat is limiting. Also, Idaho Power's HCRMP provides BMPs and habitat designations that should be protective of large trees and riparian habitat.

We do not include ODFW-65, which recommends that Idaho Power protect and monitor sensitive flora and fauna within 0.25 mile of the Snake River between Hells Canyon dam and the Salmon River, and within 0.5 mile of the project boundary along the reservoirs. We recognize that project effects on some habitats and some species may extend outside the project boundary, but conclude that effects would vary depending on factors such as site-specific conditions and species' habitat requirements and life histories, rather than extending an arbitrary distance.

We do not include Interior-80, because we conclude that the objectives for mountain quail could be more effectively addressed through implementation of other measures (ODFW-63, IDFG-30).

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 ongoing project activities or if proposed measures would cause ground disturbance or habitat loss or alteration (or noise disturbance, in the case of wildlife).

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.

We estimate the annualized cost of developing and implementing this consolidated Threatened, Endangered, and Sensitive Species Management Plan at \$132,500. The increase over our estimate of \$28,900 in the draft EIS reflects new cost information provided by Idaho Power in its April 30, 2007, filing and our adoption of the survey planning, scope, and frequency identified in FS-9 for sensitive species on National Forest System lands within the project boundary and on National Forest System lands affected by the project. This cost also includes Idaho Power's proposed cooperative measures for rare plants and agency consultation and reporting, as well as planning and field efforts for species-specific surveys and management where such species are known to occur (e.g., bald eagles) or where they may be

detected (e.g., special status bats). We include the plan in the Staff Alternative because our assessment indicates that the benefits to wildlife species would outweigh the cost of developing and implementing the plan.

#### **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 modified 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 ongoing, 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.

As specified in FS-7, the Staff Alternative includes establishment of a Cooperative Weed Management Area as a mechanism for building cooperative relationships among agencies, landowners, land managers and other individuals and organizations involved in managing weeds, while a Noxious Weed Advisory Board (which could include members who are also involved in the Cooperative Weed Management Area) would develop and implement the Integrated Weed Management Plan. Under the Staff Alternative, Idaho Power would allow for a 60-day review and comment period by the agencies and tribes before filing the plan with the Commission. Agencies to be consulted should include Forest Service, FWS, IDFG, IDPR, ODFW, county weed boards, and concerned tribes. As part of the plan,

Idaho Power would be consulting frequently, but informally, with cooperating agencies and tribes regarding additions/deletions to the list of weed species likely or known to occur in the project area; results of monitoring; outcomes of any treatments that were implemented; and plans for additional management measures. The plan would be formally updated at 5-year intervals to identify new species or areas of concern, evaluate program success, and consider new or alternative treatments.

Except in one respect, the Staff Alternative would be consistent 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, as recommended by Interior. 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.

We estimate the annualized cost of this measure at \$167,200. The increase over our estimate of \$55,000 in the draft EIS is based on new cost information provided by Idaho Power in its April 30, 2007, filing. It is also based on explanations the Forest Service provided with its modified 4(e) conditions, which led us to adopt FS-7 regarding survey and management of weeds on National Forest System lands within the project boundary and on National Forest System lands affected by the project. We conclude that it is reasonable for Idaho Power to address project effects where they occur, rather than limiting mitigation measures to lands within an administrative boundary. Forest Service comments also explained that a Cooperative Weed Management Area would complement, rather than duplicate, the functions of the Noxious Weed Advisory Board, and consequently, we include it in the Staff Alternative.

In addition to the items above, the total annualized cost of \$167,200 includes Idaho Power's proposed establishment of an advisory board and implementation of cooperative weed projects, as well as development and implementation of a comprehensive plan. It also includes agency consultation and reporting, and establishment of a Cooperative Weed Management Area. We include this plan in the Staff Alternative because we find that the benefits in terms of noxious weed and invasive species management would outweigh the cost.

### **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>134</sup> Transmission line 945 is located entirely within Hells Canyon. It runs along the eastern shore of Hells

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<sup>134</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.

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. 16P, 20P, and 21P), 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 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. It also includes Idaho Power's proposed measures to protect wildlife and botanical resources, as well as agency consultation and reporting. We include this plan in the Staff Alternative because we find that the benefits of improved transmission line and right-of-way management would outweigh the estimated annualized cost of \$11,900.

#### **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. Mule deer are very important in the region, in terms of their ecological role, as a cultural resource, and for the hunting, viewing, and wildlife appreciation opportunities they provide. They are also an important economic resource for Oregon and Idaho. ODFW stated that hunting in Baker County likely yielded between \$1.43 and \$2.9 million in 2005, based on 12 days per hunter, each spending between \$30 and \$60 per day (ODFW, February 21, 2007). IDFG estimated the economic value of mule deer hunting over the past 10 years at \$335,645 to \$1,512,632 annually, based on about 4 to 5 days per hunter, each spending approximately \$101 per day (IDFG, January 27, 2007).

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 a minimum of 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 cost of \$1.8 million. It would provide mitigation for the ongoing 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 Program 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 Service preliminary 4(e) condition no. 6 and IDFG-28.

To date, Idaho Power has acquired 18,298 acres of the first tier parcels. This acreage, plus 2,990 acres already in Idaho Power's ownership, includes 777 acres of riparian habitat, leaving a minimum of 44 acres yet to be acquired.

The total acreage to date includes 12,156 acres in Oregon and 9,132 acres in Idaho. IDFG commented that if the fourth target parcel (the 2903-acre Rocking M Ranch, located in Idaho) cannot be acquired, priority should be given to selecting lands with the highest value for mitigation, whether they are located in Oregon or Idaho (letter from T. Trent, Chief, Natural Resources Policy Bureau, IDFG, to T.J. Welch, Chief, Hydro West Branch 2, Commission, Washington, DC, dated January 27, 2007).

In their comments on the draft EIS and during the 10(j) meetings, Interior and IDFG indicated that the Staff Alternative should provide for acquisition of additional lands at a mitigation ratio higher than 1:1 if target parcels within the "first tier" (the nine parcels identified as the highest priorities by Idaho Power and the TRWG) are unavailable or cannot be acquired within a reasonable amount of time following license issuance. The higher mitigation ratio is intended to compensate for the lower values of replacement parcels (i.e., these parcels could be farther from the project, higher in elevation, more isolated from other lands managed for wildlife, or less capable of supporting high value habitats or species), and/or a longer period of time before Idaho Power could secure the lands and begin to implement enhancement measures.

To address agency concerns about the timely progress of acquiring high value lands, we include a contingency plan in the Staff Alternative. Under the contingency plan, if Idaho Power cannot acquire the remaining acreage of upland and riparian habitat within the "first tier" parcels within 5 years after license issuance, Idaho Power would acquire 5,805 acres (including at least 88 acres of riparian habitat) within the "first tier" within 10 years after license issuance. If this acreage cannot be acquired within 10 years

after license issuance, Idaho Power would acquire 8,709 acres (including at least 132 acres of riparian habitat) within the “second tier” parcels.

With FS-6, the Forest Service specifies that within 1 year of license issuance, Idaho Power should consult with the Forest Service to prepare a Land Acquisition and Management Plan that would be incorporated into the IWHP/WMMP. Although Idaho Power has already acquired three of four target parcels, implementation of this measure would be useful in identifying additional parcels to mitigate for project effects on riparian habitat along the Snake River downstream of Hells Canyon dam. These additional parcels would include 49 acres of riparian habitat to mitigate for ongoing project effects (interruption of sediment supply, flow fluctuations) on sandbar willow in shore and bottomland wetland, consistent with FS-6. We did not include this aspect of FS-6 in the Staff Alternative in the draft EIS, but now adopt it based on calculations the Forest Service provided in its justification for modified 4(e) conditions. Although we conclude that high flows, rather than project operations, are the primary factor that limits the development of riparian vegetation within shore and bottomland wetland, we accept the Forest Service estimate that project operations may prevent the establishment of native willows on 49 acres within this zone.

The additional parcels would also include 13.2 acres of riparian habitat to mitigate for anticipated effects (reduced hydrologic support) of the Staff Alternative flow regime on riparian habitat. In the draft EIS, we recommended that Idaho Power enhance 13.2 acres of riparian habitat downstream of Hells Canyon dam. We now recommend Idaho Power acquire the land needed to mitigate for project effects on this habitat, as well as the 49 acres mentioned above, as part of the larger acquisition package. We conclude that long-term management would be most efficient and effective if this additional acreage is consolidated with other lands that Idaho Power would manage under the IWHP/WMMP.

Acquisition, protection and management of 62.2 acres of riparian habitat would exceed the 56.3 acres specified in FS-6, which was based on the assumption that Idaho Power’s proposed flow regime would be implemented, with slightly less impact on riparian habitat. Idaho Power estimates that it must acquire about 25 acres of upland habitat for every acre of riparian habitat. Thus, acquisition of an additional 62.2 acres of riparian habitat would add approximately 1,493 acres of upland to the Staff Alternative. The Staff Alternative’s contingency plan would apply to this acreage, as well. We estimate the annualized cost of acquiring 62.2 acres (56.3 acres specified by the Forest Service, plus 5.9 additional acres to account for effects of implementing the staff-recommended flow regime) would be \$177,300, which we conclude would provide sufficient benefits in terms of riparian habitat mitigation to be worth the cost.

We do not include ODFW-61 or Interior-76 regarding acquisition of mitigation lands 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.

Part of the justification given by Interior and ODFW for higher mitigation ratios is 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 states that ODFW and Oregon Department of State Land policies call for no net loss of upland habitat quantity or quality, and net benefits for riparian habitat. We recognize that the Staff Alternative may not be consistent with the state’s policy. However, the FPA does not require mitigation of all project impacts. We conclude that the Staff Alternative provides substantial benefits 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 by improving their ecological values through implementation of enhancement measures. Under this alternative, Idaho Power would work with the Integrated Wildlife Habitat Program 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; and 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 that 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 as close as possible to the project, provide the same acreage of riparian and upland habitat as is affected by ongoing project operations, and serve similar functions (e.g., they 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 \$1.8 million. Because Idaho Power's proposal addresses ongoing project effects at a reasonable cost, we include it in the Staff Alternative, noting that higher costs may be associated with the contingency plan.

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. Interior recommends Idaho Power conduct a study to determine the feasibility of using riparian plantings to stabilize existing erosion sites, and reduce the acreage of acquisition if plantings are successful. The Forest Service specifies that within 2 years of license issuance, Idaho Power should assess erosion sites already identified, and where warranted and feasible, design and install control measures and then monitor their effectiveness. Where control measures are deemed infeasible, the acreage of these sites would be added to Idaho Power's riparian acquisition program. Idaho Power would then survey for new erosion sites every 5 years and implement control measures when deemed warranted and feasible.

We conclude that Idaho Power's proposed land acquisition would help to mitigate for 90 acres of existing erosion, but would not address erosion control onsite and 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 expands on FS-6, i.e., Idaho Power would 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 feasibility assessment and 5-year pilot project. If the results of the pilot project indicate a high likelihood of success at other sites, 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 Program/Wildlife Mitigation and Management Plan. Again, the contingency plan would apply to any land acquired to mitigate for erosion.

In the draft EIS, we did not recommend implementation of a 5-year pilot project as part of the feasibility assessment. We have added this recommendation to the Staff Alternative in the final EIS because we concluded that the results of field testing would provide the best basis for decisions about if and how to undertake additional stabilization/revegetation efforts. For the purpose of estimating costs, we assume the pilot project would be successful and a long-term stabilization/revegetation program would be

implemented. We estimate the annualized cost of this staff-developed measure at \$52,800. We do not include an estimated cost of acquiring additional acreage if the pilot project indicates the program would not be successful.

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.

Idaho Power's proposal addresses project effects on 86,408 acres of mule deer winter range between full pool and 2,700 feet elevation, where mule deer winter ecology studies (Edelmann, 2003) indicated that most deer were concentrated and where interactions with the reservoir occurred, and applied a habitat coefficient of 0.19 to estimate project effects on habitat capability and mortality. ODFW-61 provides for mitigation of project effects on a larger area of mule deer winter range than Idaho Power's proposal addresses. ODFW estimates the area of crucial mule deer winter range at 121,337 acres between full pool and 3,200 feet. ODFW states that a habitat coefficient of higher than 0.19 should be applied to account for higher mortality in extremely harsh winters. However, in its comments on the draft EIS, ODFW applies the 0.19 habitat coefficient to 121,337 acres, concluding that the Staff Alternative should include acquisition and management of 23,054 acres of mule deer winter range (1,452 acres of riparian habitat and 21,602 acres of uplands). Staff concludes that Idaho Power's proposed mitigation package, which would total a minimum of 23,582 acres and would likely total at least 24,191 acres, should help to address ODFW's concerns, because most of the lands are located within areas mapped as crucial mule deer winter range (Christensen, 2003) or function as a major migration route for mule deer moving between summer range in Oregon and winter range near Brownlee reservoir. The Staff Alternative would add a minimum of 1,555 acres (62.2 acres of riparian habitat; 1,493 acres of uplands) to this package. While the package includes less riparian habitat than ODFW believes is needed, the mule deer winter ecology studies (Edelmann, 2003) indicate that high quality forbs, low-stature green grasses, bitterbrush, and sagebrush at low elevations on south and southwest facing aspects are most important in harsh winters. Thus, low elevation uplands may be as important, if not more important, than riparian habitats for mule deer during the winter in this area.

Although not included as terrestrial resource measures, the Staff Alternative calls for enhancement of riparian habitat in several tributaries to the project reservoirs. Riparian habitat protection and management aimed at improving fish habitat would also benefit wildlife, including mule deer. Enhancement measures are recommended for Pine, Indian, and Wildhorse creeks and several smaller tributaries, and may be expanded to include the Powder and Burnt River basin tributaries.

In the Staff Alternative, 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 ongoing project effects and mitigation needs.

We estimate the total annualized cost of habitat acquisition (including riparian habitat to mitigate ongoing project effects downstream of Hells Canyon dam and predicted effects of implementing the staff-recommended flow regime) at \$1,945,700. This cost includes preparation of a Land Acquisition and Management Plan, as specified by the Forest Service (FS-6). The increase over our estimate of \$1,651,100 in the draft EIS reflects new cost information provided in Idaho Power's filing on April 30, 2007, which indicates additional capital improvements and more intensive management of acquired lands. It also reflects the cost of additional acreage that would be purchased in accordance with FS-6, and

implementation of a 5-year pilot project to investigate the feasibility of stabilizing and revegetating eroding shorelines and riverbanks. We include this measure in the Staff Alternative because we conclude that the benefits of this habitat acquisition and management would outweigh the cost.

#### **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 recommend that Idaho Power fund the capital cost of equipment purchase (\$298,800) and provide \$32,000 per year (approximately \$57 per acre) during the term of a new license to support habitat management on four islands.

In the draft EIS, we rejected agency recommendations to include Patch and Gold islands in the Staff Alternative because they are located outside the project boundary and are not affected by project operations. We also rejected agency recommendations to provide support for capital improvements because we concluded that while it would be reasonable for Idaho Power to contribute to ongoing agency management efforts, Idaho Power should not be responsible for initiating those efforts. In this final EIS, we modify the Staff Alternative to include all four islands, based on continuing effects of the reservoir fluctuations on waterfowl habitat and further review of onsite opportunities for enhancement (see section 3.7.2.6, *Island Habitat Enhancement Projects*). We now also include a recommendation for Idaho Power to support capital improvements on the island, because we find that Idaho Power could not implement or maintain the enhancement projects without those improvements.

The Staff Alternative would have Idaho Power consult with ODFW and IDFG to identify and implement habitat improvement projects on Porter, Hoffman, Patch, and Gold islands. On Porter, Hoffman, and Patch islands, projects would include purchasing and installing nest platforms and boxes, seeding grain to provide waterfowl forage, enhancing willows and other shrubs, and controlling weeds (ODFW, February 21, 2007). IDFG indicates funding is needed for irrigation and restoration projects on Gold Island (IDFG, January 27, 2007). 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. ODFW and IDFG describe the overall cost of managing the islands, but do not explain the basis for determining what Idaho Power's level of support should be. We include in the Staff Alternative support for capital improvements (\$298,800), which is consistent with ODFW and IDFG recommendations and would equal an annualized cost of \$32,600. We also include in the Staff Alternative an annual funding level of \$26,000, as Idaho Power proposes. This cost is slightly higher than O&M costs Idaho Power anticipates it would be applying to other lands it would acquire and manage. A higher level of funding for these islands would account for intensive management and

difficult access. The total annualized cost of this measure would be \$58,600 under the Staff Alternative. We include this measure because we find that the benefits would outweigh the cost.

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. ODFW's comments on the 10(j) meetings identified Spring, McGraw, and Fox creeks as potential translocation sites (ODFW, February 21, 2007). IDFG indicated that Indian, Eckels, Allison, and Deep creek drainages are priority areas for translocation projects (IDFG, January 27, 2007). During the 10(j) meetings, Interior suggested that potential sites may be located in the Burnt and Powder River drainages. We analyze Idaho Power's proposal and related recommendations from the Forest Service, Interior, ODFW, and IDFG in section 3.7.2.6, *Cooperative Wildlife Management Projects*.

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 determine the highest priority for mountain quail projects, i.e., habitat enhancement or translocation.

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 historical 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 ongoing 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, which we include in the Staff Alternative because we conclude that the benefit to quail would outweigh the cost.

#### **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. Monitoring protocols would be developed as part of the management plans, and would be tailored to the specific management needs identified in the plans.

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 indicate 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 modified 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.

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*.

Under the Staff Alternative, the IWHP/WMMP would 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 total annualized cost of managing these lands would be \$1,120,000. This estimate is higher than that shown in the draft EIS, based on new cost information filed by Idaho Power on April 30, 2007. Management costs also include the Land Acquisition and Management Plan identified in FS-5, establishment of a terrestrial resources working group (and long-term coordination with this group), finalizing the IWHP and WMMP, capital improvements and O&M, and measures to prevent or minimize disturbance to wildlife (scheduling O&M; developing and implementing an I&E program). We include these measures in the Staff Alternative because we find the benefits of improved habitat management would be worth the cost.

## **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.

We include in the Staff Alternative a measure documenting the need for Idaho Power to finalize the HPMP, incorporating all provisions of Forest Service 4(e) condition no. 25, and all provisions of Interior 4(e) condition no. 5, in consultation with the SHPOs, tribes, agencies, and Commission within 1 year of license issuance. The Commission is requiring Idaho Power to finalize the HPMP prior to issuance of a new license. The final HPMP must address the issues outlined in the following subsections. 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 (if it chooses to participate) to formally implement the HPMP, with Idaho Power, the tribes, BLM, and the Forest Service as consulting parties to the agreement. The final HPMP would be attached to the final Programmatic Agreement. The estimated annualized cost of the measure is \$800. 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 adversely affect, 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. In the APE downstream of Hells Canyon dam, Idaho Power proposes an initial 3-year program, at the end of which the condition of historic properties sites in this portion of the APE would have been verified and, as necessary, updated. Idaho Power would use results of this initial program to determine appropriate schedules for monitoring over the next three years. This pattern would continue throughout the license term, with the monitoring program being reviewed and revised as needed every 3 years. We include Idaho Power's proposed monitoring in the Staff Alternative, concluding that the protection afforded by monitoring these sites would be worth the annualized cost of \$109,100.

Forest Service 4(e) condition no. 25 specifies, among other provisions, 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 photographic documentation of selected rock image sites. Interior 4(e) condition no. 5 specifies that 13 sites on BLM land within the APE be included in the initial monitoring effort.

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, *Site Treatment*, that an initial 3-year program during which the conditions of all National Register listed and eligible resources (including not only archaeological sites but also rock art and other traditional cultural properties) are assessed, verified and updated as appropriate (which is consistent with Forest Service 4(e) condition no. 25 and also with Interior 4(e) condition no. 5) 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, extended to the entire APE, in the Staff Alternative and conclude that they are worth the estimated annualized cost of \$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 also proposes to recover archaeological data at four sites on Brownlee reservoir to prevent possible erosion damage. We include these measures in the Staff Alternative, concluding that the protection they

would afford these sites would be worth the combined annualized cost of \$176,800. 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, and then integrate the results into subsequent monitoring and management efforts to be undertaken over the license term under the provisions of a finalized HPMP.

#### **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. The Nez Perce Tribe submitted its oral history to Idaho Power in 2005; the document was filed with the Commission in February 2007. 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 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, in amounts comparable with the funding Idaho Power allocated for the other tribes' studies. The estimated one-time cost of this measure is \$100,000 (\$50,000 for each oral history).

#### **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 historic 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), European-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 European-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. We conclude that these measures would provide sufficient benefits to be worth the combined annualized cost of \$21,900. 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 an empirical 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. However, we recognize that new information or changing circumstances over the term of a new license could make it necessary or desirable to revise the APE, as well as the HPMP in which the APE is defined. Idaho Power's draft HPMP does not provide for such a revision, although it does state that the archaeological monitoring program would be reviewed every 3 years. To clarify our intent that the HPMP should be a "living document" that responds to circumstances that will inevitably change over time, we therefore include in the Staff Alternative a recommendation that the final HPMP include provisions for review, and as necessary revision, of the HPMP in consultation with the SHPOs, tribes, Forest Service, and BLM every 6 years over the license term. This measure is also consistent with Forest Service 4(e) condition no. 25. We estimate the annualized cost of this measure at \$1,700.

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 all 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. An HPMP revised in accordance with Forest Service 4(e) condition no. 25 would also include provisions for adaptive management strategies and also for determining when and under what circumstances re-survey may be necessary. 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 final HPMP a policy, developed in consultation with the SHPOs and tribes, 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 draft 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. Because we find no reason to recommend exclusion or modification of the HPMP's existing provisions regarding paleontological resources, 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. However, this would not preclude Idaho Power from collaborating on its own with institutions, students, and professional/academic researchers and allowing them access to archaeological materials in its possession.

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). In the draft EIS, we included this measure in the Staff Alternative because a number of new sites have been recorded since 1984 and implementing the measure would not add significantly to Idaho Power's costs over the term of a new license. However, we have reconsidered our position on this measure. We recognize that section 106 of NHPA requires the Commission to identify historic properties (resources already listed in or eligible for inclusion in the National Register) that may be affected by its actions. However, as noted by Idaho Power in its comments on the draft EIS, NHPA does not require the Commission, or a licensee, to nominate historic properties to the National Register. Section 110 of NHPA does require federal agencies that own or manage land to identify historic properties on that land and to nominate them for listing in the National Register. Because the Commission does not own or manage land, the requirements of section 110 are not applicable to relicensing of the Hells Canyon Project. Thus, we do not include this measure in the Staff Alternative.

In the draft EIS, 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. Through an oversight, that document's Staff Alternative did not include a measure regarding future evaluation of buildings in the project. 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 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 specification regarding protocols for consultation with agencies would ensure that Interior and other agencies have reasonable opportunities to provide input into the finalization and implementation of the plan. Interior's specification with respect to including 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. We also find in section 3.10.2.2 that several of the administrative components of Forest Service 4(e) condition FS-12 would help ensure that the proposed Recreation Plan addresses Forest Service standards for any improvements constructed on National Forest System lands.

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.

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.

Idaho Power's proposal is consistent with Forest Service 4(e) conditions FS-13, 14, 15, 16, and 17, which specify site improvements at Big Bar, Eagle Bar, Eckles Creek, Deep Creek Stairway, and pullouts and signage along the Hells Canyon Road.

Idaho Power's proposal is also consistent with Interior 4(e) conditions Interior-8, 9, 10, 11, 15, and 17, which specify a boat moorage plan as well as site improvements to Airstrip, Bob Creek, Westfall, Swedes Landing, Spring, Oxbow, and Copper Creek recreational sites. Idaho Power's proposal is also consistent with Interior-18, which specifies development of a low-water boat launch at or in the vicinity of Swedes Landing. We estimate the incremental annualized cost for these measures is \$39,600.

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 \$635,900.

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 modified 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 modified 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 estimate that the additional annualized cost of the measure would 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 modified 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.

As part of its modified 4(e) condition no. 19, the Forest Service specifies lengthening the boat ramps at its recreational sites on Hells Canyon reservoir if proposed project operations that would extend the lower drawdown level another 5 feet under existing conditions would adversely affect reasonable boat access. In section 3.10.2.3, we find that the measure would help ensure that reasonable public access to Hells Canyon reservoir continues from Big Bar and Eagle Bar, the only Forest Service-managed sites on Hells Canyon reservoir that provide boat access. We note that the condition does not define "prolonged" drawdown. We recommend that Idaho Power, as part of the Recreation Plan, define the conditions under which boat ramp extensions would be needed. We also recommend that, as part of the Recreation Plan, Idaho Power assess the need for extending other public boat ramps at Hells Canyon reservoir, including systematic evaluation of existing boat ramps based on the elevation at the bottom of each primary boat ramp, the amount of time that boat access would be limited under atypical conditions, and whether extending the boat ramp is needed to support public access to the reservoir. Given the uncertainty of whether boat ramp extensions would actually need to be constructed, the Staff Alternative does not include the cost of such construction.

As part of its modified 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 two ways. Idaho Power proposes, and Interior's 4(e) condition no. 7 specifies, the installation of floating restrooms on Brownlee and Oxbow 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, which is also consistent with Interior-8, the boat moorage plan. 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 \$66,800.

Lastly, modified 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. The estimated annualized cost is reflected in the cost estimate for other improvements at the Hells Canyon Creek boat launch (see section 5.2.7.2, *Recreation Site Improvements*).

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 its modified 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 its modified 4(e) condition no. 3, specifies that, as part of an integrated travel and access management plan for BLM-administered lands, 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 modified 4(e) condition no. 18 specifies that Idaho Power perform O&M necessary to meet Forest Service Standards. 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 has agreed to implement FS-18 under its Settlement Agreement with the Forest Service. We include FS-18 in the Staff Alternative; the cost is reflected in the \$85,300 annualized cost of Idaho Power's proposed operation and maintenance plan.

Forest Service modified 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 modified 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 \$108,100.

Interior modified 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 and evaluation of existing agreements and new agreements and partnerships with agencies; and establishment of best management practices.

The Forest Service (FS-1) specifies that Idaho Power obtain approval for site-specific project designs prior to any habitat or ground-disturbing activities on Forest Service lands and that if any Forest Service lands are added to the project boundary that Idaho Power obtain special-use authorization for occupancy and use of these lands. FS-2 specifies that Idaho Power prepare a resource coordination plan to establish a process for information exchange and to coordinate efforts for implementing license conditions, such as any required management plans, and ongoing project O&M activities potentially affecting Forest Service lands. This plan would include annual Forest Service consultation requirements; documentation of efforts to monitor project effects on other resources and effectiveness of required enhancement measures; means for revising or improving implementation strategies as needed; and standard operating procedures for activities on Forest Service lands.

Interior-1 specifies that Idaho Power consult and cooperate with BLM prior to initiating activities on BLM-administered lands within the project boundary. Interior's condition would require Idaho Power, among other things, to prepare site-specific plans for approval by BLM, including a safety-during-construction plan and a spoils disposal plan prior to any ground disturbing activities on BLM-administered lands. Interior-2 specifies that Idaho Power prepare and provide a written report in consultation with BLM documenting and/or evaluating measures necessary for the continued protection and utilization of BLM-administered lands and resources within the project boundary.

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 recommend (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 advisory oversight committee and resource-specific Technical Advisory Committees by Idaho Power in the Staff Alternative to facilitate the normal FERC consultation process 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. FS-1 and FS-2 specify a separate plan to address consultation with the Forest Service. We include these measures in the Staff Alternative, but find that this condition would be better met through development and implementation of the HCRMP, including details on consultation, coordination, and reporting. The scope of activities would be limited to Forest Service lands within the project boundary. We estimate that the annualized cost to Idaho Power in addition to implementing the proposed HCRMP is \$1,000 for FS-1 and \$6,100 for FS-2.

Interior-1 and -2, which we include in the Staff Alternative, appear to be generally consistent with the consulting and coordination measures in Idaho Power's HCRMP, but may require additional study analysis in the plan and may require additional time to implement. We estimate the annualized cost of these measures to be \$4,400, and \$5,000 respectively.

### **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 (Interior-4) 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 Policy 6.3.8.4 of the HCRMP to state that Idaho Power will sponsor biannual meetings and continue to coordinate with law enforcement agencies with jurisdiction within the planning area on a regular basis. We estimate that the additional annualized cost of this measure would be \$5,000.

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. The cost of these measures is included in the overall cost of developing and implementing the HCRMP.

### **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. We estimate that the annualized costs of mapping and monitoring these additional lands would be \$1,000.

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 and the Forest Service's condition (FS-26) 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 do not estimate a cost for this measure because it requires a one-time effort associated with Idaho Power's filing of a revised exhibit G.

#### **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/or 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, Idaho Power proposes to develop a Road Management Plan as an element of the HCRMP to increase the effectiveness and efficiency of efforts to manage, maintain, and enhance travel and access to not only project lands but also lands within the vicinity of the project and assist in the assessment of Idaho Power's role and responsibilities with regard to travel and access to the Project. The plan is also intended to foster coordination, cooperation and integration of efforts between the Licensee and the various entities with jurisdiction for roads.

As proposed by Idaho Power and recommended by ODFW (ODFW-76) and specified by the Forest Service as part of its modified 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 Idaho Power's proposed plan is \$27,800. This cost is included in the total HCRMP costs. We estimate minor additional annualized costs associated with fulfilling ODFW-76 to be \$1,100.

Idaho Power's proposed plan lacks certain details that would be necessary to ensure public access and protect project-related environmental resources. In its comments on the draft EIS, Idaho Power clarifies that the Road Management Plan would include an atlas as part of the GIS system. To ensure that road management measures are part of the GIS system, we continue to include in the Staff Alternative 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 as part of the proposed GIS system that depicts locations of natural areas and describes 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 \$1,500.

Interior's modified 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**

As part of its settlement with the Forest Service and consistent with modified terms and conditions FS-22, Idaho Power also proposes to develop an aesthetic improvement plan for the Hells Canyon Dam Site and Recreational Portal. The proposal and FS-22 call for Idaho Power to enhance the upper deck, entrance, and egress areas of Hells Canyon dam that will be incorporated into the Scenery Management Plan and file the aesthetic improvement plan with the Commission for approval. Alterations may include changes in fencing material, color of materials, screening of stop blocks, parking, signage, pedestrian walkways, interpretation, viewing areas and landscaping provided that such alterations are consistent with the FERC approved security plan for the Dam. A schedule for implementation, to be conducted by the Licensee, would be included in the aesthetic improvement plan.

Idaho Power originally proposed to implement aesthetic measures as part of the HCRMP (see section 3.12.2.1, *Land Use Management Plan*) in which goals and objectives as well as policies and guidelines for aesthetic standards are discussed. Now, as part of its settlement with the Forest Service and consistent with modified terms and condition FS-24, Idaho Power proposes to prepare a Scenery Management Plan for project facilities and operations on Forest Service lands within the project boundary and adjacent to the project boundary within 1 year of license issuance. This plan would include: existing transmission lines and associated service roads; design standards and guidelines for physical structures and landscaping; general aesthetic clean-up and implementation; replacement of guardrails and jersey barriers; mitigation of contrast from project facilities; and enhancement of other facilities.

Interior-25 recommends 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. The annualized cost of this measure, which we include in the Staff Alternative, would be \$2,500.

Based on our analysis presented in section 3.11.2.2, *Aesthetic Improvements and Resource Management*, we conclude that development and implementation of an aesthetics improvement measures 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 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 \$168,800.

## **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 108 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.

In the draft EIS, of the 173 recommendations that we considered to be within the scope of section 10(j), we wholly included 92 measures in the Staff Alternative, included 27 in part, and did not include 54. Following publication of the draft EIS, we held a meeting with the fish and wildlife agencies to try to resolve inconsistencies with the FPA and to provide both agency personnel and FERC staff the opportunity to clarify their positions on various measures that we did not adopt as part of the Staff Alternative. The 10(j) meeting was held in Boise, Idaho, on December 5 to December 7, 2006; other interested parties, including representatives of Idaho Power, several tribes, and other organizations, also participated. We filed a meeting summary on January 12, 2007. Comments on the meeting summary were filed by IDFG (January 30, 2007), NMFS (February 8, 2007), the Forest Service (February 12, 2007), ODFW (February 21, 2007), and Interior (March 15, 2007). As a result of the meeting and subsequent clarifications, as well as, the agencies' comments on the draft EIS, we revised our recommendation concerning several 10(j) measures. Among the measures we now adopt as part of the Staff Alternative are: (1) the FWS modified fishway prescription; (2) enhancement measures to support redband and bull trout restoration in portions of the Powder and Burnt River basins; (3) funding for the development and implementation of Hatchery and Genetic Management Plans for each mitigation hatchery; (4) development and implementation of an invertebrate monitoring plan to evaluate trends in the abundance and distribution of rare and sensitive species of mollusks; (5) assessment of water quality-related effects on white sturgeon, genetic monitoring, and translocation of reproductive-sized white sturgeon into the Swan Falls-Brownlee reach; (6) evaluation of fall Chinook salmon egg-to-fry survival; and (7) habitat management of 4 state-owned islands rather than 2 islands.

In this final EIS, of the 173 recommendations that we consider to be within the scope of section 10(j), we wholly include 110 in the Staff Alternative, include 18 in part, and do not include 45. We discuss the reasons for not including those recommendations in section 5.2, *Discussion of Key Issues*. Table 108 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 modified 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 109 summarizes our staff conclusion with respect to the modified 4(e) conditions. Of the 44 modified 4(e) conditions submitted by Interior and the Forest Service, we include in the Staff Alternative 36 conditions as specified by the agency and include 4 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 3 conditions for reasons summarized in table 109 and discussed in more detail in section 5.2, *Discussion of Key Issues*.

Table 108. 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.
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	\$0	Adopted, cost is included in NMFS-13j
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-10a	Monitor Pacific lamprey population status downstream of the project.	No <sup>c</sup>	\$8,300	Not adopted
IDFG-10b	Participate in the Columbia River basin Lamprey Technical Work Group	No	\$5,000	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	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	Adopted
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	Adopted, except that monitoring of genotypic frequencies upstream of Swan Falls dam is not included because this is addressed in license articles for Idaho Power's upstream projects.
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

<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-28	Acquire and manage 23,582 acres as mitigation for project effects.	Yes	\$1,651,100	Adopted
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	Adopted
IDFG-32	Implement cooperative weed control, site monitoring, and reseedling.	Yes	\$50,000	Adopted
IDFG-33	Implement cooperative protection and monitoring of rare plant sites.	No <sup>e</sup>	\$6,000	Adopted; included in threatened, endangered, and sensitive species management
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 if trigger criteria identified in Interior's modified fishway prescription are met.	Yes	\$182,700	Adopted
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 if trigger criteria identified in Interior's modified fishway prescription are met.	Yes	\$365,500	Adopted
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	Adopted, but would use surplus hatchery fish from unlisted stocks only
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
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	\$80,900	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)

<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-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	Adopted
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)
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 and the need for hatchery supplementation would be determined via a feasibility assessment.
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 total dissolved gas-abatement structures on Hells Canyon dam.	Yes	\$407,600	Adopted
Interior-62aii	Construct total dissolved gas-abatement structures on Brownlee dam.	Yes	\$354,700	Adopted
Interior-62b	Monitor effectiveness of total dissolved gas-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)

<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-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 would be selected as specified in Idaho Power's fall Chinook spawning and gravel management plan.
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	Adopted; DO measures should be implemented consistent with the timing specified in the water quality certificate, and monitoring should be designed to evaluate operational effects without the operational restrictions identified in Interior-66.
Interior-71	Conduct biannual monitoring of benthic macrophytes and algae.	Yes	\$14,200	Adopted with same exceptions as Interior-70.
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	Adopted with same exceptions as Interior-70.
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	Adopted with same exceptions as Interior-70.

<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-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, but we recognize that the measure may be included in the monitoring plan if the parties so desire, based on monitoring results.
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, but we recognize that the measure may be included in the monitoring plan if the parties so desire, based on monitoring results
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	\$136,700	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 Threatened, Endangered, and Sensitive Species Management Plan
Interior-79	Develop and implement IWHP and WMMP, including establishment of pre-dam baseline conditions.	Yes	\$1,026,700	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	\$10,500	Adopted, except that nest survey area would be extended, and the number of winter surveys would be reduced
Interior-82	As part of Threatened, Endangered, and Sensitive 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 Threatened, Endangered, and Sensitive Species Management Plan, implement measures to protect southern Idaho ground squirrel.	Yes	\$1,200	Adopted

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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
Interior-85	As part of Threatened, Endangered, and Sensitive 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
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
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	Adopted (component of measure 110P)

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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
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 total dissolved gas-abatement structures on Hells Canyon dam.	Yes	\$407,600	Adopted
NMFS-11	Construct total dissolved gas-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 at Pahsimeroi hatchery.	Yes	\$690,300	Adopted

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NMFS-13g	Monitor and evaluate hatchery performance at Niagara Springs hatchery.	Yes	\$46,200	Adopted
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	Provide funding to develop and implement Hatchery Genetic Management Plans and hatchery program evaluations	No <sup>b</sup>	\$66,700	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, b, c, and f	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. Fund an aquatic resources committee to evaluate and prioritize projects and redirect funding if necessary to achieve water quality and egg-to-fry survival goals.	No, no nexus to project	\$9,278,400	Not adopted
NMFS-14d	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 sites downstream of Bliss, C.J. Strike, and Swan Falls dams
NMFS-14e	Fall Chinook incubation survival monitoring upstream of Brownlee reservoir.	Yes	\$20,000	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-15	Measure flows and ramping rates within 1 mile downstream of Hells Canyon dam.	Yes	\$10,000	Not adopted <sup>b</sup> , but flow gaging plan will be developed to implement flow and water quality monitoring within 5 miles of Hells Canyon dam
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)
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

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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
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, except that construction would occur after trigger criteria specified in Interior's modified fishway prescription have been attained.
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>c</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)

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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)
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>h</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

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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 Interior's modified fishway prescription.
ODFW-25a	Implement monitoring and evaluation program for Pahsimeroi hatchery.	Yes	\$46,200	Adopted
ODFW-25b	Implement monitoring and evaluation program for Oxbow hatchery.	Yes	\$46,200	Adopted
ODFW-25c	Implement monitoring and evaluation program for Niagara Springs hatchery.	Yes	\$46,200	Adopted
ODFW-25d	Implement monitoring and evaluation program for Rapid River hatchery.	Yes	\$46,200	Adopted
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

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-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).
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

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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	Adopted
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	Adopted
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	Adopted, with the exceptions identified for measures ODFW-43 and ODFW-44, described below.
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	Adopted, except Idaho Power would be responsible only for the collection of samples for analysis by others.

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ODFW-44	Provide a minimum of \$100,000 annually to fund water quality and habitat improvement measures elsewhere in the basin to aid in sturgeon recovery	No, no nexus to project	\$100,000	Not adopted. Although we do not adopt the specific funding level recommended by ODFW, we adopt numerous other measures that would improve water quality conditions and improve sturgeon habitat in the project area (measures 4P, 5P, 103–109P, and 8Pc).
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	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	Adopted
ODFW-48	Monitor genotypic frequencies of white sturgeon between Shoshone Falls and Lower Granite dams.	No <sup>c</sup>	\$2,300	Adopted, except that monitoring of genotypic frequencies upstream of Swan Falls dam is not included because this is addressed in license articles for Idaho Power's upstream projects.
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)
ODFW-50	Monitor warmwater fish populations including sampling techniques appropriate for monitoring catfish abundance (recommendation modified during 10(j) meeting).	Yes	\$250,000	Adopted

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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 gravel augmentation would occur only if adverse effects on fall Chinook production occur.
ODFW-54a	Develop total dissolved gas-abatement plan.	Yes	\$2,200	Adopted
ODFW-54b	Monitor effectiveness of total dissolved gas-abatement measures.	Yes	\$14,100	Adopted
ODFW-54c	Construct total dissolved gas-abatement structures on Hells Canyon dam.	Yes	\$407,600	Adopted
ODFW-54d	Construct total dissolved gas-abatement structures on Brownlee dam.	Yes	\$354,700	Adopted
ODFW-54e	Construct total dissolved gas-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, except that ODEQ and IDEQ would be responsible for analyzing bioaccumulants in samples collected by Idaho Power.

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ODFW-58	Develop and implement a plan to monitor temperature, total dissolved gas, 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; included in IPC-90
ODFW-60	Establish a Terrestrial Resources Work Group, with pre-defined roles, responsibilities, and schedules.	No <sup>c</sup>	\$12,500	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	\$58,600	Adopted, with ODFW-recommended capital cost, Idaho Power-proposed annual O&M funding.
ODFW-63	Enhance low-elevation riparian habitat and participate in mountain quail projects for 5 years.	Yes	\$9,600	Adopted
ODFW-64	Develop and implement Bald Eagle Management Plan and enhance eagle habitat.	Yes	\$10,500	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 Threatened, Endangered, and Sensitive Species Management Plan
ODFW-66	Control and monitor exotic and invasive vegetation, and establish a Cooperative Weed Management Area.	Yes	\$136,100	Adopted
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

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-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.

EPAct provides parties to this licensing proceeding the opportunity to propose alternatives to preliminary conditions. In the draft EIS, we included in the Staff Alternative 19 of Idaho Power’s 23 alternative conditions. Both Interior and the Forest Service submitted modified conditions. In its comments on the draft EIS, Idaho Power recommended that we adopt the modified conditions as filed by Interior and the Forest Service. Table 109 summarizes our position on the modified conditions.

Table 109. Interior and Forest Service modified 4(e) conditions for the Hells Canyon Project.  
(Source: Staff)

4(e) Conditions	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
2. Prepare a report documenting and/or evaluating measures for the protection and use of BLM lands	Interior-2	\$5,000	Yes
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	Yes
6. Develop and implement an integrated Comprehensive Recreation Management Plan	Interior-6	\$7,600	Yes.
7. Develop and implement a Litter and Sanitation Plan	Interior-7	\$66,800	Yes
8. Develop and implement a Project Boat Moorage Plan	Interior-8	\$5,000	Yes.
9. Develop and implement a Site Enhancement Plan for BLM’s Airstrip, Bob Creek Section C, and Westfall sites	Interior-9	\$4,600	Yes.
10. Develop and implement a Swedes Landing Enhancement Plan	Interior-10	\$5,000	Yes
11. Develop and implement a Spring Recreation Site Enhancement Plan	Interior-11	\$5,000	Yes

4(e) Conditions	Agency	Annualized Cost	Included in Staff Alternative? <sup>a</sup>
12. Develop and implement a Steck Recreation Site Enhancement Plan	Interior-12	\$3,800	Yes.
13. Develop and implement a Jennifer's Alluvial Fan Site Enhancement Plan	Interior-13	\$9,800	Yes
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.
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
18. Develop and implement a Low Water Boat Launch Plan	Interior-18	\$5,000	Yes
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	\$545,100	Yes
23. Prepare an Integrated Wildlife Habitat Program and a Wildlife Mitigation and Management Plan	FS-5	\$25,000	Yes
24. Prepare and implement a Land Acquisition and Management Program	FS-6	\$160,500	Yes
25. Prepare an Integrated Weed Management Plan	FS-7	\$30,500	Yes
26. Prepare a Threatened and Endangered Species Management and Monitoring Strategy	FS-8	\$100	Yes
27. Prepare and implement a Sensitive Species Management Plan	FS-9	\$62,500	Yes

4(e) Conditions	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	\$1,200	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 inspection 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
37. Extend boat ramps on Hells Canyon reservoir if needed to provide reasonable public access under proposed operations.	FS-19	\$100,000 total one-time cost	Yes
38. Perform trail maintenance on nine 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 exclude restroom and measures that could compromise security.

4(e) Conditions	Agency	Annualized Cost	Included in Staff Alternative? <sup>a</sup>
41. Condition 23 in draft EIS (design standards and landscaping) has been incorporated into FS-24	FS-23	NA	NA.
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. Included in Idaho Power's proposed measure 75P.
43. Finalize and implement the Historic Properties Management Plan	FS-25	\$800	Yes
44. Provide Forest Service with a map and aerial photos depicting the approximate location of the project boundary in a form compatible with the Forest Service GIS	FS-26	\$2,000	Yes.
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.

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

<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 47 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**

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.

Bureau of Land Management. 1988. Cascade Resource Management Plan. Department of Interior. Boise, Idaho. July 1, 1988.

Bureau of Land Management. 1983. Lower Salmon River Recreation Area Management Plan. Department of the Interior. Boise, Idaho. May 1983.

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.

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

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

Bureau of Land Management. 1993. Wallowa and Grande Ronde Rivers Final Management Plan. Department of the Interior, Baker, Oregon. December 1993. Chapters 1 – 3.

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

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

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

- 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 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.

By letter dated August 1, 2006, we requested formal consultation with NMFS on the four Snake River ESUs and their critical habitat (letter from T. Welch, Chief, Hydro West Branch 2, Commission, Washington, DC, to K. Kirkendall, FERC Coordinator, NMFS, Portland, OR). We also requested concurrence with our "not likely to adversely affect" determinations on the nine other Columbia River salmon and steelhead ESUs. In its comments on the draft EIS, NMFS did not concur with our determinations for the Columbia River ESUs and indicated that formal consultation would not be initiated because of insufficient information, incorrect baseline, and lack of a defined proposed action. On August 1, 2006, we requested formal consultation with FWS on the bull trout and its critical habitat, as well as the bald eagle. We also requested concurrence with our "not likely to adversely affect" determinations on the MacFarlane's four-o'clock, Spalding's catchfly, gray wolf, and northern Idaho ground squirrel. By letter dated August 31, 2006, FWS indicated that the draft EIS did not meet the information requirements for initiation of formal consultation and that the action alternative was not adequately described (letter from J.L. Foss, Field Supervisor, Snake River Fish and Wildlife Office, FWS, Boise, ID, to M.R. Salas, Secretary, Commission, Washington, DC).

Table 110 shows our determinations regarding the effect of relicensing the Hells Canyon Project on federally listed species. Table 110 also summarizes the basis for our effect determinations. We will request formal consultation with NMFS on all 13 listed ESUs of Snake and Columbia River salmon, and their critical habitat, and with FWS on MacFarlane’s four-o’clock and Spalding’s catchfly,<sup>135</sup> as well as bull trout.<sup>136</sup> We will also request concurrence from FWS with our findings for the gray wolf and northern Idaho ground squirrel. This final EIS will serve as our biological assessment.

Table 110. 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
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	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
Middle Columbia River steelhead ( <i>O. mykiss</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.

<sup>135</sup> In the draft EIS, we concluded that relicensing the project with our recommended measures was “not likely to adversely affect” MacFarlane’s four-o’clock or Spalding’s catchfly. We have modified our findings for these species to “likely to adversely affect” in light of the need for further surveys prior to conducting any ground-disturbing activities.

<sup>136</sup> As discussed in section 3.8.1.14, FWS announced a decision to remove the bald eagle from the list of threatened and endangered species, effective 30 days following publication in the Federal Register (FWS, 2007a). Consequently, there is no longer a need to complete formal consultation for this species.

<b>Species</b>	<b>Species Status</b>	<b>Species Finding</b>	<b>Critical Habitat Finding</b>	<b>Basis for Determination</b>
Upper Columbia River steelhead ( <i>O. mykiss</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
Lower Columbia River Chinook salmon ( <i>O. tshawytscha</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
Columbia River chum salmon ( <i>O. keta</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
Lower Columbia River coho salmon ( <i>O. kisutch</i> )	Threatened	Likely to adversely affect	None designated	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
Lower Columbia River steelhead ( <i>O. mykiss</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
Upper Willamette River Chinook salmon ( <i>O. tshawytscha</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
Upper Willamette River steelhead ( <i>O. mykiss</i> )	Threatened	Likely to adversely affect	Likely to adversely affect	Continued potential for beneficial and adverse effects of flood control operations on water quality and quantity during juvenile migration.
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

Species	Species Status	Species Finding	Critical Habitat Finding	Basis for Determination
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	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 because not all lands surveyed.
Spalding's catchfly ( <i>Silene spaldingii</i> )	Threatened	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 because not all lands surveyed.
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.
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.

Species	Species Status	Species Finding	Critical Habitat Finding	Basis for Determination
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Delisted, monitor species	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 and Subbasin Plan 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 most of the objectives of the Columbia River Basin Fish and Wildlife Program and would contribute toward achieving the program's objectives. Measures to reduce total dissolved gas, enhance dissolved oxygen, maintain stable flows during fall Chinook salmon spawning, and minimize the risk of stranding, as well as the provision for flow augmentation water during the fall Chinook salmon outmigration, would assist with meeting the Program objectives of halting declining trends in salmon and steelhead populations above Bonneville dam and allowing for the recovery of fish and wildlife affected by the hydrosystem that are listed under the Endangered Species Act. The tributary enhancement program and planting surplus spring Chinook salmon and steelhead to provide forage for bull trout would contribute to the Program objective of restoring healthy ecosystems and watersheds. In addition to the measures listed above, which would contribute to halting declining trends in salmon and steelhead, development of a new facility on the Yankee Fork to collect, spawn, and incubate steelhead or Chinook salmon eggs and developing a plan to use surplus hatchery salmon and steelhead to provide ceremonial and subsistence fisheries for the Shoshone-Paiute and Burns Paiute tribes would assist with meeting the Program objective of providing abundant opportunities for tribal trust and treaty right harvest and for non-tribal harvest. The Staff Alternative does not include measures that would directly address the Program objective of restoring the widest possible set of healthy, naturally reproducing populations of salmon and steelhead; to reintroduce anadromous fish into blocked areas. However, we include several measures that would help to restore and monitor the condition of upstream habitat. In addition, construction of passage facilities on one or more tributaries should assist with the restoration of anadromous fish to areas upstream of and within the project area in the future when habitat is suitable and the concerns of other stakeholders have been addressed through the development of a comprehensive reintroduction plan.

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 a provision to evaluate the benefits of providing flow augmentation from Brownlee reservoir 6 years after license issuance, 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.

We reviewed each of the subbasin plans that have been prepared for subbasins within the Snake River basin. The subbasin plans provide a framework within which fish and wildlife projects to be funded by the Bonneville Power Administration are selected, based on objectives and strategies

developed for each subbasin. In table 111, we list measures included in the Staff Alternative that would contribute to meeting specific objectives identified within these subbasin plans. We did not identify any measures included in the Staff Alternative that would impede the attainment of any objectives listed in these subbasin plans.

### **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 area on the date of designation of a river as a component of the national wild and scenic rivers system.

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 powerboat wakes and variable releases from the Hells Canyon dam, appears to contribute to sandbar and shoreline erosion downstream of the project. The Forest Service, in its preliminary section 7(a) determination and report filed on January 26, 2006, determined that the continued degradation of sandbars under Idaho Power's proposed operations would adversely affect the scenic, recreational, fish, and wildlife values of the river. The Forest Service also made a preliminary determination that the continued depletion of sand beaches and bars would result in the complete elimination of that resource by the end of a new license period, which would rise to the level of "unreasonable diminution" of scenic and recreational values. The Forest Service specified development of a sandbar maintenance and restoration plan (FS-4) to avoid unreasonably diminishing these values. In the draft EIS, we did not include FS-4 in the Staff Alternative because we considered the small additional sand restoration program to not be worth the potential adverse effects of sand-delivery barges on recreational boating and wildlife. Based on comments on the draft EIS, however, we reevaluated our recommendation and now include FS-4 in the Staff Alternative. Implementation of FS-4 would help restore some of the sand currently trapped by the dams and would assist in replenishing the sandbars that are an important component of the river's scenic and recreational attributes.

Overall, the environmental measures included in the Staff Alternative would help improve water quality passing through the project by increasing dissolved oxygen levels, allowing pesticides and other pollutants to break down in the upper reaches of Brownlee reservoir, and reducing elevated total dissolved gas levels. These measures would help improve water quality in the Wild and Scenic reaches.

Table 111. Measures included in the Staff Alternative relevant to objectives of Columbia River Fish and Wildlife Program subbasin plans. (Source: Staff)

<b>Number</b>	<b>Measure Name</b>	<b>Relevant Staff Alternative Measures</b>
<b>Middle Snake (Shoshone Falls to Hells Canyon Dam)</b>		
1a	Restore aquatic ecosystems and user opportunities impacted by the loss of anadromous fish components.	8P, 11P, 103S, 104S
2a	Achieve white sturgeon population recovery to levels identified in table 5 in the subbasin plan.	11P, 106S
3a	Ensure continued existence of high density (core) redband trout populations.	8P
3b	Ensure continued existence of moderate or low density redband trout (satellite) populations.	8P
4a	Maintain and increase bull trout distribution and abundance (greater than or equal to 500 adults) within Indian and Wildhorse creeks.	8P
4b	Reduce and prevent impacts of brook trout on bull trout where they exist, especially within the Indian Creek drainage	8P
5a	Increase mountain whitefish productivity and production to desirable levels within 15 years through habitat improvements	8P
9a	Support freshwater mollusk conservation and recovery through habitat restoration, ground and surface water conservation, and continued research of environmental factors limiting mollusk growth, survival, and reproduction.	8P
10a	Increase understanding of the composition, population trends, and habitat requirements of the terrestrial communities of the middle Snake subbasins.	12P, 14P, 19P, 12S
11a	Restore flows in limited reaches	8P
11b	Reduce water temperature to meet needs of aquatic focal species	8P, 109P
11c	Reduce instream sedimentation to meet water quality standards	8P
11d	Coordinate with TMDL process to support nutrient reduction efforts in 303 (d) listed stream segments affecting ESA listed or focal species.	4P
11e	Reduce number of artificially blocked stream miles by 2019 to increase fish access to habitat, while screening diversions that negatively affect listed or focal species	8P
11f	Improve aquatic habitat diversity and complexity in tributary systems where focal species populations are limited	8P
12a	Protect existing quality, quantity, and diversity of native habitats.	12P, 13P, 14P, 15P,

<b>Number</b>	<b>Measure Name</b>	<b>Relevant Staff Alternative Measures</b>
		17P, 19P, 14S, 15S
12b	Reduce extent and density of established noxious weeds and invasive exotics.	12P, 15P, 17P, 18P, 20P
14a	Manage grazing to reduce impacts on the aquatic and terrestrial communities in the subbasin. Protect and restore riparian, wet meadow, and native upland habitats.	12,P, 15P, 17P, 14S, 15S
14b	Reduce conflicts between livestock and native wildlife, fish, and plant populations.	72P
16a	Protect mature pine/fir forest habitats.	12P, 15P, 17P, 15S
17a	Protect existing shrub-steppe habitats from additional fragmentation and degradation. Prevent the additional loss of shrub-steppe habitats. Restore areas important for focal species	12P, 15P, 17P, 15S
18a	Protect remaining native grassland remnants.	12P, 15P, 17P, 15S
18b	Restore historic native grassland habitat to natural conditions.	12P, 15P, 17P, 15S
19b	Protect, enhance or restore riparian habitats.	12P, 13P, 14P, 15P, 17P, 11S, 14S, 15S
22a	Protect and foster cultural uses of natural resources in the Middle Snake subbasins.	103S
<b>Bruneau</b>		
7a	Within the next 10 years, increase riparian cover and stream shading in high-priority restoration hydrologic unit codes to levels consistent with the proper functioning condition and site capability. These levels vary, but in small to medium-sized streams (i.e., those measuring less than 5 meters in width), shading should equal between 60 and 80% (Zoellick, 2004).	109P
<b>Owyhee</b>		
There are no adopted measures or project effects applicable to objectives stated in this subbasin plan.		
<b>Malheur</b>		
5	Mitigate for the loss of anadromous fish species in the Malheur Subbasin through substitution programs that emphasize the long-term sustainability of native resident fish in native habitats wherever possible.	103S
<b>Boise, Payette and Weiser</b>		
There are no adopted measures or project effects applicable to objectives stated in this subbasin plan.		

<b>Number</b>	<b>Measure Name</b>	<b>Relevant Staff Alternative Measures</b>
<b>Burnt/Powder</b>		
1	Improve riparian, floodplain and wetland habitats	8P, 12P, 14P, 15P, 17P, 14S, 15S
2	Improve stream channel processes.	8P
3	Improve Water Quality (temperature, dissolved oxygen, chemical pollutants, biological pollutants, pH, turbidity).	4p, 8P, 109P
4	Improve habitat connectivity and fish passage.	8P
<b>Snake River Hells Canyon (Hells Canyon dam to the Clearwater River)</b>		
1a	Ameliorate negative impacts from operations of the Hells Canyon Project	3P, 4P, 5P, 6P, 7P, 103P, 105P, 106P, 107P, 108P, 109P, 4S, 9S, 101S, 102S, 105S, Operational measures 1, 2, 3 and 5
2a	Increase smolt-to-adult return rates of naturally produced spawning adults to at least 4 to 6% for spring Chinook salmon, 3% for fall Chinook salmon, and 4% for steelhead, as measured at Lower Granite dam, to increase natural production and harvest of fish populations.	4P, 5P, 6P, 103P, 105P, 106P, 107P, 108P, 109P, 4S, 9S, 10S, 101S, 102S, Operational measures 1, 2, and 3
4a	Increase understanding of the composition, population trends, interspecies interactions, habitat requirements, ecosystem processes, and impacts of management activities on terrestrial communities of the Snake Hells Canyon subbasin.	18P, 19P, 21P, 12S
5a	Maintain and enhance populations of focal, sensitive, and threatened and endangered species in the subbasin.	15P, 19P, 21P, 12S, 15S
6a	Mitigate the negative impacts of Hells Canyon Dam on terrestrial species and habitats.	12P, 14P, 17P, 19P, 21P, 11S, 12S, 14S, 15S
8a	Restore natural flow regime that supports and meets the life history needs of aquatic species in the subbasin.	Operational measures 1, 2 and 3
8b	Provide temperature regimes that meet the life stage specific needs of aquatic focal species.	109P

<b>Number</b>	<b>Measure Name</b>	<b>Relevant Staff Alternative Measures</b>
9a	Protect the existing quality, quantity and diversity of native plant communities providing habitat to native wildlife species by preventing the introduction of noxious weeds and invasive exotic plants into native habitats.	18P, 21P
9b	Reduce the extent and density of established noxious weeds and invasive exotics.	18P, 21P
11a	Protect and restore riparian habitats.	11S
<b>Clearwater</b>		
A	Increase the number of naturally spawning adults to achieve goals in table 3 in the subbasin plan within 24 years (timeline is consistent with the Council's Fish and Wildlife Program). This should amount to 4–6% smolt-to-adult return rate for spring-summer Chinook salmon, 3% for fall Chinook salmon, and 4% for steelhead as measured at Lower Granite dam, within next 24 years.	Operational measures 1 and 2
R	Develop an increased understanding of the thermal impacts of Dworshak dam operations on life history characteristics of fall Chinook salmon, other fishes, and associated wildlife species in downstream reaches, and reduce negative impacts by 2010.	Operational measure 2
<b>Imnaha</b>		
There are no adopted measures or project effects applicable to objectives stated in this subbasin plan.		
<b>Salmon</b>		
1a	1A: Increase the number of naturally spawning adults to achieve recovery goals in table 6 in the subbasin plan within 24 years (timeline is consistent with the Northwest Power and Conservation Council's Fish and Wildlife Program). This should amount to 4–6% smolt-to-adult return rate for spring-summer Chinook salmon, 3% for fall Chinook salmon (minimum), 4% for sockeye salmon (minimum), and 4% for steelhead (minimum) as measured at Lower Granite dam and in the tributaries.	5P, 105P, 106P, 107P, 108P, 109P, Operational measures 1 and 2,
1b	1B: Achieve goals defined in table 6 in the subbasin plan for the Salmon subbasin through the application of artificial propagation programs. Minimize short- and long-term genetic, ecological, and life history effects on wild populations.	104S
65a	65A: Protect and foster both Indian and non-Indian cultural uses of natural resources in the Salmon subbasin.	104S
<b>Grande Ronde</b>		
There are no adopted measures or project effects applicable to objectives stated in this subbasin plan.		
<b>Lower Snake</b>		
There are no adopted measures or project effects applicable to objectives stated in this subbasin plan.		

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.

We conclude that implementation of the Staff Alternative would not invade or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area on the date of designation of the Snake River downstream of Hells Canyon dam as a component of the National Wild and Scenic Rivers System.