

## EXECUTIVE SUMMARY

This final environmental impact statement (EIS) for relicensing the Hells Canyon Hydroelectric Project has been prepared by the staff of the Federal Energy Regulatory Commission (Commission or FERC) to fulfill the requirements of the National Environmental Policy Act (NEPA); the Commission's implementing regulations under Title 18, Code of Federal Regulations (CFR), Part 380; and the Council on Environmental Quality regulations for implementing NEPA (40 CFR Parts 1500–1508). The purpose of this document is to inform the Commission, the public, and the various federal and state agencies, tribes, and non-governmental organizations about the potential environmental effects of the proposed project and its reasonable alternatives.

The Commission must decide whether to relicense the Hells Canyon Project and, if so, what conditions to place on any license issued. In deciding whether to authorize the continued operation of the hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (e.g., flood control, irrigation, and water supply), the Commission must give equal consideration to the purposes of energy conservation; the protection of, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality. This final EIS evaluates the potential natural resource benefits, environmental effects, and economic costs associated with granting a new FERC license for the Hells Canyon Project. The alternatives examined include the following: (1) No Action; (2) Idaho Power's Proposal; (3) the Staff Alternative; and (4) the Staff Alternative with Mandatory Conditions, which includes conditions required by agencies under section 18 and section 4(e) of the Federal Power Act and section 401 of the Clean Water Act.

### **Idaho Power's Proposal**

On July 21, 2003, Idaho Power Company (Idaho Power or Applicant) filed an application for license with the Commission for a new license for the Hells Canyon Project, located on the Snake River in Washington and Adams counties, Idaho, and Wallowa and Baker counties, Oregon. The current license expired on July 31, 2005, and the project is operating under an annual license.

The Hells Canyon Project consists of three developments (dams, reservoirs, and powerhouses) on the segment of the Snake River forming the border between Idaho and Oregon. The three developments are Brownlee, Oxbow, and Hells Canyon, which, combined, provide 1,167 megawatts (MW) of power generating capacity.

The Hells Canyon Project is Idaho Power's largest power generating resource, providing approximately 70 percent of Idaho Power's annual hydroelectric generation and about 40 percent of the company's total annual generation. With extensive reservoir storage capacity at the Brownlee development, the Hells Canyon Project provides the major portion of Idaho Power's peaking and load-following capability. In the absence of the Hells Canyon Project, Idaho Power's estimated requirements for new power generating resources over the 2004–2013 planning horizon would more than double to 2,143 MW, and we conclude in this final EIS that there is a continuing need for the project's power generating capacity.

Specifically, Idaho Power's Proposal has four aspects:

1. Continuing to operate and maintain the existing project facilities, which consist of the following:
  - The Brownlee development, completed in 1958, with facilities that include: (1) a 1,380-foot-long, 395-foot-high, clay-core, earth and rockfill dam; (2) an impoundment

approximately 57 miles long with a surface area of 14,621 acres and a total volume of 1,420,062 acre-feet; and (3) a reinforced concrete powerhouse containing five vertical Francis turbine generators, having a combined rated capacity of 585.4 MW.

- The Oxbow development, completed in 1961, with facilities that include: (1) a 960-foot-long, 209-foot-high, clay-core earth and rockfill dam; (2) a 12-mile-long impoundment, with a surface area of 1,150 acres and a total volume of 58,385 acre-feet; (3) a reinforced concrete powerhouse containing four vertical Francis generators, having a combined rated capacity of 190 MW; and (4) a 2-mile-long bypassed reach during low-flow conditions.
  - The Hells Canyon development, completed in 1967, with facilities that include: (1) a 910-foot-long, 330-foot-high, cast-in-place concrete gravity dam with integral spillway, intake, and powerhouse sections; (2) a 25-mile-long impoundment, with a surface area of 2,412 acres and a total volume of 167,720 acre-feet; and (3) a reinforced concrete powerhouse constructed against the downstream face of the dam, containing three vertical Francis generators, having a combined rated capacity of 391.5 MW.
  - One 19-mile-long, 69-kilovolt transmission line (transmission line 945) running from the Oxbow switchyard to the Pine Creek substation and then to the Hells Canyon substation.
  - Four fish hatcheries and three adult fish traps.
  - Idaho Power-owned recreational facilities, including: (1) Woodhead Park, (2) McCormick Park, (3) McCormick overflow, (4) Old Carters Landing, (5) Hibbards Landing, (6) Copperfield Park, (7) the Copperfield boat launch, (8) Hells Canyon Park, (9) Airstrip B, and (10) several informal camping and access sites.
2. Continuing to operate the project under essentially the same constraints as those that characterize current operations. The project is currently operated to optimize its power and energy production value, subject to compliance with license requirements, flood control mandates, and certain discretionary criteria adopted by Idaho Power. Because most of the usable reservoir capacity in the Hells Canyon Project is contained in the reservoir farthest upstream (Brownlee), operations of all three powerhouses and dams are driven by operations at the Brownlee development. In summary, typical Brownlee operation over the course of a year consists of the following:
- Starting in mid-January, Brownlee reservoir is drafted (lowered), under the direction of the U.S. Army Corps of Engineers (Corps), to provide storage space for springtime flood waters.
  - The reservoir refills in late spring, and Idaho Power tries to achieve a near-full condition [elevation 2,069 feet mean sea level (msl)] by early June, while maintaining releases from Hells Canyon dam sufficient to keep the river downstream of Hells Canyon dam above the target flow selected the previous fall for protection of fall Chinook salmon spawning and incubation.
  - Once the reservoir refills, Idaho Power initiates a 30-day period of stable water levels for protection of Brownlee resident fish spawning.
  - During July, Idaho Power typically tries to keep Brownlee reservoir nearly full throughout the month to conserve storage for August, which usually has an above-average monthly system power load, lower market energy availability, and higher average market energy prices. High reservoir levels are also advantageous for

reservoir-oriented recreation activities. During August, Idaho Power typically drafts Brownlee reservoir to meet system power loads.

- During late August and through September, Idaho Power adjusts Brownlee reservoir’s draft rate so as to be able to achieve the necessary starting elevation for the fall Chinook program. This starting elevation ensures a stable spawning flow during the spawning period and a nearly full reservoir at the end of the spawning period around the first week of December.
  - Beginning in mid-October and lasting through early December, Idaho Power maintains a constant outflow from the project, normally between 8,000 and 13,000 cubic feet per second (cfs), to ensure that fall Chinook construct their redds (nests) below a certain target flow elevation.
  - Throughout the year, flows are managed to meet a year-round 5,000-cfs minimum flow and a maximum 1-foot-per-hour ramping rate at Johnson Bar, 18 miles downstream of Hells Canyon dam. Also under the current license, Idaho Power operates the project in the interest of navigation to maintain a target flow of 13,000 cfs in the Snake River at Lime Point (downstream of the Salmon River confluence at River Mile 172), at least 95 percent of the time.
3. Implementing a set of 94 environmental measures, the purposes of which include the following:
- Maintain or improve the quality of project waters;
  - Improve hatchery facilities and operations;
  - Protect fall Chinook salmon;
  - Improve the white sturgeon population;
  - Enhance native salmonid populations in project tributaries;
  - Protect resident warm-water fish;
  - Acquire and improve approximately 22,761 acres of upland and 821 acres of riparian habitat to benefit wildlife affected by project operation;
  - Control noxious weeds;
  - Protect and interpret archeological and historic resources;
  - Improve recreational sites and facilities; and
  - Improve the appearance of project facilities and minimize visual contrast.
4. Changing the project boundary to exclude 3,800 acres of federal land surrounding the reservoirs above an established reservoir elevation that Idaho Power believes are no longer needed for project purposes.

### **Staff Alternative**

After evaluating Idaho Power’s Proposal, along with terms and conditions, prescriptions, 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.”

Under the Staff Alternative, the project would be operated as proposed by Idaho Power, but with the following additional operational constraints:

- Stricter reservoir refill targets after the flood control season;
- Releases from the project to augment downstream flows for the purpose of enhancing juvenile fall Chinook salmon migration conditions;
- Additional ramping restrictions during the fall Chinook salmon rearing period;
- An 8,500-cfs minimum flow downstream of Hells Canyon dam in medium-high and extremely high water years; and
- Warmwater fish spawning protection levels in Brownlee reservoir;

In addition to the foregoing operation-related measures, the Staff Alternative incorporates most of Idaho Power's proposed environmental measures, but with certain modifications. The Staff Alternative also includes 35 environmental measures additional to those proposed by Idaho Power. In recognition of the substantial cumulative effects that Idaho Power's mid-Snake and Hells Canyon projects have had on fisheries upstream of the project, including the elimination of anadromous fish runs upstream of Hells Canyon dam, numerous measures to benefit resident and anadromous fisheries are included in the Staff Alternative. Measures that are focused on enhancing fisheries downstream of the project include providing flow augmentation water from Brownlee reservoir to benefit outmigrating juvenile fall Chinook salmon, continued management of flows to benefit spawning and incubating fall Chinook salmon, restricted ramping rates during the fall Chinook salmon rearing season, and several measures that would improve water quality downstream of the project. Measures that would benefit resident fisheries and may contribute toward the eventual restoration of anadromous fish to habitat upstream of the project include habitat enhancement measures to be implemented in the Pine and Indian creeks and Wildhorse, Powder, and Burnt river basins; modification and improvement of the adult fish trap at Hells Canyon dam; stocking of surplus hatchery spring Chinook salmon and steelhead in Hells Canyon reservoir and construction of a monitoring weir at Pine Creek; the future construction of an adult trap at Oxbow dam and weirs at Indian Creek and on the Wildhorse River; and measures designed to meet Idaho Power's share of responsibility for nutrient and temperature loads under the TMDL. Because we conclude that resolving water quality and stakeholder issues would require considerable time, we also include measures designed to support tribal ceremonial and subsistence fisheries in the near term by developing a plan to transplant surplus hatchery spring Chinook salmon and steelhead into select tributaries, constructing hatchery facilities to support the streamside incubation box program on the Yankee Fork of the Salmon River, and investigating the potential for augmenting populations of white sturgeon by implementing a conservation hatchery program.

### **Conditions and Recommendations**

Section 4(e) of the Federal Power Act gives the Secretaries of the Interior and Agriculture authority to impose conditions on a license issued by the Commission for hydropower projects located on "reservations" under the respective Secretary's supervision. See 16 U.S.C. §§ 796(2), 797(e).

In a January 26, 2006, filing with the Commission, the U.S Department of the Interior (Interior), on behalf of the Bureau of Land Management, submitted 19 preliminary terms and conditions pursuant to section 4(e). On February 27, 2006, Idaho Power filed alternative conditions, under section 241 of the Energy Policy Act of 2005 (EPAAct), for all 19 Interior preliminary conditions. In a May 15, 2006, filing, Interior withdrew six of its preliminary conditions, replacing five of them and withdrawing one without substitution. On January 3, 2007, Interior filed modified conditions numbered 1–18 pursuant to FPA section 4(e).

In a January 26, 2006, filing, the U.S. Forest Service (Forest Service) provided 27 preliminary section 4(e) terms and conditions. On February 27, 2006, also under section 241 of EPAct, Idaho Power filed alternative conditions for 20 of the Forest Service preliminary conditions. The Forest Service withdrew and replaced nine of its preliminary conditions in a filing on May 10, 2006, and withdrew and replaced a tenth preliminary condition in a June 9, 2006, filing. The remaining 10 alternative conditions were subsequently resolved in an agreement between Idaho Power and the Forest Service dated October 6, 2006. Consistent with the agreement, Idaho Power filed a statement amending its alternative conditions on October 6, 2006, and the Forest Service filed its modified conditions on November 2, 2006. For a summary of the Interior and Forest Service modified conditions, see section 2.3.1.3.

Section 18 of the Federal Power Act, 16 U.S.C. § 811, states that the Commission shall require construction, maintenance, and operation by a licensee of such fishways as the Secretaries of the U.S. Department of Commerce (Commerce) and Interior may prescribe.

In a January 26, 2006, filing, Interior (for the U.S. Fish and Wildlife Service) provided preliminary prescriptions for fishways for bull trout, and in a February 27, 2006, filing, Idaho Power, under section 241 of EPAct, presented an alternative to Interior's prescription. Interior's January 26, 2006, filing also requests that the Commission include as a license condition a general reservation of authority to prescribe fishways during the term of a new license. In its January 26, 2006, filing, Commerce (for the National Marine Fisheries Service) elected not to use its fishway authority to require fish passage at any of the project's dams, but, like Interior, requested that the Commission include as a license condition a general reservation of authority to prescribe fishways during the term of a new license. On January 3, 2007, Interior filed its modified fishway prescription. For a summary of these prescriptions, see section 2.3.1.2.

The Staff Alternative includes many measures included in Idaho Power's proposal and its application for section 401 water quality certification as well as some of the section 18 fishway prescriptions, section 4(e) conditions, section 10(j) recommendations, section 10(a) recommendations, and measures developed by the staff. We did not include measures in the Staff Alternative that we find are not justified, are unrelated to the project, or would not provide benefits over the staff-developed measures. We address all recommendations throughout this final EIS and specifically in section 5.2, *Discussion of Key Issues*.

The Staff Alternative with Mandatory Conditions includes all the measures in the Staff Alternative plus three 4(e) conditions related to recreation and land management that we do not include in the Staff Alternative because we conclude that they are not related to the project or are not Idaho Power's responsibility.

### **Other Alternatives Considered**

Under the No-action Alternative, the project would continue to operate under the terms and conditions of the existing license and of existing settlement agreements or memoranda of understanding or agreement. No new environmental measures would be implemented. We use this alternative to establish baseline conditions for comparison with Idaho Power's Proposal and the Staff Alternative, and to judge the benefits and costs of any measures that might be required under a new license.

We also considered federal takeover, issuance of a nonpower license, and project retirement, but concluded that none of these alternatives are reasonable in the context of this proceeding.

### **Project Effects**

We summarize the more significant differences between Idaho Power's Proposal and the Staff Alternative in table ES-1. Because the Staff Alternative with Mandatory Conditions is so similar to the Staff Alternative, we do not list it separately in this summary table. 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.

Based on our independent analysis of the Hells Canyon Project, including our consideration of all relevant economic and environmental concerns, we select the Staff Alternative as our preferred alternative and conclude that our preferred alternative represents the best balance between developmental and non-developmental resources.

Table ES-1. 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	<p>Compared to without project conditions:</p> <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>	<p>Compared to Idaho Power’s Proposal:</p> <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	<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 (DO) concentrations in and downstream of Brownlee reservoir affecting habitat suitability for fish.</li> </ul>	<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>• DO concentrations would be slightly improved downstream of Hells Canyon dam during the flow augmentation period in extremely low flow years.</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
Effects of Environmental Measures	<ul style="list-style-type: none"> <li>• Total dissolved gas levels downstream of Brownlee dam would continue to exceed the 110-percent of saturation criterion when spill exceeds 3,000 cfs.</li> <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>• DO supplementation would improve DO 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 DO 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 DO 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</li> </ul>	<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 DO 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 DO 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>Canyon reservoirs, Oxbow bypassed reach, and the Snake River 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 and improve information</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 hatchery and genetic</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<p>on the effects of hatchery production on listed species.</p>	<p>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; (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> </ul>
<p>Effects of Other Environmental Measures</p>	<ul style="list-style-type: none"> <li>• DO 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 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 DO levels downstream of the dam, improving habitat conditions for aquatic resources, including fall Chinook salmon.</li> <li>• Reductions in total dissolved gas exceedances downstream of Brownlee, Oxbow, and Hells Canyon dams, at low and moderate spill rates, would benefit aquatic resources by reducing gas bubble trauma.</li> </ul>	<ul style="list-style-type: none"> <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 Creek, and the Wildhorse River.</li> <li>• Construction of weir and trap fishways on Pine Creek, Indian Creek and the Wildhorse River would allow tracking of bull trout population trends and effectiveness monitoring of brook trout control and tributary enhancement efforts.</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<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 fish transfers.</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>	<ul style="list-style-type: none"> <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 Hells Canyon and Oxbow reservoirs by &lt;1 acre and by about 15 acres downstream of Hells Canyon dam.</li> </ul>	<ul style="list-style-type: none"> <li>• Effects on special status plants essentially the same as Idaho Power's Proposal.</li> <li>• Effects on noxious weeds similar to Idaho Power's Proposal, but slightly more weed occurrence at Brownlee reservoir and slightly less occurrence downstream of Hells Canyon dam.</li> </ul>

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Effects of Environmental Measures	<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>	<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>
	<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 continue to be managed on a case-by-case basis.</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 same as Idaho Power's Proposal.</li> <li>• Application of project-wide wildlife habitat planning would improve coordination of habitat management for lands within the project boundary compared to Idaho Power's Proposal.</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
<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>• 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>
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 white sturgeon and native resident and anadromous salmonids.</li> <li>• Development of a plan to implement the deferred study of reservoir water level fluctuation effects on cultural resources would enhance understanding of those effects and form the basis for further protective measures, if needed.</li> </ul>	<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> <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 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, construction of spawning and incubation facilities on the Yankee Fork, and potential expansion of white sturgeon measures to include stocking in project reservoirs would</li> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
<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>	<p>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> <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 protection near recreation uses.</li> <li>• Proposed changes in the litter and sanitation management program would substantially improve upon existing conditions.</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> <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> </ul>

Resource	Idaho Power's Proposal	Staff Alternative <sup>a</sup>
	<ul style="list-style-type: none"> <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>• 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 through October.</li> <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> </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 reservoir drawdowns.</li> <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> </ul>

<b>Resource</b>	<b>Idaho Power's Proposal</b>	<b>Staff Alternative<sup>a</sup></b>
Effects of Environmental Measures	<ul style="list-style-type: none"> <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>	<ul style="list-style-type: none"> <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 guidelines, and formalizing it into an aesthetic improvement management plan would improve delivery of the intended benefits.</li> <li>• Adding aesthetic improvements to Hells Canyon dam would enhance the visual experience for visitors.</li> </ul>



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