

STATE OF OREGON
PROVISIONAL STATE POSITION
HELLS CANYON COMPLEX HYDROELECTRIC PROJECT
OREGON STATE WATER RIGHT NOS. HE 161, HE 188
AND HE 189
FEDERAL LICENSE NO. 1971
March 5, 2003

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I. Introduction

In September 2002, the Idaho Power Company (IPC) submitted for public review a draft license application (DLA) to renew its Federal Energy Regulatory Commission (FERC) license (P-1971) and Oregon water right certificates HE 161, HE 188 and HE 189 for the Hells Canyon Complex Hydroelectric Project (Project) located on the Snake River in eastern Oregon and Idaho.

This document is the State of Oregon Hydroelectric Application Review Team's (HART's) provisional state position (PSP) regarding the Project's DLA. As required by Oregon law, the PSP discusses (1) whether, and under what conditions, the Oregon Water Resources Department (OWRD) should issue a water right for the Project; (2) whether the Project complies with the water quality standards identified in the Clean Water Act (CWA) § 401 Water Quality Certification and what conditions are appropriate to include in the FERC license to ensure that the Project meets these water quality standards; and (3) recommendations to FERC regarding fish and wildlife also known as 10(j) recommendations. ORS 543A.095(4).

In addition, the PSP summarizes the state's reauthorization policy, standards of review, Project benefits and impacts on resources, reauthorization issues, proposes protection, mitigation, and enhancement (PM&E) measures and considers IPC's proposed PM&E measures. Also, where there is insufficient information in the DLA for the state to comment fully on whether the Project will meet its standards, the PSP identifies those areas and requests that IPC provide more information.

II. State Agency Review of Applications for Reauthorization of Hydroelectric Water Rights

Oregon law requires affected state agencies to conduct a coordinated review of existing hydroelectric projects seeking FERC license and state water right renewal. ORS 543A.020 and 543A.115.

This coordinated review of an existing hydroelectric project, such as the HCC Project, begins when the applicant for a new license notifies the state that it will renew its FERC license and invites interested parties, such as the state, to participate in the license renewal proceeding.

A coordinated review means that the state will a) resolve any internal state agency conflicts concerning the Project by the time an applicant issues its final license application, b) fully

participate in the federal license renewal proceeding, including reviewing and commenting on the applicant's DLA and final license application, c) determine whether the Project will meet applicable state standards, and d) issue four sequential and iterative updates about whether the state supports renewal of the applicant's license throughout the federal proceeding. These updates are known as the PSP, provisional unified state position (PUSP), second provisional unified state position (SUSP) and final unified state position (FUSP) and will be discussed in further detail below.

The state's coordinated review and state positions are developed through the formation of a HART, which is made up of affected state agencies. The IPC Hells Canyon Complex HART includes the Oregon Department of Environmental Quality (ODEQ), Oregon Department of Fish and Wildlife (ODFW), OWRD, Oregon Parks and Recreation Department (OPRD), Oregon Marine Board, and the Public Utility Commission, Department of Geology and Mining Industries, and the Division of State Lands (ODSL).

Development of the state position is an iterative process and its first written statement of that position is a PSP. The PSP is published for public comment after the applicant has issued its draft license application, but before the applicant issues its final license application. The PSP receives a 30-day public comment period. Based on the comments received, the state may revise its position and issues a PUSP, generally, though not always, 160 days before the applicant issues its final license. After the applicant issues its final license application, the state prepares a second unified state position (SUSP).

The SUSP differs from a PSP and PUSP in that it also includes a draft water right proposed final order and a draft water certificate. The SUSP receives a 60 day public comment period at the same time that the draft CWA § 401 Water Quality Certificate is issued for public comment.

HART considers the public comment received on the SUSP in its development of the FUSP. The FUSP includes the CWA § 401 Water Quality Certification, Section 10(j) fish and wildlife recommendations, any other conditions recommended for inclusion in the state and federal license for the Project, as well as any additional information requests to be addressed in the federal proceeding. ORS 543A.115. The FUSP is submitted to FERC and IPC at the same time the state's Federal Power Act Section 10(j) fish and wildlife recommendations are due to FERC. The 10(j) recommendation set forth comments and recommended terms and conditions to be included in the Project's federal license regarding fish and wildlife issues. At this time, HART also prepares a proposed final order on reauthorization of the water right. The proposed final order is submitted to OWRD for final processing in accordance with ORS 543A.120 to 543A.300.

This processing of the water right by OWRD begins with a notice to all interested parties, and includes an opportunity for protest, contested case and review by the OWRD Commission. The statute also allows the final order to be amended in the following situations: (a) new information developed during the federal relicensing process pertaining to environmental impacts or assessments that reveals impacts not known at the time the proposed final order was issued; (b)

significant changes in the final application to FERC; (c) conditions and restrictions in the FERC license that are inconsistent with the water right as proposed in the proposed final order; or (d) protests received after the proposed final order is issued. ORS 543A.130(8).

III. State Policy on Reauthorization of Hydroelectric Water Rights

With regard to hydroelectric project reauthorization, it is the policy of the state to:

- a) reauthorize the use of water by existing projects, provided that such projects meet the standards established in ORS 543A.025, are consistent with other applicable state laws and will not impair or be detrimental to the public interest;
- b) recognize the existing projects have resulted in both benefits and costs to society, and that the opportunity exists on reauthorization to promote the public benefits while minimizing the public costs;
- c) maintain or enhance the natural resources of the state and to protect the natural resources of the state from adverse impacts caused by the continued existence of a project;
- d) protect the health and safety of the residents of the state; and
- e) require OWRD and other affected state agencies to conduct a coordinated review of projects seeking reauthorization in order to develop a unified state position in any local, state or federal proceedings related to the reauthorization of hydroelectric projects.

IV. Standards

State law (ORS 543A.025) defines the minimum requirements for the renewal of hydroelectric projects within Oregon and issuance of new state water rights. These standards are summarized as follows:

- Promotion, through mitigation measures, of restoration and rehabilitation of fish and wildlife to levels identified in goals, plans and policies of the Fish and Wildlife Commission.
- Consistency with any plan adopted by the Pacific Northwest Electric Power and Conservation Planning Council for fish and wildlife resources.
- Compliance with water quality standards, including full support of sensitive beneficial uses, and meeting water quality criteria and the antidegradation policy.

- Must not endanger the public health or safety.
- Protection, maintenance and enhancement of wetland and riparian resources.
- Maintenance, protection or enhancement of other existing resources, including recreation, cultural and aesthetic resources.

V. Project History

Efforts to develop the hydroelectric power potential of the Snake River's flow through Hells Canyon began in the 1930s. Much of the discussion centered on how best to maximize public benefits by making low-cost power available for agricultural and industrial development. Public power advocates favored a Bureau of Reclamation proposal to build a 600-foot high dam on the northern end of the Hells Canyon reach of the Snake River. This Project would have created a 93-mile long pool that would have extended well into what is now Brownlee Reservoir. IPC offered a proposal to construct a three dam complex on the southern edge of Hells Canyon.

A classic debate between the proponents of public and private power continued until 1955, when the Federal Power Commission issued a license to IPC for its three dam complex. Construction of the Hells Canyon Complex began in the late 1950s, with formal dedication of the entire complex occurring in May of 1968. The Hells Canyon Complex is a 1,167 megawatt, 3-dam complex on the Snake River bordering Oregon and Idaho. The HCC is comprised of Brownlee, Oxbow, and Hells Canyon dams and their associated reservoirs, which inundated 12,000 acres and 91 miles of the Snake River. The Project produces power with which to enhance the economic development of the state of Idaho, particularly through the use of electricity to pump water to hundreds of thousands of acres of agricultural land.

IPC is currently operating under FERC license P-1971 and three time-limited state water right certificates, HE 161 (Oxbow), constructed in 1961, HE 188 (Brownlee), constructed in 1958, and HE 189 (Hells Canyon), constructed in 1967. IPC owns the Project and holds the original FERC license to operate the Project.

The current FERC license expires in July 2005. IPC has been engaged with state and federal agencies, tribes, and other stakeholders in the federal relicensing process since 1996. IPC issued its Formal Consultation Package for Relicensing in January 1997. HART agencies offered comments on the FCP. Proposed final study plans were issued between June and November 1999.

Pursuant to a request by IPC in their Notice of Intent to Reauthorize dated November 10, 1999, the HART is processing IPC's application for reauthorization of the Project's water rights HE 161, HE 188, and HE 189 prior to their expiration dates of December 31, 2011, December 12, 2010 and December 31, 2017, respectively, in order to correspond with the expiration date of the Project's FERC license, P-1971, expiration date of July 31, 2005.

The HART received IPC's DLA in September 2002. In January 2003, HART agencies submitted detailed comments on IPC's DLA. These comments were prepared in response to the FERC's

requirement that IPC provide a 90-day comment period on its DLA. To review these comments go to the world wide web at "<ftp://ftp.wrd.state.or.us/pub/Publications/>" and select the document entitled "State of Oregon 01-10-03.pdf". If you have any difficulty in retrieving this document from the Internet, please call Kristen Bonanno (OWRD) at 503-378-8455, extension 306.

Presently, the HART is conducting a review of the DLA to determine if it complies with Oregon laws. As discussed above, this document is the Oregon HART's PSP for the IPC Hells Canyon Complex Project.

VI. Project Benefits

The Hells Canyon Complex is central to IPC's hydroelectric system. In an average water year, the three plants provide 70 percent of the IPC's hydroelectric generation and nearly 40 percent of the IPC's total system generation. Water storage in Brownlee reservoir also enables the Project to provide the major portion of IPC's peaking and load-following capabilities. The Project is a major factor in allowing IPC to provide reliable, relatively low-cost electric power to its customers in Idaho and Oregon. IPC serves approximately 380,000 customers in Idaho and 20,000 customers in Oregon. In favorable water years, the Project can provide excess power to the regional power grid. The Project contributes to reserve margin capabilities for the regional power grid.

The Brownlee dam has a peak generating capacity of 728 megawatts (MW) and an annual generation of 2,734,300 megawatt hours (MWh). The Oxbow Dam has a peak generating capacity of 220 MW and annual generation of 1,111,246 MWh. Hells Canyon dam has a peak generating capacity of 450 MW and annual generation of 2,319,456 MWh.

The Project serves multiple beneficial purposes throughout the year. Its primary purpose is providing a stable power source, but it is also used for flood control and recreation. Its winter and summer operations are particularly important because energy needs are highest during those seasons. In wintertime, customers need extra electricity for lighting and heating. During the summer, they need extra electricity for air conditioning and irrigation pumping.

Many recreational facilities and opportunities, as well as a variety of amenities for public use, are available throughout the Project area. Fishing, powerboating, and camping are the most common activities in the reservoir areas.

Project facilities contribute to the property tax base of several Oregon counties. In Baker County, IPC paid approximately \$650,378.43 in the 2002-2003 tax year, and is the second largest tax payer in the county. IPC paid approximately \$544,841.07 to Malheur County in the 2002-2003 tax year. IPC has the largest assessed property value and is the largest taxpayer in Wallowa County. In the 2002-2003 tax year, IPC contributed approximately \$380,001.71 to Wallowa County. IPC also paid \$14,067.16 to Union county in the 2002-2003 tax year.

The Project supports populations of non-native fish species, including crappie, bass, and catfish. These fish populations are an important part of the recreational opportunities in the Project area.

VII. Summary of Project Resource Impacts and Preliminary Conditions

Below, the Project's impacts are briefly summarized by resource area along with a summary of IPC's proposed PM&Es to address those impacts. IPC's PM&E measures are designated as "IPC A1," "IPC A2," etc., and reference the applicable resource section of this document and the specific comment number. IPC's proposed PM&Es were summarized from information that IPC provided in its DLA and are not a comprehensive listing of IPC's PM&E measures. IPC's proposed PM&Es measures are followed by HART's proposed conditions to be included in the Project's water right, CWA §401 Water Quality Certification, and 10(j) recommendations as well as its federal license. HART conditions are designated as "HART A1," "HART A2," etc, and please recognize that "IPC A1" and "HART A1," for example, are not intended to directly correspond to each other.

While HART has summarized IPC's proposed PM&Es in this PSP, at this early stage of application review, HART is still evaluating whether IPC's PM&Es are sufficient to meet state standards. Consequently, HART is not taking a position as to whether it agrees or disagrees with a particular PM&E measure proposed by IPC in its DLA. HART is also not taking a position on whether taken as a whole IPC's PM&E measures adequately address Project impacts. Moreover, HART's proposed conditions are by no means comprehensive, but just the conditions that HART has been able to identify so far in the short amount of time since the DLA was published. These proposed conditions may change as more information becomes available. At this time, no effort is being made to reconcile IPC's PM&Es with HART's proposed conditions. However, as this is an iterative process, subsequent versions of HART's position on the Project (in particular the SUSP and FUSP) will identify which IPC PM&E measures HART finds are adequate to address Project impacts and which are not as well as clarifying what additional conditions HART finds that IPC must undertake to meet state standards.

It should also be noted that HART has requested and is awaiting more information from IPC before it can finish developing its position on IPC's Project. As mentioned before, these issues are identified in significant detail in HART's comments on IPC's DLA, which can be found on the Internet at "<ftp://ftp.wrd.state.or.us/pub/Publications/>" by selecting the document entitled "State of Oregon 01-10-03.pdf." In contrast to the detailed comments described above, this PSP document only very briefly identifies those major issues.

A. FISH AND WILDLIFE RESOURCES

Impacts

The Project adversely affects fish, aquatic, terrestrial and riparian resources by conversion of historic wetland, riparian and upland habitats to reservoir habitat. It also blocks passage of fish and wildlife between riverine systems above and below the Project, causing fragmentation of fish populations and aquatic species, including anadromous fish species that historically inhabited the Pine, Powder, Burnt, Owyhee, and Malheur basins in Oregon. The loss of anadromous salmonids within and above the Project has led to the loss of marine-derived nutrients that had previously been imparted every year in the form of salmon carcasses. The Project has eliminated connectivity between white sturgeon, bull trout, redband trout and other resident fish populations above, within, and below the Project.

Construction and continued operation of the Project eliminated numerous anadromous and resident fisheries in Oregon. IPC's hatchery mitigation program does not adequately mitigate for lost natural production of anadromous fish and lost harvest opportunity for Oregon fishers.

Proposed operations at the Project significantly reduce modeled habitat for early life stages of white sturgeon across all hydrologic year types and habitat for redband and bull trout is reduced within the Oxbow Bypass and below Hells Canyon Dam.

The current minimum flow of 100 cfs in the Oxbow Bypass does not provide suitable spawning, incubation, larval, or young-of-year habitat for white sturgeon or suitable spawning and incubation habitat for native salmonids. Suitability below Hells Canyon Dam is primarily influenced by load-following operations.

The Project also intercepts intermittent and perennial streams and creeks, and intercepts sediment and gravels necessary for maintenance of sandbars, terraces, spawning beds and other features below Hells Canyon Dam. Brownlee Reservoir has trapped 9 million tons of sand-sized material. Additionally, the 94-mile Project directly intercepts sediment from several small tributaries. Water released from Hells Canyon Dam contains virtually no suspended sediment.

Current and proposed operations permanently and completely eliminate the capability of the inundation and fluctuation zones to support quality wildlife habitat and the winter range to support mule deer. Annual reservoir related mortality of mule deer is estimated to be 10% in years with mild to moderate winter conditions and 19% during winters with harsh conditions.

Dam construction inundated 12,000 acres of low elevation, critical habitat for mule deer and other wildlife including big game and upland and passerine bird species, and created in its place three large reservoirs. These reservoirs inhibit wildlife movement, particularly deer, and disrupt traditional migration routes and travel corridors between Oregon and Idaho. In addition, inundation of 12,000 acres eliminated numerous trees and bald eagle habitat. Continued inundation of this habitat and Project operations prevent tree species from regenerating and prevents vegetation

establishment. Numerous islands (75 acres), which provided waterfowl nesting and brooding habitat, were eliminated by construction and remain unavailable to wildlife.

Construction of the Project and associated parks has increased the number of visitors to the Project. Impacts to terrestrial resources occur through dispersed recreation and damage to the riparian zone, vehicle collisions with wildlife, harassment of wildlife, and lost habitat as a result of construction of parks, facilities, transmission lines, roads, and reservoirs.

Operation and Maintenance (O&M) activities and the presence of the transmission-line system result in habitat degradation, disturbance to wildlife during sensitive periods, increased predation of birds, bird structure collisions, and bird electrocutions. O&M activities alter local patches of shrub-steppe communities and facilitate the infestation or expansion of noxious weeds along transmission-line service roads and at tower locations. Clearing of vegetation in the ROW affects vegetation composition and pattern, decreases snag and large-tree resources, and depletes downed-wood resources.

Conditions Proposed by IPC

IPC has proposed the following PM&E measures to mitigate for Project impacts. Existing measures IPC is already undertaking include IPC A1, A2, A3, A11, A12, A13, A14. The rest are new additional measures. These measures are only briefly summarized here, but discussed more fully in IPC's DLA at E.3-118 to 180 and E.3-408 to 439.

- IPC A1 Protect fall chinook during spawning and incubation periods by providing stable flows during the fall spawning period and support and participate in spawning surveys, monitor redds and water temperatures during the early fall through late spring within the upper Hells Canyon reach to determine when emergence is complete and protective minimum flows can be relaxed each spring.

- IPC A2 Operate and maintains four hatchery facilities and three adult traps to mitigate the effects of constructing and operating the Project. Provide two 5,000-gallon-capacity fish tankers trailers for transporting salmon and steelhead smolts to various release sites and three 1,000-gallon-capacity adult fish trucks for relocating adult salmon and steelhead from traps to hatchery facilities.

- IPC A3 Protect resident centrarchids during spawning periods and monitor populations.

- IPC A4 Conduct surveys in Pine and Indian creeks, modify Hells Canyon fish trap, design and construct Oxbow fish trap, enhance tributary habitat, outplants of anadromous carcasses, enhance the forage and prey base, install a permanent monitoring weir at Pine Creek, introduce fluvial bull trout, and conduct long-term monitoring and removal of brook trout in Indian Creek.

- IPC A5 Improve Pahsimeroi Fish Hatchery, including controlling pathogens, developing a

locally adapted steelhead broodstock, and monitoring and evaluating hatchery performance.

- IPC A6 Enhance Oxbow Fish Hatchery including constructing adult holding pond and spawning facilities, expanding the fall chinook rearing program, distributing carcasses, providing general upgrades to the facilities, and monitoring and evaluating hatchery performance.
- IPC A7 Improve Niagara Fish Hatchery, including expanding the hatchery building, acquiring an additional smolt tanker, upgrading employee housing, and monitoring and evaluating hatchery performance.
- IPC A8 Improve Rapid River Fish Hatchery, including constructing adult rearing pond and spawning facilities, distributing carcasses, upgrading employee housing, and monitoring and evaluating hatchery performance.
- IPC A9 Conduct stock assessments of white sturgeon populations in Snake River reaches between Swan Falls and Brownlee dams and downstream of Hells Canyon Dam every 10 years during the new license period established for the Project.
- IPC A10 Conduct a water quality assessment on early life stages of white sturgeon between Swan Falls Dam and Brownlee Dam, and translocate white sturgeon into the Swan Falls to Brownlee reach.
- IPC A11 Design and construct transmission lines for raptor protection.
- IPC A12 Feed winter big game.
- IPC A13 Conduct big game habitat improvement project.
- IPC A14 Establish a small wildlife management area adjacent to the mouth of the Powder River with ODFW and other interested parties.
- IPC A15 Acquire upland and riparian habitat.
- IPC A16 Enhance habitat on Gold Island in cooperation with the Idaho Department of Fish and Game (IDFG) and on Hoffman, Patch and Porter Islands with ODFW. Also, enhance low-elevation riparian habitat and reintroduce mountain quail in areas adjacent to the HCC reservoirs.
- IPC A17 Manage wildlife resources on lands owned by IPC which are associated with the Project.
- IPC A18 Develop and implement transmission-line operations and management plan.

Conditions Proposed by HART

The following conditions are draft ODFW Federal Power Act Section 10(j) recommendations. These 10(j) terms and conditions are the State of Oregon's recommendations to FERC on how and what IPC should be required to do in their new federal license to protect, mitigate and enhance fish and wildlife populations and their habitats affected by the Project. The 10(j) recommendations are included in Attachment 2, but the major recommended conditions are summarized below. IPC shall undertake the following measures as follows:

- HART A1 Implement Project operations that are determined through comprehensive analysis and modeling of alternative scenarios and that meet the following objectives: 1) achieve flow augmentation goals for increasing migration rates of juvenile salmon and steelhead from the Hells Canyon reach to Lower Granite Dam; 2) provide optimal habitat for spawning fall chinook salmon in the Hells Canyon reach, including protection of redds and provide rearing habitat for juvenile fall chinook; 3) optimize value of stored water delivered from upstream federal storage reservoirs for fish mitigation purposes by passing through the Project or storing in Brownlee for later release; 4) provide rearing habitat for redband trout, bull trout, and other native resident fish; 5) provide optimal habitat for spawning white sturgeon in the Hells Canyon reach including providing rearing habitat for juvenile and adult white sturgeon; and 6) manage Brownlee reservoir operations to minimize new impacts to resident fish and fishing opportunities.
- HART A2 Utilize a ramping rate of no more than 2 inches per hour below each of the three dams of the Project. The ramping rate shall apply to load following operations, as well as to Project start-up and planned Project shutdowns.
- HART A3 Discharge from the Oxbow Dam a continuous minimum flow of 5,000 cfs throughout the Oxbow Bypass during the white sturgeon spawning and incubation time period, March through June. A minimum flow of 2,000 cfs should be maintained in the Oxbow bypass from July through February to protect rearing salmonids and white sturgeon. The minimum flow shall be measured at the upstream end of the Oxbow Bypass at a location to be determined through consultation with ODFW.
- HART A4 Conduct additional study of flow:habitat relationships in the Oxbow Bypass reach, using the Instream Flow Incremental Methodology or other methodologies approved by ODFW. Collect additional flow data at 500 cfs increments between 2,000 and 5,000 cfs increments and rerun the analysis of the weighted useable areas versus discharge for all salmonid species and life stages and white sturgeon. The study shall include an analysis of habitat suitability in the powerhouse reach.
- HART A5 Involve ODFW and other state and federal fish agencies in a consensus approach to

assessing effects of Project operations, including load-following operations, on redband trout and bull trout. This evaluation should include an assessment of the behavioral changes and energetic impacts to the various species and life stages as they fluctuate flows with a load following operational scenario.

- HART A6 Involve ODFW and other state and federal fish agencies in a consensus approach to assessing effects of Project operations, including load-following operations, on white sturgeon. This evaluation should include an assessment of the behavioral changes and energetic impacts to the various life stages as they fluctuate flows with a load following operational scenario.
- HART A7 Determine the appropriateness of utilizing White Sturgeon Habitat Suitability Indices from the Columbia River for habitat assessment in the Snake River below Hells Canyon.
- HART A8 Assess the appropriateness of utilizing the juvenile fall chinook modeled developed for the mid-Columbia River for habitat assessment in the Snake River below Hells Canyon.
- HART A9 Within six months of license issuance, in consultation with state and federal agencies and tribes, prepare and begin to implement a comprehensive fish passage mitigation plan that addresses fish passage for all fish species affected by the HCC. This plan shall identify either: i) measures that IPC would implement in a phased-in approach to successfully pass fish upstream and downstream through the Project through all phases of their life cycles; or ii) alternative mitigation measures that IPC would implement in lieu of fish passage at the Project. A phased-in fish passage plan for the HCC should include the following evaluations:
- (a) Evaluate efficiency and effectiveness of adult fish collection using fish traps located at the base of each dam, including evaluation of adult movement from release sites to spawning locations in the mainstem Snake and tributaries.
 - (b) Evaluate efficiency and effectiveness of juvenile fluvial fish collection using fish traps located at the base of each dam.
 - (c) Model reservoir hydraulics to refine operations or structural changes that will assist juvenile migration through the reservoirs and Project facilities.
 - (d) Conduct physical modeling and prototype testing of alternative juvenile fish collection and turbine intake screening structures.
 - (e) Conduct and evaluate habitat restoration projects in key tributaries to increase fish habitat production potential.
 - (f) Conduct fish pathogen risk assessments to determine appropriate stocks to use for reintroduction and to monitor ongoing passage operations.
 - (g) Test releases of excess hatchery juvenile fish to monitor their movement through tributaries and reservoirs and their collection at traps and other

prototype systems. Measure survival and collection efficiency for each species and life stage tested.

- (h) As other components of the plan reach benchmarks indicating high likelihood of success, install screening and collection facilities that are determined to be most effective based on modeling and prototype testing.

- HART A10 Implement a Fall Chinook Salmon Spawning and Incubation Protection Program. This Program should ensure stable flows in the Hells Canyon reach each year beginning October 1st through emergence of larval fish from redds. Flow should not decrease below 8,000 cfs. In addition, IPC should consult with ODFW, IDFG, National Oceanic Atmospheric Administration (NOAA Fisheries) Fisheries, U.S. Fish and Wildlife Service (USFWS), and the U.S. Army Corps of Engineers to develop and refine specific details of the Fall Chinook Salmon Spawning and Incubation Program.
- HART A11 Fund and participate in annual spawning surveys and deep-water spawning surveys for Snake River fall chinook salmon. Conduct water temperature monitoring to determine timing of emergence from redds. Consult with ODFW, ODEQ, IDFG, NOAA Fisheries, USFWS to identify the locations of monitoring sites and frequency of measurement.
- HART A12 Prepare and implement a long-term, comprehensive monitoring and evaluation program for all four of its mitigation hatcheries, in coordination with ODFW. This program shall include monitoring of hatchery fish straying to natural spawning habitat.
- HART A13 Modify production goals to include adult returns and societal use, in coordination with ODFW, IDFG, and federal and tribal agencies.
- HART A14 Expand Oxbow Hatchery for fall chinook salmon broodstock collection and spawning.
- HART A15 Investigate and develop alternative fisheries in Oregon, in consultation with and approval by ODFW.
- HART A16 Implement facility upgrades and enhancements at each of IPC's four hatcheries to ensure adequate water quality, the ability to warm and chill water, and sufficient numbers of containers to separate fish into test groups.
- HART A17 Continue to collect information about Pacific lamprey that may be using tributaries below Hells Canyon Dam. Based on further analysis of Project impacts on Pacific lamprey and after consultation with ODFW and other resource agencies with management responsibilities for lamprey, implement measures to mitigate for impacts to Pacific lamprey caused by ongoing operations of the HCC. The measures

need to be consistent with Oregon's fish passage and screening statutes as well as ODFW fish management and protection administrative rules.

- HART A18 Identify and fund habitat enhancement measures in tributaries containing redband trout and bull trout within and above the HCC, in coordination with ODFW.
- HART A19 Fund measures to identify time and space barriers to bull trout and redband trout movement including water quality, in coordination with ODFW.
- HART A20 Provide mitigation for all four segments of the white sturgeon population: Swan Falls to Brownlee, Brownlee to Oxbow, Oxbow to Hells Canyon, and below Hells Canyon Dam. Mitigation should include purchasing or leasing water to improve the chances that sturgeon will spawn and survive and measures to improve water quality.
- HART A21 Conduct site-specific analysis of white sturgeon to determine potential effects of bioaccumulation of contaminants on reproductive success and recruitment, in consultation with ODFW.
- HART A22 Develop a written implementation plan that identifies measures that should be taken to mitigate for the lack of sediment transport from above the Project to the Snake River reach below Hells Canyon Dam, within six months after issuance of the new license. The plan shall incorporate all recommendations provided by the agencies during consultation.
- HART A23 If the plan developed in condition HART A22 identifies gravel augmentation as the most effective means to mitigate for the interruption of sediment transport by the Project dams, then initiate annual augmentation of bedload gravel supplies in the Snake River downstream of Hells Canyon Dam within one year of issuance of the new license. Consult with ODFW and other state and federal resource agencies to determine the quantity, quality, and timing of the gravel augmentation.
- HART A24 Develop a plan in consultation with ODEQ and IDEQ for meeting the total dissolved gas allocation for HCC. This plan should include appropriate implementation measures, a timeframe and an effectiveness monitoring plan. The overall plan should be implemented prior to receiving the new license to minimize ongoing impacts. Develop measures that will assure compliance with Oregon's 110% saturation standard below all three Projects as required by the Total Maximum Daily Load, Oregon water quality standards and the Clean Water Act.
- HART A25 Immediately consult with ODEQ and IDEQ and implement measures to improve dissolved oxygen concentrations within and below the HCC. This plan should include appropriate implementation measures, a timeframe and an effectiveness

monitoring plan. The plan should be implemented prior to receiving the new license to minimize ongoing impacts.

- HART A26 Immediately consult with ODEQ and IDEQ to develop and implement a temperature management plan. This plan should include implementation measures, a timeframe and an effectiveness monitoring plan. The plan should be implemented prior to receiving the new license to minimize ongoing impacts.
- HART A27 Conduct a study to determine mercury, Dieldrin, and DDT/DDE levels in fish in Brownlee Reservoir. This data should be used in biomagnification of analytes modeling, including bald and golden eagles as target species.
- HART A28 Conduct site-specific analysis of white sturgeon to determine potential the effects of bioaccumulation of contaminants on reproductive success and recruitment.
- HART A29 Implement water quality monitoring measures immediately in order to better inform the water quality-related PM&E measures. Work with ODEQ and IDEQ and the fisheries agencies to develop appropriate and meaningful monitoring measures.
- HART A30 Conduct a study to evaluate alternatives, including changes in Project operations, to reduce erosion below Hells Canyon Dam.
- HART A31 Establish and fund a Fish and Wildlife Habitat Mitigation Program. Early implementation of this Program shall begin as soon as possible, and credit shall be accepted for habitat mitigation prior to license issuance if the multi-agency committee described in “c” below has pre- approved such properties for this purpose. The following elements should be included in this Program:
- a) The goal of the Fish and Wildlife Habitat Mitigation Program shall be to mitigate for habitat affected by ongoing Project operations utilizing a 3:1 ratio, in which 3 acres of habitat mitigation is provided for every 1 acre that is lost by ongoing Project operations.
 - b) The Fish and Wildlife Habitat Mitigation Program shall identify dedicated funds for riparian, wetlands, and riverine lands mitigation.
 - c) The Fish and Wildlife Habitat Mitigation Program shall be implemented by IPC with guidance and approval of a multi-agency committee, comprised of representatives from fish and wildlife agencies, federal land management agencies, Native American Tribes, and IPC.
 - d) The Fish and Wildlife Habitat Mitigation Program clearly identify fish and wildlife habitat enhancement and public access for fishing and hunting as important objectives.
 - e) The Fish and Wildlife Habitat Mitigation Program shall include acquisition and holding of lands or easements by IPC that are managed to maximize wildlife habitat and include public fishing and hunting opportunities.

- f) The Fish and Wildlife Habitat Mitigation Program shall specify approved uses of the land to assure that the major goals of the program are not compromised. Compatible uses could include low impact recreation opportunities such as hiking trails and access to the river bank and wildlife habitat protection and improvement Projects. All lands acquired for conservancy purposes should have development restrictions, limiting and controlling human access and impacts.
- g) Property that contains degraded wildlife habitat may be considered if measures are included to restore the land to increase wildlife habitat.
- h) Sites for potential acquisition or conservation easements should include lands around Brownlee Reservoir, the Powder River Arm, or the Lookout Mountain or Pine Creek Management Units.
- i) Criteria for managing the Fish and Wildlife Habitat Mitigation Program shall be developed jointly by IPC and the multi-agency committee described above. Criteria should include, but not be limited to, numbers of species positively affected, habitat connectivity, habitat values, public access for fishing, hunting, observation, and proximity to other public lands or high value lands.
- j) Properties that provide protection or restoration of habitat that benefits both aquatic and terrestrial species, such as riparian habitats, shall be given priority over those that benefit single species or species types.
- k) The Fish and Wildlife Habitat Mitigation Program shall include criteria to ensure consistency with ODFW's management policies and rules.

HART A32 Develop, a Resource Management Plan for 3,450 non-flooded acres of property owned by IPC within the FERC Project boundary and for 1,850 acres within Hells Canyon but outside of the Project boundary, in consultation with ODFW and other state and federal resource agencies and Native American Tribes. The Resource Management Plan shall identify specific management priorities for IPC properties, including habitat protection and restoration. ODFW and other state and federal resource agencies and Native American Tribes shall be invited to participate in a management advisory committee to identify which properties should be managed as habitat mitigation sites, and to advise on best management practices for those properties. IPC shall begin management of its properties for habitat protection and restoration prior to receiving the new license. The Resource Management Plan shall describe ongoing maintenance and improvements needed to protect habitat values through the new license term.

HART A33 Establish and fund the Land Protection Plan and Program to include up to 53,000 acres of winter range wildlife habitat. Early implementation of this Program shall begin as soon as possible, and credit shall be accepted for properties protected prior to license issuance if the multi-agency committee has pre- approved such properties for this purpose. The Land Protection Program shall be consistent with ODFW wildlife and habitat mitigation policies and objectives.

- HART A34 Plan and conduct a study of a hard winter on wintering mule deer whenever the next hard winter occurs. The study shall assess the effect of icing on passage and direct mortality. The study shall include aerial surveys over Hells Canyon the next spring to determine fawn survival relative to adults and determine habitat use.
- HART A35 Develop and implement contingency mitigation measures that would be implemented if the study required by the HART 34A condition confirms adverse impacts to mule deer populations.
- HART A36 To reduce and avoid adverse effects of Project roads on wildlife species, IPC shall schedule O&M activities that utilize Project roads to avoid the crucial winter range during winter months and cooperate with ODFW and federal land management agencies to initiate appropriate temporary road closures if human disturbances begin to negatively affect wildlife species.
- HART A37 Develop and implement, in cooperation with ODFW, a winter big game feeding program for Oregon wildlife populations in the Project vicinity. The program shall include plans for purchasing and distributing feed.
- HART A38 Prepare, in consultation with ODFW and other wildlife agencies, a Bald Eagle Protection Plan that utilizes adaptive management techniques for determining the most effective measures for improving bald eagle habitat and productivity. The Plan should focus habitat management on protection of potential perch and nesting trees and roosting habitat. The Plan should identify opportunities to increase trees in the Project area as well as mechanisms to control human activities where they conflict with bald eagle use. The Plan should also include annual monitoring of bald eagle habitat utilization and reproductive success.
- HART A39 Develop and implement a public information and education program to inform the public about adverse effects of human disturbances on wildlife species and their habitat, in consultation with ODFW. This program shall include recommended measures that the public can take to minimize disturbances. The program shall identify strategies that IPC will implement to avoid and control human disturbances of wildlife, including bald eagle nesting disturbances and riparian habitat protection during passerine migration and nesting periods.
- HART A40 Develop a plan to avoid new impacts and mitigate for ongoing impacts to low elevation habitat and terrestrial species caused by human activities at dispersed sites on IPC-owned land.
- HART A41 Continue involvement, including funding, in the Murray wetland rehabilitation project in the Powder River Arm.

- HART A42 Pursue the acquisition of Goat Island and creation of small islands in the upper end of the Powder River arm of Brownlee Reservoir. Additionally, set aside a dedicated fund to ensure cooperative management and maintenance of habitat values on the islands over the term of the new license. Within six months of license issuance and in consultation with ODFW and IDFG, complete an Island Management Plan that will identify anticipated costs to cooperatively manage and maintain and provide wildlife habitat values over the term of the new license. Set aside the funding levels identified in the Island Management Plan, but in no case shall the annual allotment be less than \$26,000 in 2002 dollars, corrected for inflation. The fund shall be used solely for wildlife and habitat management and enhancements on the islands. Decisions regarding funding of island projects shall be made by a team comprised of representatives from ODFW, IDFG, and IPC. In addition, replace equipment and machinery on mitigation islands that no longer function effectively. For Patch Island, replace wooden barge with new construction steel barge large enough to transport tractors and equipment on and off the island for repairs and maintenance. For Patch and Porter islands, replace vintage tractors with 85 horse (or greater) tractors with loaders and cab, provide 3 or 4 bottom plows, two 10' off-set disks, two 10 or 12' drills with grass seed adapters, two harrows, two culti-packers, two 100 gallon sprayers with fill pump and hose, and two 10-12' mowers. The costs to replace failing equipment shall be in addition to the dedicated fund that IPC shall establish for wildlife and habitat management of the islands.
- HART A43 During the initial five years after license issuance, contribute up to \$20,000 each year for equipment, personnel, logistical support and expertise to cooperative restoration projects aimed at reintroducing mountain quail in the Hells Canyon area. Cooperate in an ODFW mountain quail reintroduction study by providing personnel to assist with tagging and release and to monitor radio-marked quail in Hells Canyon.
- HART A44 Repair damage to wildlife habitats caused by routine, emergency, and major O&M activities. To improve resource conditions, reduce erosion, and minimize the spread of noxious weeds, revegetate roads, structure sites, and other areas that are affected by ground-disturbing O&M activities. To reduce impacts to wildlife and to improve habitat conditions, integrate monitoring and management activities into an adaptive management program. Information from monitoring activities shall be coordinated with O&M constraints and implementation of best management practices. Develop a list of best management practices in consultation with ODFW and other natural resource agencies.
- HART A45 Develop a detailed monitoring plan and conduct active monitoring for electrocution mortalities. Modifications should be made to transmission lines if any species are reported electrocuted.
- HART A46 Implement measures to minimize risks of bird collisions with transmission lines at

known collision sites. Conduct monitoring to determine if the number of collisions decreases after mitigation measures are implemented, and modify such measures further if indicated by the monitoring. Develop a detailed plan for monitoring collisions at suspected collision sites. If a problem is detected at suspected collision sites, implement measures to minimize collisions as soon as information becomes available.

HART A47 Restrict the timing and location of O&M activities that may impact certain wildlife species and identified botanical resources during critical periods. Restrictions shall govern O&M activities that impact big game wintering range, sage and sharp-tailed grouse leks, nest sites of riparian birds, raptor nests, and bald eagle perching and roosting areas. In addition, while performing O&M, utilize methods that avoid or minimize impacts to plant species and communities.

HART A48 Include the following measures in IPC's Transmission Line O&M Plan, in consultation with ODFW:

- a) O&M activities within 0.3 mi (500 m) of active leks should be scheduled outside the sage and sharp-tailed grouse breeding seasons. In addition, rehabilitate grouse habitat that is degraded by O&M activities.
- b) Develop and implement a management plan to discourage raptor and raven nesting within 2.9 mi of active leks.
- c) O&M activities, other than patrols, that occur from November through March and that are within 0.25 mi (400 m) of roosts should be conducted from late morning to early afternoon.
- d) Major road maintenance should not occur within 0.25 mi (400 m) of bald eagle nests during the nesting period from March through July. In addition, transmission-line O&M activities that could threaten bald eagles should not occur during the nesting period.
- e) Develop a management program to avoid O&M activities, except for patrols, within 0.4 mi (700 m) of an occupied goshawk nest and within 0.5 mi (800 m) of an occupied ferruginous hawk nest from April through July.
- f) Develop a management program to minimize O&M removal of riparian habitat during April through June, the breeding season for yellow warblers.

HART A49 Develop and implement projects to enhance and restore shrub-steppe habitat to mitigate for unavoidable impacts to sage and sharp-tailed grouse. Participate in cooperative projects with ODFW and other state and federal agencies to enhance and restore shrub-steppe habitat in the Hells Canyon area.

HART A50 Monitor sage and sharp-tailed grouse lek sites within 3 km of HCC transmission lines. Consult with ODFW on acceptable methods and timing of monitoring. Inventory raptor nests that occur on transmission-line structures annually throughout the term of the license. Provide annual reports of these monitoring activities to ODFW and other wildlife agencies.

B. WETLANDS, RIPARIAN AND UPLAND HABITAT (BOTANICAL RESOURCES)

Impacts

The Project's ongoing blockage of sediments results in changes in vegetative communities. The Project has trapped a substantial amount of sediment behind all three dams, which contributes to the decline in distribution and abundance of sandbar willow (*Salix exigua*) and changes in structural and floristic characteristics of riparian habitat. The Project has significantly altered seasonal and daily discharge rates. These daily and hourly flow fluctuations and clear water releases affect aquatic, terrestrial, botanical, cultural, and recreational resources by increasing the rate of erosion of sandbars and terraces. Substantial erosion of sandbar features has occurred throughout the canyon, particularly along the upper reaches close to Hells Canyon Dam, and the number of sandbars in Hells Canyon has decreased dramatically since construction of the Project.

Current and proposed operations permanently and completely eliminate the capability of the inundation and fluctuation zones to support quality wildlife habitat and the winter range to support mule deer. Proposed operations prevent 343 acres of riparian habitat from establishing in areas of the Brownlee Reservoir shoreline zone that are currently occupied by upland habitat and impact 6,148 acres (388 acres riparian and 5,761 acres upland habitat) of wildlife habitat in the reservoir fluctuation zone. 90 acres of reservoir and river shoreline has eroded due to Project operations and other affects. Annual reservoir related mortality of mule deer is estimated to be 10% in years with mild to moderate winter conditions and 19% during winters with harsh conditions.

Conditions Proposed by IPC

IPC has proposed to undertake PM&E measures to mitigate for impacts to botanical resources. These measures are summarized below, but more detail is provided in IPC's DLA at E.3-569 – 570 and E.6-29-30.

- IPC B1 Acquire upland and riparian habitat.
- IPC B2 Participate in cooperative projects on noxious weed control.
- IPC B3 Conduct site monitoring and reseeded.

- IPC B4 Protect and monitor sensitive plant sites.
- IPC B5 Develop and implement a transmission-line O&M plan.
- IPC B6 Manage IPC's existing property in the Powder River arm for mitigation.

Conditions Proposed by HART

HART proposes that IPC shall undertake the following measures to mitigate for impacts to botanical resources as follows:

- HART B1 Develop wetlands at existing sites and include measures for off-site, in-kind mitigation for functional loss of wetlands. Existing sites can be improved by planting riparian vegetation or expanding the wetland area, and can be improved by active management, such as preventing livestock from entering those areas. Develop an expanded wetlands mitigation plan approved by HART that outlines how, and under what timelines, mitigation actions will be taken.
- HART B2 Pursue an aggressive riparian restoration and enhancement plan, in conjunction with state and federal management agencies and the Tribes. Develop a program approved by HART that includes planting trees and shrubs along riparian areas identified as suitable for riparian habitat by the resource agencies. Develop an aggressive riparian habitat acquisition program with a list of ranked areas to acquire and manage for riverine riparian habitats.
- HART B3 Develop a comprehensive evaluation of the effects of human activities on botanical resources and plant communities. The evaluation shall include proposed mitigation for these impacts. In consultation with ODFW and other federal and state resource agencies, IPC shall implement mitigation measures for these impacts.
- HART B4 Begin immediate development and implementation of a Noxious Weed Advisory Board and a Cooperative Weed Management Plan, rather than waiting until issuance of the new license. The Cooperative Weed Management Plan should be drafted in consultation with ODFW and other management agencies.

C. RECREATION

Impacts

IPC Project operations can affect access at all three Project reservoirs. Operation of the Project results in reduced or lost access at boat ramps in Brownlee Reservoir dependent on water year. Brownlee reservoir boat ramps are unusable for periods of days to weeks in the spring and fall during medium and high flow years. All developed boat ramps but Woodhead Park in Idaho are

unusable for some period during the spring and fall in medium water years and no ramps are usable in high water years during some period of the spring and fall.

Conditions Proposed by IPC

IPC has proposed to undertake the following PM&E measures to mitigate for Project impacts to recreational resources. They are summarized below, but more detail is provided in IPC's DLA at E.5-67 *et seq* and H-37 to H-42. Measures IPC C1-C7 are existing measures that IPC proposes to continue. Measures IPC C 8-C 26 are new measures.

- IPC C1 Operate flow information monitors downstream of Hells Canyon Dam.
- IPC C2 Memorandum of understanding between the USFS and IPC regarding Hells Canyon Visitors Center.
- IPC C3 Continue implementing existing plan for both litter disposal and placing portable toilets within the Project area.
- IPC C4 Continue implementing public safety program.
- IPC C5 Aid local law enforcement.
- IPC C6 Maintain IPC roads.
- IPC C7 Operate and maintain IPC-managed parks and recreation facilities.
- IPC C8 Provide boat moorage on Project reservoirs.
- IPC C9 Enhance litter and sanitation plan.
- IPC C10 Develop information and education (I&E) plan.
- IPC C11 Provide a forum and limited funds to coordinate resources among appropriate law enforcement agencies in the vicinity of the Project.
- IPC C12 Develop recreation adaptive management plan.
- IPC C13 Enhance road maintenance.
- IPC C14 Restrict public access to Redfish Cave.
- IPC C15 Develop site plan for Big Bar recreation site.
- IPC C16 Develop site plan and enhance Eckels Creek dispersed recreation site.

- IPC C17 Reconstruct Hells Canyon Park.
- IPC C18 Develop airstrip A&B dispersed recreation site.
- IPC C19 Enhance Eagle Bar dispersed recreation site, cooperation and maintenance of IPC-managed parks and recreation facilities, boat ramp and associated facilities at Big Bar D recreation site, Bob Creek Section A, B, and C dispersed recreation sites, Westfall and Copper Creek dispersed recreation site, Copperfield boat launch area, Oxbow boat launch, Carters and Old Carters Landing recreation site, Hewitt and Holcomb Parks, Swedes Landing and Spring recreation site.
- IPC C20 Reconstruct McCormick Park.
- IPC C21 Develop low-water boat launch at or near Swedes Landing.

Conditions Proposed by HART

A brief summary of HART’s proposed Project recreation PM&Es are described below. IPC shall complete the following conditions as follows:

- HART C1 Locate and develop an additional boat launch site on the Oregon side of Hells Canyon Reservoir, perhaps in the vicinity of Copper Creek and/or the Westfall site. In addition, an additional boat launch site on the Oregon side of Brownlee Reservoir, perhaps in conjunction with the Bob Creek area should be located and developed.
- HART C2 Develop a low-water boat launch on Brownlee Reservoir, at or near the Swede’s Landing site. As proposed in the DLA, redevelop boat launching and support facilities at the Spring Recreation site. Maintain and periodically replace boat launching and support facilities at Hewitt and Holcomb Parks on Brownlee Reservoir.
- HART C3 Design and install a breakwater or similar protection measures to protect the public and the facilities at the boat launch area in Farewell Bend State Park and evaluate and implement measures to prevent further bank erosion along the park’s lake frontage and restore shoreline vegetation and habitat. Undertake periodic replacements of floats and piles, resurfacing and replacement of ramps and parking areas and upgrade or install sanitation related facilities like restrooms, septic system, dump station, fish cleaning station and potable water treatment. Provide additional opportunities for water based and related recreation like Americans with Disabilities Act accessible fishing piers and shoreline pedestrian trail and provide enhanced education and interpretive facilities and opportunities at the park. Provide planning and funding assistance for other support facilities at Farewell Bend State Park in future years.

- HART C4 Provide assistance to agencies that operate public launch sites in Oregon to ensure that facilities are adequately maintained and repaired. In addition, IPC will identify additional locations where new boat launches can be developed or existing facilities enhanced to enable boats to be launched at lower reservoir levels.
- HART C5 Develop a site plan for enhancement of Hewitt and Holcomb Parks with Baker County that includes a description of specific measures to be implemented, costs, and implementation schedule. Provide financial assistance to Baker County for operation and maintenance of Hewitt and Holcomb Parks.
- HART C6 Continue funding maintenance of the Oxbow-Hells Canyon Road (22 miles), Homestead Road from Oxbow, Oregon, to Ballard Creek (6 miles), and Brownlee-Oxbow Road (12 miles).
- HART C7 Coordinate development and implementation of Best Management Practices for road maintenance with state and federal agencies.
- HART C8 Provide information on number, location, and cost of portable and vault toilets it plans to provide at dispersed recreation sites.
- HART C9 Identify agencies it will consult in development of an Information and Education Plan. Provide specific information on elements of the plan, projects to be implemented and associated costs.
- HART C10 Identify agencies and entities that will be consulted and which will be involved in development of the Recreation Adaptive Management Plan. Identify monitoring and reporting efforts to be undertaken.
- HART C11 Develop a detailed site plan for the dispersed recreation site at Copper Creek.
- HART C12 Consult with state and federal agencies regarding proposed changes to Hells Canyon Park and specify anticipated removal or modification to existing vegetation. No trees should be damaged or removed in reconstructing this park.
- HART C13 Develop detailed site plans in consultation with and for review by federal and state agencies for Westfall Dispersed Recreation Site, Bob Creek Section A, B and C Dispersed Recreation Site and Airstrip A&B Dispersed Recreation Site.
- HART C14 Consult with state and federal agencies regarding proposed changes to Copperfield Boat Launch Area, Oxbow Boat Launch, Carters and Old Carters Landing Recreation Site, Spring Recreation Site and Reconstruction of McCormick Park access sites and recreation areas. A detailed site plan for each shall be developed. Specific measures to be implemented shall be identified and funding level specified.

IPC shall specify removal or modifications expected to existing vegetation. No trees shall be damaged or removed in enhancement of this park.

HART C15 Develop, in cooperation with Bureau of Land Management, a final site plan to enhance Swedes Landing. Fund development and implementation of the site plan and enhancements to Swedes Landing.

HART C16 Improve access to the Stud Creek Trail including the stairway and railings similar to that provided on the Idaho side of the river.

D. WATER QUALITY

Impacts

There are serious water quality problems associated with the facilities and operation of the Project, principal among these are issues with temperature, dissolved oxygen and total dissolved gas. These water quality problems violate state water quality standards, and impair populations of both anadromous and resident fish, including federally listed threatened and endangered species. As mentioned before, HART submitted detailed comments on IPC's DLA that addressed ODEQ water quality issues and information needs in January 2003. To review these comments go to the Internet at "<ftp://ftp.wrd.state.or.us/pub/Publications/>" and then select the document entitled "State of Oregon 01-10-03.pdf." Below is a very brief summary of those issues.

The ODEQ's review for CWA §401 Water Quality Certification will seek reasonable assurance that Project operations under a new FERC license will either meet Oregon water quality standards, or assigned load allocations from the Snake River/Hells Canyon TMDL, whichever are appropriate. ODEQ's overall concern with the DLA is that as a whole, it does not provide sufficient information to show that proposed Project operations will:

- Not cause or contribute to violations of Oregon quality standards;
- Correct water quality standards violations that are caused by present Project operations; or
- Meet load allocations established by the approved TMDL

There was not enough information or analysis about environmental conditions, or specificity about water quality-related PM&E measures, in the DLA for the ODEQ to provide a set of proposed water quality certification conditions in this PSP.

Conditions Proposed by IPC

IPC has proposed to undertake the following PM&E measures to mitigate for the Project's impacts to water quality. They are summarized below, but more detail is provided in IPC's DLA at E.2-25 to E.2-32. IPC D1-D3 are existing measures, while IPC D4 –D7 are new measures.

- IPC D1 Pass 100 cfs of minimum flow through the Oxbow Bypass.
- IPC D2 Dispose of wastes associated with recreational use of the Project.
- IPC D3 Preferentially using the upper spillgates at Brownlee Dam during periods of spill.
- IPC D4 Aerate Brownlee Reservoir by supplementing Brownlee Reservoir with 1,450 tons of dissolved oxygen (DO) annually.
- IPC D5 Install and operate turbine-venting systems in units 1 through 4 at the Brownlee Project.
- IPC D6 Investigate and install (if practical) a system to inject oxygen or atmospheric air into water passing through unit 5 at the Brownlee Project.
- IPC D7 Install flow deflectors in the Hells Canyon Dam spillway to alter the flow characteristics from the spillway to reduce air entrainment deep in the Hells Canyon Dam tailrace during spill episodes up to approximately 30,000 cfs.

Conditions Proposed by HART

ODEQ anticipates that IPC will propose additional PM&E measures for water quality. These measures are expected to be structural or operational devices or approaches, or a combination of the two, such as are sufficient to provide reasonable assurance that the standards or TMDL allocations will be met. Designs and plans for structural and operational measures will be accompanied by appropriate forecasting tools, such as water quality models, that allow the future effectiveness of the measures to be predicted. Reasonable assurance does allow for the use of adaptive management plans, analogous to those required as a part of TMDLs, that allow a period of time over which implementation of PM&E measures and related water quality monitoring establish whether additional measures will be required to achieve the allocations or criteria. Such measures, and management and monitoring plans will then be included as conditions of the CWA § 401 Water Quality Certificate. A Management Plan for each water quality problem will be included as conditions in the CWA § 401 Water Quality Certificate. These Plans must include a plan and time schedule for implementing an operation change (installation of equipment or use of a management practice, for example), a goal to be achieved by the operation change, a plan for monitoring both implementation and the effectiveness of the operation change to achieve its expected goals, and a feedback loop for revising or modifying operations as necessary to reach the goal. It is conceivable that there could be several iterations before a specific operation would be deemed effective.

i. Temperature

The concern with water temperature is the temporal shift, caused by the Project, of delaying warming in spring and cooling in fall compared with seasonal changes in the river upstream

of the complex. Fall chinook spawning has been delayed by the warm fall temperatures. To compound the impact, fall chinook salmon outmigration timing has also shifted as a result of changes in thermal regime from Project construction and reservoir operations. Further, delayed spring cooling below Hells Canyon Dam can delay incubation and growth rates and can delay emergence between 1-4 weeks. Delayed emergence may either delay out-migration or produce fish that are smaller at migration. Both of these result in mortality and decreased survival. The CWA §401 certification application will need to provide measures and a temperature management plan that adequately address this part of the temperature standard.

ii. Dissolved Oxygen

Lack of adequate DO concentrations is a spatially and temporally persistent problem in the Project. Between late August and mid-October dissolved oxygen levels less than 6 mg/L can persist for several miles downstream of Hells Canyon Dam, in which reach chinook are found. DO levels less than 8 mg/L can result in reduced size at emergence, reduced fitness, and death for salmon eggs and embryos. Levels below 6 mg/L can result in avoidance, delayed migration, reduced swimming speeds, reduced fecundity, reduced spawning condition, and death for juvenile and adult salmon. Low dissolved oxygen levels may be affecting the distribution of adults potentially forcing them into less suitable habitats for spawning as evidenced by the absence of prespawn adults within the upriver section when observed dissolved oxygen levels are low.

The Snake River TMDL includes a DO allocation for Brownlee Reservoir and IPC has proposed a conceptual approach to meeting it. IPC will need to work with ODEQ to understand appropriate application of Oregon's DO criteria to the rest of the Project, and provide measures and a DO management plan that address DO problems in Brownlee Reservoir, the Oxbow bypass reach, and the reach downstream of Hells Canyon Dam.

iii. Total Dissolved Gas

Total dissolved gas (TDG) supersaturations are pervasive in the Project from below Brownlee Dam throughout the Hells Canyon reach. TDG levels up to 136% occur below Hells Canyon Dam during spill events (Hells Canyon TMDL). At these TDG levels juvenile and adult anadromous fish exhibit gas bubble disease symptoms and can be killed in laboratory and field experiments. Adult steelhead and chinook salmon captured at Hells Canyon Dam have exhibited symptoms of gas bubble disease.

The Snake River TMDL allocations for TDG rest wholly with the Project. IPC has proposed conceptual structural and operational approaches to partially mitigating TDG. Again, a TDG management plan will need to provide a series of measures, that when implemented concurrently or sequentially through the plan, will completely meet the TDG allocations.

iv. pH and Nuisance Algae

The DLA suggested that pH violations occur in Brownlee Reservoir, but dismissed them because they are not pervasive. Oregon water quality standards do not allow for standards violations, regardless of the low level of occurrence. Thus, the CWA §401 certification application will also need to provide reasonable assurance that the pH and nuisance algae criteria will be met under future operating conditions.

v. Toxics

Mercury, DDT and Dieldrin are found in fish tissue in the Project area. Although there are no toxics allocations in the Snake River TMDL at this time for the Project, Project operations have the potential to affect the biological availability of mercury. The §401 certification application will need to provide a management plan to address the mercury standard and the certification will contain conditions to ensure that any future TMDL allocations for toxics are adequately addressed by the Project.

vi. Biological Criteria

This standard provides ODEQ with a measure of total integrated stress on the aquatic community in addition to parameter-specific criteria. In the §401 certification process, Oregon typically includes conditions such as instream flows, ramping rates, and habitat enhancement measures under this rule. Accordingly, the §401 certification application needs to directly address this standard.

E. WATER USE

Impacts

IPC currently operates three time-limited state water right certificates, HE 161, HE 188, and HE 189. All three Oregon water rights contain subordination clauses that render the water rights subject and inferior in right to other water rights for consumptive uses. IPC makes no mention of its existing Oregon hydroelectric water rights in the DLA.

HE 161 (Oxbow) was issued on December 19, 1961, with a priority date of June 23, 1947 for 16,000 cfs, December 20, 1955 for 8,500 cfs, and December 4, 1961 for 2,000 cfs. Thus, IPC's total water right for Oxbow is 26,500 cfs. HE 161 allows IPC to use a total of 26,500 cfs of water from the Snake River.

HE 188 (Brownlee) was issued on June 16, 1961, with a priority date of May 20, 1953. Under HE 188, IPC is allocated 24,500 cfs of water from the Snake River, and the ability to store such water up to 1,500,000 acre-feet, of which 1,000,000 acre-feet are useable.

FERC issued orders amending FERC P-1971 on August 11, 1976 to allow construction and

operation of the fifth unit and on January 17, 1977 for modification of the tailrace for the fifth unit. HE 188 was amended on January 20, 1981 to add a fifth generating unit and an additional 10,500 cfs for power generation. The fifth unit went into service on March 31, 1980. Brownlee has the right to use a total of 35,000 cfs.

HE 189 (Hells Canyon) was issued on April 22, 1968, with a priority date of May 20, 1953. HE 189 allows IPC to use 27,000 cfs of water from the Snake River, and to store such water up to 183,000 acre-feet, of which 12,000 acre-feet are useable.

OWRD will include minimum flow rates, ramping rates and minimum reservoir levels in its water right certificate as appropriate. These will be developed in conjunction with ODFW and ODEQ when IPC has provided the necessary information requested by ODFW and ODEQ.

Conditions Proposed by IPC

HART has identified what appear to be some upward or downward changes for water right parameters by IPC in the DLA. However, the DLA does not contain enough specific information for HART to clearly identify all of IPC's actual proposed measures for renewal of its Oregon water rights. Below are the proposed measures that HART was able to identify. These are described in more detail in IPC's DLA at E.2-6, E.2-25 to E.2-26, E.6-20, E.1-27, A-1 to A-19, B-1 to B-17.

- IPC E1 Maintain a 100-cfs minimum flow between Oxbow Dam and the powerhouse outlet.
- IPC E2 Ramping rate for Hells Canyon Reservoir of 1 foot per hour at Johnson Bar, 18 river miles below Hells Canyon Dam.
- IPC E3 Maintain minimum flows of between 5,000 and 6,500 cfs measured at Johnson Bar, 18 river miles below Hells Canyon Dam.
- IPC E4 Maintain up to 10 foot vertical operating change per day at Hells Canyon Reservoir and Oxbow reservoir.
- IPC E5 Maintain normal reservoir levels at 1,688 mean sea level (msl) (Hells Canyon), 1,805 msl (Oxbow), and 2,077 msl (Brownlee).
- IPC E6 Maintain minimum flow of between 8,000-13,000 cfs in mid-October through early December below Hells Canyon Dam for fish.
- IPC E7 Fill Brownlee Reservoir by the end of June each year for recreation and fish.

Conditions Proposed by HART

At this time, HART is still evaluating the sufficiency of IPC's proposed operating parameters relative to the Project's impacts to water resources and will be setting forth further analysis of these

PM&Es in subsequent versions of Oregon's position. However, in order to be able to adequately assess whether the Project's proposed operating parameters will comply with Oregon's water standards set forth in ORS 543A.025 and 543A.120, OWRD has requested that IPC provide additional information concerning its proposed Project water usage. As mentioned before, HART submitted detailed comments on IPC's DLA that addressed OWRD's water quantity issues and information needs in January 2003. To review these comments go to the Internet at "<ftp://ftp.wrd.state.or.us/pub/Publications/>" and then select the document entitled "State of Oregon 01-10-03.pdf." Below is a very brief summary of those issues. When OWRD has enough information to analyze IPC's proposal, OWRD will propose terms and conditions for IPC's water right certificate.

i. Highest use of the water

Specifically, IPC should provide information demonstrating how its Project conserves the highest use of the water for all purposes. ORS 543A.025(1)(a). This discussion should reference the relevant State of Oregon basin plans, describe that the Project is subordinate to other uses such as, but not limited to, irrigation, domestic use, and municipal water supply. It should also discuss why the Project's proposed minimum instream flows, what those minimum flow rates will be, as well as how they were developed, and any other beneficial uses of water the Project provides.

ii. Economic Development

IPC should also describe how the Project maximizes the economic development of the waters involved in the FLA. ORS 543A.025(1)(b). In addressing this particular standard, IPC should look to the basin plan, which describes what the State of Oregon considers to be the maximum economic development of the Snake River. IPC should also describe the economic benefit to the area provided by the Project such as how many people it employs, their combined annual salary, direct Project-related purchases in the community, property taxes associated with the Project in addition to recreation-related benefits of the Project and any other economic benefits the Project's use of the waters involved provides.

iii. Beneficial Use

A description of whether and how the Project controls the waters of the state for beneficial purposes, including recreation, drainage, flood control (which the DLA does address) and sanitation. ORS 543A.025(1)(c).

iv. Wasteful, Uneconomic, Impracticable or Unreasonable Use

IPC should also describe how the Project prevents wasteful, uneconomic, impracticable or unreasonable use of the waters involved. ORS 543A.025(1)(e). In particular, IPC should characterize the various benefits to recreational boating, fish and wildlife, riparian plantings, cultural resources and any other benefits that the Project may provide.

v. Vested and Inchoate Rights

IPC should address how it will operate the Project in a manner to protect all vested and inchoate rights to the waters of Oregon or to the use of the waters of Oregon. ORS 543A.025(1)(f).

vi. Water Availability

IPC should include an assessment of water availability and the amount of water the Project requires for its proposed use. ORS 543A.120(2)(c). IPC should also include a discussion in its FLA that demonstrates the Project’s compatibility with applicable land use plans, specifying what those land use plans are and how the Project is compatible with them. ORS 543A.120(2)(b). In addition, IPC must demonstrate that the Project’s proposed use of water will not injure existing water rights. ORS 543A.120(2)(d).

F. SCENIC AND AESTHETIC VALUES

Impacts

The Project impacts to scenic and aesthetic resources include a large, light-colored ring of shoreline (up to 101 vertical feet) that is visible the length of the reservoir when Brownlee reservoir is drawn down for flood control in wetter years. This ring is referred to as the “drawdown zone.” A five foot drawdown zone exists at Oxbow and Hells Canyon reservoirs. In addition, Project transmission lines affect visual quality because they are mildly reflective, and pole or towers visible in the foreground interrupt the landscape. IPC’s major facilities also visually impact the landscape.

Conditions Proposed by IPC

IPC has proposed a number of PM&E measures to address Project impacts to scenic and aesthetic resources. These PM&E measures are summarized briefly below but are described in more detail in IPC’s DLA at E.6-23, E.6-37 *et seq.*

- IPC F1 Design standards and guidelines for physical structures.
- IPC F2 Design standards and guidelines for landscaping.
- IPC F3 Develop and implement general aesthetic clean-up plan.
- IPC F4 Replace guardrails.
- IPC F5 Mitigate contrast from Project facilities to lessen the contrast.
- IPC F6 Enhance others’ facilities.
- IPC F7 Provide information and education.

IPC F8 Reduce visual impacts of structures, conductors, and transmission line rights-of-way.

Conditions Proposed by HART

At this time, HART is not proposing any scenic and aesthetic conditions, but may in subsequent versions of Oregon’s position.

G. HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

Impacts

The Hells Canyon Archaeological District includes 152 historic and 384 prehistoric sites. A number of sites and buildings in the Project area are eligible or potentially eligible for inclusion in the National Register of Historic Places. A total of 842 archaeological sites between Hells Canyon Dam and the confluence with the Salmon River have been identified and 76 archaeological sites on 12 transmission lines. Project operations impact historic, cultural, and archaeological resources in the Project vicinity. Such impacts are related to recreation access, as well as to pool fluctuations, cutback erosion, and riverine erosion. Impacts include vandalism, siltation, bank erosion, deflation (erosion caused by the action of wind over the ground), road damage, camping impacts, agricultural impacts, off-road vehicle use, power lines, dislodging of buried sites, and abandoned railroad grades.

Conditions Proposed by IPC

IPC has proposed several PM&E measures to address Project impacts to historic, cultural and archaeological resources. These PM&E measures are summarized below but are described in more detail in IPC’s DLA at E.4-30 *et seq.*

- IPC G1 Monitor eligible sites along transmission lines.
- IPC G2 Monitor known burial site on Oxbow Reservoir.
- IPC G3 Monitor known sites on Brownlee, Oxbow and Hells Canyon Reservoirs, below Hells Canyon dam.
- IPC G4 Implement the Cultural Resource Management Plan to promote PM&E of significant historic and archaeological resources.
- IPC G5 Provide access for Native Americans to traditional cultural places, sacred sites and traditional plant-gathering areas.

- IPC G6 Coordinate historic and archaeological resource management and protection with other land uses.
- IPC G7 Increase awareness of historic and archaeological values, as appropriate.
- IPC G8 Promote the understanding of hydropower in the culture and economy of the region.
- IPC G9 Pursue multiple resource solutions to cultural resource problems.
- IPC G10 Stabilize sites below Hells Canyon Dam and on Brownlee Reservoir.
- IPC G11 Recover data at four archaeological sites on Brownlee Reservoir if the sites cannot be stabilized.
- IPC G12 Develop Native American interpretive sites on Brownlee, Oxbow and Hells Canyon Reservoirs.
- IPC G13 Develop Euro-American interpretive sites on Brownlee, Oxbow, and/or Hells Canyon Reservoirs.
- IPC G14 Develop Asian-American interpretive sites on Brownlee, Oxbow, and/or Hells Canyon Reservoirs.
- IPC G15 Develop Euro- and Asian-American interpretive projects.
- IPC G16 Develop Native American Programs that include the Burns Paiute Tribe, Confederated Tribes of the Warm Springs Indian Reservation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservations, Shoshone-Paiute Tribes, Shoshone-Bannock Tribes.
- IPC G17 Pursue additional projects under Section 106 of the National Historic Preservation Act for any subsequent impacts attributable to operations of the Project.

Conditions Proposed by HART

At this time, HART is not proposing any historic, cultural or archaeological condition, but may in subsequent versions of Oregon’s position.

H. GEOLOGIC ISSUES

Impacts

Hells Canyon is one of the more active areas of the state in terms of recently monitored seismic activity. Recent field work documents the presence of several active faults at the surface and the extent of large regional landslides overlooking the Snake River needs to be fully appreciated.

Conditions Proposed by IPC

See conditions IPC I 10 – 18 below for a summary of IPC’s geologic PM&Es. These PM&Es are described in more detail in IPC’s DLA at DLA H-37 to H-42.

Conditions Proposed by HART

The following conditions are proposed by HART to address the Project’s geologic issues.

HART H1 IPC shall undertake a seismic analyses to enable a proper understanding of the earthquake potential. This analysis should included attention to source parameter calculations, deterministic treatment of the faults, and use of the most recent probabilistic earthquake characterizations available from the US Geological Survey (Art Frenkel). The earthquake potential should be used in the analysis of the stability and continued operation of the structures in the event of an earthquake.

HART H2 IPC shall make a determination of the potential for earthquake-induced landslides to generate waves in the reservoir. A reasonable characterization of the potential landslides and of these waves should be used to help guide free-board management at the dam, if the frequency of the wave occurrence falls within reasonable limits. These free-board adjustments (if any) may or may not influence water modeling for the reservoir, because it may significantly impact the depth of water to be used in the models.

I. PUBLIC HEALTH AND SAFETY

Impacts

Since the original license was issued, IPC has recorded approximately fewer than 25 employee and contractor lost-time accidents, and 16 public safety accidents within the Project boundary have been recorded. All of the employee and contractor safety accidents are considered to be Project related. Since licensing, there have been three employee or contractor deaths associated with operation or construction of the Project. Two of these deaths occurred recently when a plane crashed during a deer survey being conducted for environmental studies associated with this license application. The fatal airplane accident, which the FAA concluded was a result of pilot error, killed

the contracted pilot and a company employee.

Most of the public safety incidents recorded within the Project boundary were associated with outdoor recreation and/or auto accidents. Also, most recorded public safety incidents were related to serious injury or death because minor accidents experienced by recreationists are generally not reported and therefore do not come to the IPC's attention. Since the Project was licensed, 13 people are known to have died within the Project boundary, although their deaths were unrelated to Project operations. Of these deaths, eight were drownings, resulting from falls, boating and fishing accidents, and auto accidents. Two deaths resulted from injuries from falls, two were from physical ailments, and one was from injury sustained during an auto accident.

Conditions Proposed by IPC

IPC has proposed PM&E measures to address Project impacts to public health and safety. PM&E measures are summarized below but more detail is available at IPC's DLA at H-37 to H-42.

- IPC I1 Maintain state-of-the-art dam and plant safety, employee safety, and public safety programs.
- IPC I2 Maintain and implement emergency action plans (EAPs).
- IPC I3 Secure potentially hazardous areas, to the extent practical, against public entry. Maintain multiple warning devices, including sirens, signs, warning buoys, and boat barriers, to warn the public away from hazards.
- IPC I4 Inspect all intake buoys and cables, megaphones, outdoor lighting, audio/visual warning devices, fences, signs, and safety barriers at least monthly.
- IPC I5 Support public water-safety education programs, including Water Awareness Week.
- IPC I6 Conduct quarterly training on the EAP.
- IPC I7 Train all personnel involved with Project and system operations receive on the importance of the Project's plans and procedures.
- IPC I8 Conduct a functional test of one of the Project's EAPs every five years.
- IPC I9 Review and update EAP annually to ensure that any downstream development or changes in operation are accurately reflected in the plan. Distribute updated plans to plan holders, including all regional emergency response agencies.
- IPC I10 Maintain monitoring devices at the Project dams and powerhouses to ensure that any structural deterioration would be discovered immediately.

- IPC I11 Maintain landslide monitoring survey grids alongside Brownlee Reservoir and seismic monitoring equipment at Brownlee Dam.
- IPC I12 Maintain multiple monitors on most of the powerhouse mechanical equipment and on the spillways and flow monitoring equipment at a number of locations.
- IPC I13 Do dam alignment and settlement surveys annually to confirm that there are no changes in long-term historical trends.
- IPC I14 Train all plant operators are trained to recognize potential hazards, including seepage, sinkholes, and changes in alignment and settlement, as well as to implement a prearranged notification procedure if a problem is discovered.
- IPC I15 Survey landslides upstream from Brownlee Dam every five years to monitor trends and will be surveyed every five years from now on.
- IPC I16 Perform annually a complete inspection of the entire Project, using a checklist similar to that used by dam operators for monthly inspections.
- IPC I17 Conduct intermittent underwater inspections by trained divers to look for any signs of structural deterioration at the upstream intake structures and conduits and the downstream spillways and tailraces.
- IPC I18 Inspect every five years the entire Project and dam safety monitoring documentation.

Conditions Proposed by HART

A brief summary of HART’s proposed conditions for public health and safety is included below.

- HART I1 Provide a dedicated team of two marine officers whose primary responsibility would be patrolling waters within the Project. The seasonal officers, operating under contract through the Baker County Sheriff or Oregon State Police, would provide an additional 496 hours of patrol effort on Brownlee Reservoir, an additional 288 hours of patrol effort on Hells Canyon Reservoir, and an additional 288 hours of patrol effort on Oxbow Reservoir beyond the current levels of patrol provided by Baker County Sheriff’s marine program and Oregon State Police Fish and Wildlife troopers. The season of patrol would coincide with the warm season as referenced in the DLA. In addition to the personnel costs associated with the marine officers, IPC will provide funding to equip and train the marine officers along with necessary supplies, fuel, maintenance, and other operating costs. Marine officers must be certified through the Marine Board's Marine Safety and Law Enforcement Academy.
- HART I2 Provide a dedicated team of two marine officers whose primary responsibility would be patrolling waters below Hells Canyon Dam. The seasonal officers, operating

under contract through the Wallowa County Sheriff or Oregon State Police, will provide expanded safety and enforcement coverage during the primary floating season (mid May to mid September). The marine officers will provide an estimated additional 576 hours of on-water patrol in coordination with existing USFS HCNRA, Wallowa County Sheriff and Oregon State Police marine patrols. In addition to the personnel costs associated with the marine officers, funding must be provided to equip and train the marine officers along with necessary supplies, fuel, maintenance, and other operating costs. Marine officers must be certified through the OMB's Marine Safety and Law Enforcement Academy. Funding must also be provided for the initial purchase of a suitable jet boat to serve as a platform for the marine officers, and commit to providing full replacement costs of the jet boat to be paid at periodic intervals through the life of the license and water rights.

HART I3 Provide a dedicated team of two marine officers whose primary responsibility would be patrolling waters the Snake River above Farewell Bend State Park. The seasonal officers, operating under contract through the Malheur County Sheriff or Oregon State Police, will provide expanded safety and enforcement coverage during the primary boating season (May 1-October 31). The marine officers will provide an estimated additional 576 hours of on-water patrol in coordination with existing Malheur County Sheriff and Oregon State Police marine patrols. In addition to the personnel costs associated with the marine officers, funding must be provided to equip and train the marine officers along with necessary supplies, fuel, maintenance, and other operating costs. Marine officers must be certified through the Marine Board's Marine Safety and Law Enforcement Academy. Also, funding must be supplied for the initial purchase of a suitable jet boat to serve as a platform for the marine officers, and full replacement costs of the jet boat paid at periodic intervals through the life of the license and water rights.

HART I4 Develop a comprehensive program to deal with gray water and human waste generated by boaters who use the Project. Commit to working with the OMB to determine suitable locations for two new pumpout/dump stations and two floating restrooms on Brownlee Reservoir. Indicate an intention to provide the necessary funding to purchase and install these facilities and/or to apply for assistance through the federal Clean Vessel Act program. Commit to providing annual operation and maintenance of the facilities and periodic repair or replacement throughout the life of the license and water rights.

HART I5 Comply with all dam safety procedures, requirements and reviews as may be required by the State of Oregon or appropriate federal authorities, including maintaining and updating the EAP for Project facilities.

J. LICENSE TERM

HART J1 At this time, the state is not taking a position on the Project's license term.

K. OTHER ISSUES

- HART K1 Because ownership of the Project may change over the life of the Project, mitigation commitments by IPC must be written into the FERC license and state water right so it is clear to a new owner of the Project what mitigation actions are expected.
- HART K2 IPC must apply for and obtain an authorization from the ODSL to occupy state-submerged and submersible land. IPC will also provide ODSL with maps indicating the location of the Idaho-Oregon state boundary relative to the structures at each of the three facilities: Hells Canyon, Oxbow, and Brownlee.
- HART K3 Tie the Hells Canyon Resource Management Plan (HCRMP) to Desired Future Conditions and goals developed in resource work groups.
- HART K4 Prioritize areas for resource protection, in consultation with state and federal agencies, and where recreation use is determined as the primary use in specific areas, adverse effects on natural resources should be avoided and minimized and mitigation for these impacts should be provided.
- HART K5 Recognize that continued recreational development will impact aquatic and terrestrial resources and that at some point expanding recreational development shall no longer be considered.
- HART K6 Evaluate and recommend measures to reverse the decline of *Salix* and rebuild willow bars in areas of existing habitat.
- HART K7 Do not designate areas in deer and elk winter range as recreation reserves.
- HART K8 Define a Special Management Area as an area which is afforded a higher level of resource protection based on the sensitivity and importance of these sites.
- HART K9 Form a multi-agency coordinating committee to review and approve management plans for lands acquired as mitigation.
- HART K10 Modify the definition of a resource conservation area to clarify that a lower level of protection is provided not a lower level of management.
- HART K11 Protect all riparian vegetation from vehicle access and other adverse human impacts. Unavoidable impacts shall be mitigated with measures consistent with ODFW's Fish

and Wildlife Habitat Mitigation Policy.

HART K12 Develop policies that provide protection for shoreline and riparian habitat.

HART K13 Prepare a land management plan to describe how decisions regarding new development and other human actions will be made, including justification for buffer widths, clarification of what constitutes “significant” actions, and how the internal IPC Team will function and interact with resource agencies. Additionally, ODFW and other state and federal resource agencies need to be consulted on all development projects and human actions planned for lands acquired or managed for mitigation.

ATTACHMENT 1

LIST OF ACRONYMS

10(j) recommendations	Fish and wildlife recommendations by ODFW
401 certificate	Clean Water Act Section 401 water quality certificate by ODEQ
CFS	Cubic feet per second
CWA	Clean Water Act
DLA	Draft License Application
DO	Dissolved oxygen
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FUSP	Final Unified State Position
GWh	Gigawatt hour
HART	Hydroelectric Application Review Team
HE	An Oregon time-limited water right for hydroelectric use of water
IDFG	Idaho Department of Fish and Game
IPC	Idaho Power Company
MSL	Mean Sea Level
MOU	Memorandum of Understanding
MM	Millimeter
MW	Megawatt
NMFS	National Marine Fisheries Service
O&M	Operation and maintenance
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODSL	Oregon Division of State Lands
OPRD	Oregon Parks and Recreation Department
OWRD	Oregon Water Resources Department
PSP	Provisional State Position
PUSP	Provisional Unified State Position
ROW	Right of way
SPUSP	Second Proposed Unified State Position
THP	Theoretical horsepower
USACOE	United States Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Service

ATTACHMENT 2

Oregon Department of Fish and Wildlife

Preliminary

10(j) Recommendations, Terms and Conditions

for

IDAHO POWER COMPANY'S

Hells Canyon Hydroelectric Project

(FERC #1971)

March 2003

**Oregon Department of Fish and Wildlife
La Grande, Oregon**

ATTACHMENT 2

Overview

This document provides the Oregon Department of Fish and Wildlife's (ODFW) preliminary 10(j) Recommendations, Terms, and Conditions on Idaho Power Company's (IPC's or Applicant's) relicensing of the Hells Canyon Complex (HCC) Hydroelectric Project (Project) (Federal Energy Regulatory Commission (FERC) Project No. 1971). These comments are organized first with a section describing the authorities that guide ODFW's participation in this relicensing process followed by preliminary comments, recommendations, terms and conditions for the new license for operation of the HCC. These comments, recommendations, terms and conditions are preliminary in nature and will be modified as needed with the issuance of the Final License Application, the FERC Environmental Impact Statement, and as new information and additional study reports are made available in the licensing process.

ODFW's Statutes, Policies, and Rules

ODFW has authority pursuant to Section 10(j) of the Federal Power Act (FPA) and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) to provide recommended terms and conditions to the FERC regarding protection, mitigation and enhancement of fish and wildlife and their habitat affected by operation and management of the Hells Canyon Hydroelectric project. In addition, ODFW's goals, objectives and management authorities for the fish and wildlife populations affected by the Project are found in the following Oregon Revised Statutes (ORS), Oregon Administrative Rules (OAR) and associated plans and are summarized below.

- Wildlife Policy (ORS 496.012)
Establishes wildlife management policy to prevent serious depletion of any indigenous species and maintain all species of fish and wildlife at optimum levels.
- Oregon Plan for Salmon and Watersheds (ORS 541.405)
Restores native fish populations, and the aquatic systems that support them, to productive and sustainable levels that will provide environmental, cultural, and economic benefits.
- Policy to Restore Native Stocks (ORS 496.435)
Establishes goal of the State of Oregon to restore native stocks of salmon and trout to their historic levels of abundance.
- ODFW's Fish Passage Law (ORS 509.580 - 509.645)
Establishes as state policy that upstream and downstream passage is required at all artificial obstructions in those Oregon waters in which migratory native fish are currently or have historically been present. For existing hydroelectric projects, relicensing by the FERC is the "trigger" that initiates consideration of fish passage.
- General Fish Management Goals (OAR 635-007-0510)

Fish shall be managed to take full advantage of the productive capacity of natural habitats, and ODFW shall address losses in fish productivity due to habitat degradation through habitat restoration.

- Natural Production Policy (OAR 635-007-0521-0524)
Protects and promotes natural production of indigenous fishes.
- Wild Fish Management Policy (OAR 635-007-0525-0529)
Protects genetic resources of wild fish.
- Wild Fish Gene Resource Conservation Policy (OAR 635-007-0536-0538)
Manages wild fish to maintain their adaptiveness and genetic diversity.
- Trout Management (OAR 635-500-0100-0120)
Maintains the genetic diversity and integrity of wild trout stocks; and protects, restores, and enhances trout habitat.
- Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0000-0030)
Requires or recommends mitigation for losses of fish and wildlife habitat.
- Oregon's Elk Management Plan
Protects and enhances elk populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.
- Oregon's Black Bear Management Plan
Maintains healthy populations of black bear consistent with public desires and state law.
- Oregon's Cougar Management Plan
Maintains healthy populations of cougar consistent with public desires and state law.
- Wildlife Diversity Plan (OARs 635-100-0001 through 0030)
Maintain Oregon's wildlife diversity by protecting and enhancing populations and habitats of native wildlife at self-sustaining levels throughout natural geographic ranges.

Introduction

The current federal license for the Hells Canyon Complex project will expire in July 2005. IPC initiated consultation with state and federal agencies and other stakeholders under the FERC traditional relicensing process in January 1997, when it issued its Formal Consultation Package. The ODFW provided comments on this document (ODFW letter from Burchfield to Kleckner, May 1997) and participated extensively in work groups that identified study needs and reviewed subsequent study proposals. ODFW submitted detailed comments on IPC's Aquatic Studies Package (Letter from Burchfield to

Randolph, July 1999). The Applicant conducted studies between 1997 and 2001, and filed its Draft License Application (DLA) with the State of Oregon and FERC on September 20, 2002.

The State of Oregon provided comments on the DLA to the Applicant on January 10, 2003. In its review of the DLA, ODFW found that the Applicant failed to conduct studies requested by ODFW and other resource agencies necessary to identify Project impacts. Additionally, the Applicant chose not to evaluate and compare alternatives for continued operation of the Project that were proposed by ODFW. The DLA does not identify and clearly describe proposed mitigation measures for most resource areas, and thus it is difficult for ODFW to assess whether the Applicant's proposed measures will adequately mitigate for Project impacts. ODFW believes that extensive additional information will be needed before mitigation measures can be clearly defined as license conditions. The measures proposed by ODFW in this document should thus be considered as preliminary conditions and may be modified as additional information is developed prior to new license issuance.

ODFW is providing the following comments and recommended terms and conditions for the State of Oregon's Provision State Position. These recommended terms and conditions, which may be modified based on public comment or to resolve conflicts with other state agencies, will be filed with FERC pursuant to the Fish and Wildlife Coordination Act, 16 USC 661et seq., and Federal Power Act, 16 USC 803(j) no more than 60-days after FERC issues Notice of Application Ready for Environmental Analysis.

COMMENTS, RECOMMENDATIONS, TERMS AND CONDITIONS

Aquatic Resources

Pursuant to section 10(j) of the Federal Power Act, ODFW recommends that FERC include the following conditions (numbered and shown in italics) in the new license.

A. Project Operations and Flows

Project Operations Modeling

A-1. The Licensee shall implement project operations that are determined through comprehensive analysis and modeling of alternative scenarios and that meet the following objectives: 1) achieve flow augmentation goals for increasing migration rates of juvenile salmon and steelhead from the Hells Canyon reach to Lower Granite Dam; 2) provide optimal habitat for spawning fall chinook salmon in the Hells Canyon reach, including protection of redds and provide rearing habitat for juvenile fall chinook; 3) optimize value of stored water delivered from upstream federal storage reservoirs for fish mitigation purposes by passing through the project or storing in Brownlee for later release; 4) provide rearing habitat for redband trout, bull trout, and other native resident fish; 5) provide optimal habitat for spawning white sturgeon in the Hells Canyon reach

including providing rearing habitat for juvenile and adult white sturgeon; 6) manage Brownlee reservoir operations to minimize new impacts to resident fish and fishing opportunities.

Background and Rationale

During relicensing consultation, ODFW requested that IPC conduct alternative operations modeling to analyze the potential benefits of each alternative. In its comments on the Formal Consultation Package and within a letter from Stephanie Burchfield to Craig Jones dated June 21, 1999, ODFW requested that IPC model eight operational scenarios. These scenarios were selected by ODFW to adequately address the effects of construction and operation of the HCC on current and future flows in the lower Snake River. This information is critical in determining the effects of the HCC on anadromous fish populations and in identifying optimal flow needs for spawning, incubation, emergence, and migration.

1. Flows at the Hells Canyon Dam site and Lower Granite Dam with current irrigation depletion before construction of the HCC.
2. Flows below Hells Canyon Dam and Lower Granite Dam with current irrigation depletion after construction of the HCC.
3. Flows below Hells Canyon Dam and Lower Granite Dam and Brownlee Reservoir elevations with current FCRPS Biological Opinion fishery operations (110kaf spring/237 kaf summer Brownlee and 427 kaf from the upper Snake). Model assuming no, 100 kaf, 200 kaf of upper Snake water shaped in Brownlee Reservoir (that which cannot be diverted before August 31).
4. Flows below Hells Canyon Dam and Lower Granite Dam and Brownlee Reservoir elevations under future NPPC upper Snake flow volumes (927 kaf in 1996 and 1427 kaf in 1998). Model assuming no, 100 kaf, 200 kaf, 400 kaf, and 600 kaf upper Snake water shaped in Brownlee.
5. Same as scenario 4, with an additional 100 kaf from Brownlee during spring.
6. Same as scenario 5, with an additional 100 and 200 kaf from Brownlee during summer.
7. Same as scenario 4, except no volume from Brownlee Reservoir.
8. Model what flow volumes can be drafted from Brownlee during the spring and summer and maintain flows of 9, 12, and 15 kcfs for spawning, incubation, and emergence (October 1-April 30) of fall chinook salmon below the HCC.

These model scenarios encompass a wide range of operations to serve as “bookends” in order to conduct a comprehensive evaluation of the biological effects of the HCC operations under current and future regional fishery programs and identify appropriate fishery mitigation measures for relicensing.

Instead, IPC’s chose to model two operational scenarios, neither of which represents current Project operations nor operations proposed for modeling by ODFW. These scenarios do not provide information needed to compare Project impacts under current conditions to reasonable alternatives. In ODFW’s comments on IPC’s Draft License

Application (DLA), we explain why the two scenarios that IPC chose to model were not useful alternatives for assessing Project impacts or for developing an operational approach that optimizes flows for fish while minimizing impacts on other resources (ODFW letter from Colleen Fagan to Craig Jones, January 10, 2003).

ODFW is unable at this time to define a preferred Project operational scenario because IPC did not conduct the necessary studies during the pre-licensing consultation period. In the interim between filing this initial set of terms and conditions and a revised set, ODFW requests that IPC conduct the modeling that ODFW identified as needed since the First Stage Consultation period. The current Project operations should be used as the baseline to describe Project impacts to aquatic, terrestrial and botanical resources. IPC should redo its analysis using current operations including flood control, load following, flow augmentation, the fall chinook program, and minimum flow requirements at Johnson Bar and Lime Point, as the baseline condition. IPC should work cooperatively with ODFW and other interested parties to evaluate current and alternative Project operations. Operational scenarios requested by ODFW, National Marine Fisheries Service (NOAA Fisheries), and the USFS should also be analyzed. ODFW also requests that IPC model 1) existing operations without load following but with flood control, flow augmentation, the fall chinook program, and minimum flow requirements at Johnson Bar and Lime Point and 2) the Snake River with flood control but no other constraints.

Ramping Rates

A-2. The Licensee shall utilize a ramping rate of no more than 2 inches per hour below each of the three dams of the Hells Canyon Project. The ramping rate shall apply to load following operations, as well as to project start-up and planned project shutdowns.

Background and Rationale

Project ramping occurs when operations require an increase or decrease in flow through the turbines to adjust for shifts in power demand. Ramping also occurs during Project drawdown for flood control, as well as when outflow is reduced to facilitate reservoir refill. Ramping can also occur when maintenance activities require lowering the reservoirs to access structures. Unplanned outages are an uncontrollable cause of Project ramping. Project start-up after planned and unplanned outages also involves ramping.

In the DLA, IPC proposed a one foot per hour ramping rate, yet provided insufficient justification to support this rate.

Sudden flow changes in bypass reaches and below powerhouse outfalls due to Project operations can adversely impact fish and aquatic resources. Significant rapid flow reductions can affect fish populations by dewatering redds and stranding fry or juvenile fish. Rapid flow increases in stream reaches can wash out existing redds, displace fry, displace macroinvertebrates, or adversely impact amphibian populations in these reaches. Down ramping of only 1 inch per hour can impact fish populations. One very significant ramping event at a very unusual time can cause a significant limiting condition for one or

more age classes of fish, or a section of habitat can be impacted for a long period (Hunter 1992).

Large flow fluctuations can also result in increased erosion of gravel and sandbars, which can reduce available habitat for spawning fish and macroinvertebrate species. ODFW identified in comments on the DLA that IPC did not adequately address the effects of daily ramping on sandbar and terrace erosion in Hells Canyon. Daily and hourly flow fluctuations may be increasing the rate of erosion of sandbars and terraces, thus affecting aquatic, terrestrial, botanical, cultural and recreational resources.

Ramping rates recommended by ODFW are consistent with FERC conditions at other hydroelectric projects and are based in part on evaluations at other projects and recommendations from Hunter (1992). The recommended ramping rates are feasible to apply at the Project, effective for protecting aquatic and riparian resources, and have been accepted for implementation at other hydroelectric projects by FERC.

Unregulated rivers rarely experience drops in water surface elevation in excess of two inches per hour except during floods. IPC's proposed ramping rate of one foot per hour is considerably greater than ramping rates set at other projects (Pelton Round Butte, Leaburg, and North Umpqua – all equal to or less than 2" hour and 1' per day).

Until IPC conducts a site-specific ramping rate study at the Hells Canyon Project, ODFW believes the regionally-accepted rate of 2 inches per hour should be implemented. If adequate site-specific studies are conducted and conclusions indicate that different ramping rates could be equally protective of fish resources and angling opportunities, then ODFW would use the new information to determine if a different ramping rate should apply at this Project.

Oxbow Bypass Flows

A-3. The Licensee shall discharge from the Oxbow Dam a continuous minimum flow of 5,000 cfs throughout the Oxbow Bypass throughout the white sturgeon spawning and incubation time period, March through June. A minimum flow of 2,000 cfs should be maintained in the Oxbow bypass from July through February to protect rearing salmonids and white sturgeon. The minimum flow shall be measured at the upstream end of the Oxbow Bypass at a location to be determined through consultation with ODFW.

A-4. The Licensee shall conduct additional study of flow:habitat relationships in the Oxbow Bypass reach, using the Instream Flow Incremental Methodology or other methodologies approved by ODFW. The Licensee shall collect additional flow data at 500 cfs increments between 2,000 and 5,000 cfs increments and rerun the analysis of WUA versus discharge for all salmonid species and life stages and white sturgeon. The study shall include an analysis of habitat suitability in the powerhouse reach.

Background and Rationale

ODFW believes IPC's proposed minimum flow of 100 cfs in the Oxbow Bypass is insufficient for white sturgeon and native salmonids. In Technical Report E.2.3-1, IPC concludes the current minimum flow of 100 cfs does not provide suitable spawning, incubation, larval, or young-of-year habitat for white sturgeon in the Oxbow Bypass. Overall, habitat suitability increases with increasing flow for most of the life history stages of sturgeon (spawning, incubation, larval, young-of-year). Spawning habitat begins to be available at flows of at least 5 kcfs and a flow of 10 kcfs is necessary to provide increased spawning habitat in Hells Canyon Reservoir.

In the DLA, IPC argues that higher flows in the Oxbow Bypass would increase drift of larval sturgeon out of the reservoir, and thereby negate any additional benefits that higher flows would have on improved spawning in the bypass reach. ODFW believes this hypothesis is unsubstantiated. Further, even if larval drift were significant, these larval sturgeon might serve to enhance the population below Hells Canyon Dam without causing significant productivity loss in the relatively short length of the Hells Canyon Reservoir.

In addition, the minimum flow of 100 cfs does not provide suitable spawning habitat for fall chinook salmon (*Oncorhynchus tshawytscha*). Flows of 5,000 and 10,000 cfs represent the minimum ranges necessary for any spawning to occur (Technical Report E.2.3-1).

In recommendation C-2, ODFW seeks a revised flow study to provide needed information for determining the most effective minimum flows for the Oxbow Bypass reach. In ODFW's comments on the DLA, we described why IPC's choices of flows in its study potentially misrepresent the relationship between Weighted Useable Area (WUA) and discharge, especially between 1,850 and 5,000 cfs. ODFW also questioned IPC's representation of WUA in its flow study (ODFW letter from Colleen Fagan to Craig Jones, IPC, January 10, 2003). WUA graphs for rearing fall chinook salmon, redband trout (*Oncorhynchus mykiss*) and bull trout (*Salvelinus confluentus*) depict a declining linear relationship with flow, though ODFW believes this is likely an artifact of the flows IPC chose to measure. We believe the peaks of the curves are probably between 2,000 and 5,000 cfs. We also question whether the WUA vs. flow relationship truly goes to from over 20,000 square meters at 1,850 cfs to zero at 5,000 cfs and back up to nearly 20,000 square meters at 10,000 cfs for rearing fall chinook salmon as represented in Figures 77 and 78 in Technical Report E.2.3-1.

Flow Requirements and Project Operations for Redband Trout and Bull Trout

A-5. The Licensee shall involve ODFW and other state and federal fish agencies in a consensus approach to assessing effects of project operations, including load-following operations, on redband trout and bull trout. This evaluation should include an assessment of the behavioral changes and energetic impacts to the various species and life stages as they fluctuate flows with a load following operational scenario.

Background and Rationale

Bull trout and redband trout have been observed at all times of year in the mainstem Snake River below the HCC and they also utilize habitats within the Project area tributaries. The extent of their utilization of reservoir habitats has not been evaluated.

ODFW's comments on the DLA identified numerous flaws in IPC's instream flow analysis for redband trout and bull trout. Habitat suitability criteria developed by IPC for redband and bull trout were not available for review by ODFW when the DLA was released. These criteria should be made available as soon as possible so that ODFW and other fish agencies can reach consensus with IPC on appropriate criteria to apply in the modeling. In its technical reports, IPC acknowledges that it probably underestimated habitat availability for these species because of its study design and modeling analysis. IPC should model habitat throughout the year in response to Project operations and the shift in the thermal regime below Hells Canyon Dam.

ODFW believes IPC needs to re-evaluate the potential effect of load-following operations on native resident salmonids and other native resident fish species, including sturgeon. In our DLA comments, we identified numerous concerns with IPC's analysis of load-following operations.

Flow Requirements and Project Operations for White Sturgeon

A-6. The Licensee shall involve ODFW and other state and federal fish agencies in a consensus approach to assessing effects of project operations, including load-following operations, on white sturgeon. This evaluation should include an assessment of the behavioral changes and energetic impacts to the various life stages as they fluctuate flows with a load following operational scenario.

A-7. The Licensee shall determine the appropriateness of utilizing White Sturgeon Habitat Suitability Indices from the Columbia River for habitat assessment in the Snake River below Hells Canyon.

Background and Rationale

White sturgeon (*Acipenser transmontanus*) are broadcast spawners that release adhesive eggs into the current. The adhesive eggs tend to settle out and adhere to objects in slower velocity areas, often in shallow backwater habitats. These are some of the habitats most susceptible to being exposed to the atmosphere and desiccation due to flow fluctuations.

IPC states that proposed operations at the HCC significantly reduced modeled habitat below Hells Canyon Dam for early life stages of white sturgeon across all hydrologic year types (extreme low to extreme high) but not other life stages (Technical Report E.2.3-2). Suitability was primarily influenced by load following. IPC indicated that such Project effects are not important because it does not believe recruitment of early life stages is limiting the white sturgeon population. ODFW questioned this conclusion in our comments on the DLA. The white sturgeon population below Hells Canyon Dam is

17 fish/km, approximately half of the management goal of 32 fish/km and below levels necessary to sustain a harvestable fishery.

IPC utilized Habitat Suitability Indices (HSI) for all life stages of white sturgeon except for adults and juveniles developed on the Columbia River because these early life stages were too difficult to observe in the Snake River. Since these early life stages were presumably not too difficult to observe in the Columbia River, it implies they may utilize different habitat in the Columbia than in the Snake or that they are using similar habitat differently. IPC needs to explain how it validated that the criteria from the Columbia River are appropriate for use in the Snake River.

Flow Requirements and Project Operations for Fall Chinook Salmon

A-8. The Licensee shall assess the appropriateness of utilizing the juvenile fall chinook modeled developed for the mid-Columbia River for habitat assessment in the Snake River below Hells Canyon.

Background and Rationale

The model (Tiffan et al. 2001) IPC used to describe suitable fall chinook juvenile habitat does not appear to have been validated for the Snake River. It was developed for fall chinook in the Hanford Reach of the Columbia River. The only reference to the suitability of using this modified model in the Snake River is that it "...provided satisfactory results for biologists conducting similar research on the Columbia River" (DLA). IPC does not provide any comparison of the Hanford Reach of the Columbia River with the Hells Canyon reach of the Snake River. Information and assurance needs to be provided by IPC that these two river reaches are physically, chemically, and biologically similar or the model may not be directly transferable from one geographic location to another.

IPC does not explain its reason for using this model rather than the PHABSIM analysis it used for other species/life stages, nor is there any discussion of the advantages and disadvantages of using this different approach. Furthermore, IPC had to modify the Tiffan model (e.g. remove velocity as a variable) because IPC's hydraulic model (MIKE 11 1D) does not predict individual cell velocities. IPC used a "shoreline gradient only" adaptation without a discussion of how the two models might be related.

B. Upstream and Downstream Fish Passage

B-1. Within six months of license issuance, the Licensee shall, in consultation with state and federal agencies and tribes, prepare and begin to implement a comprehensive fish passage mitigation plan that addresses fish passage for all fish species affected by the HCC. This plan shall identify either: i) measures that IPC would implement in a phased-in approach to successfully pass fish upstream and downstream through the project through all phases of their life cycles; or ii) alternative mitigation measures that

IPC would implement in lieu of fish passage at the project. A phased-in fish passage plan for the HCC should include the following evaluations:

- a) Evaluate efficiency and effectiveness of adult fish collection using fish traps located at the base of each dam, including evaluation of adult movement from release sites to spawning locations in the mainstem Snake and tributaries.*
- b) Evaluate efficiency and effectiveness of juvenile fluvial fish collection using fish traps located at the base of each dam.*
- c) Model reservoir hydraulics to refine operations or structural changes that will assist juvenile migration through the reservoirs and project facilities.*
- d) Conduct physical modeling and prototype testing of alternative juvenile fish collection and turbine intake screening structures.*
- e) Conduct and evaluate habitat restoration projects in key tributaries to increase fish habitat production potential.*
- f) Conduct fish pathogen risk assessments to determine appropriate stocks to use for reintroduction and to monitor ongoing passage operations.*
- g) Test releases of excess hatchery juvenile fish to monitor their movement through tributaries and reservoirs and their collection at traps and other prototype systems. Measure survival and collection efficiency for each species and life stage tested.*
- h) As other components of the Plan reach benchmarks indicating high likelihood of success, install screening and collection facilities that are determined to be most effective based on modeling and prototype testing.*

Background and Rationale

Oregon's fish passage law (ORS 509.580 - 509.645) establishes a state policy that upstream and downstream passage is required at all artificial obstructions in those Oregon waters in which migratory native fish are currently or have historically been present. At existing hydroelectric projects, relicensing by FERC and reauthorization of a hydroelectric license or water right by Water Resources Department are the "triggers" that initiate consideration of fish passage. Applicants are required to request approval from the Oregon Fish and Wildlife Commission for a fish passage proposal or a waiver or exemption of fish passage. As part of a waiver proposal, an Applicant needs to develop an alternative mitigation package that provides a net benefit to fish species affected over the benefit of providing passage. IPC needs to comply with Oregon's fish passage statutes by requesting approval from the Oregon Fish and Wildlife Commission for a fish passage proposal, a waiver with proposed alternative mitigation in lieu of fish passage, or a fish passage exemption.

In ODFW's May 12, 1997 comment letter on the Formal Consultation Package, ODFW recommended that IPC investigate the feasibility of reintroducing salmon, steelhead (*Oncorhynchus mykiss*), and lamprey (*Lampetra tridentata*) to the Snake River and its tributaries blocked by construction of the HCC. ODFW recommended that at a minimum, IPC should provide a complete evaluation of anadromous fish habitats available, an estimate of production potential, conceptual designs for fish passage and

collection facility options that could be used to accomplish reintroduction and an assessment of the risks and benefits of reintroduction. ODFW recommended project decommissioning and dam removal be included in the options considered, and the assessment of risks and benefits should be comprehensive, including a full evaluation of the fish production, recreational, wildlife, and environmental outcomes anticipated from each reintroduction alternative.

In ODFW's comments on the detailed aquatic study plan, "Feasibility of Reintroduction of Anadromous Fish Above or Within the Hells Canyon Complex," ODFW strongly recommended that the relicensing studies culminate in clearly identified measures for evaluation and timelines for decision-making, as well as quantifiable goals and objectives. We indicated this would require outlining steps for analysis of alternatives and prototype testing, methods for measuring success, and critical decision points.

IPC's approach to evaluating engineering feasibility of fish passage has been primarily a review of upstream and downstream passage facilities that have been tested and installed at other dams. In ODFW's comments on the DLA, we noted that IPC should have focused its efforts on an engineering feasibility analysis specific to the HCC. This approach should include dam configuration evaluation, evaluation of engineering approach necessary to achieve the physical and biological objectives, and physical constraints and opportunities with different engineering designs and dam management activities.

Some of the studies ODFW believes should be initiated immediately have been identified by IPC as "Considerations for Future Study" in its June 2000 supplemental study plan. These include monitoring trap efficiency at Hells Canyon Dam, performing experimental releases of juvenile and adult fish, and juvenile and adult spillway survival tests.

Rationale for Fish Passage for Anadromous Fish

Fish passage through the HCC for a suite of species is essential to reconnecting the system ecologically. Over a million adult anadromous Pacific salmon and steelhead called the Snake River and its tributaries home in the area from Hells Canyon Dam (RM 247) to Shoshone Falls (RM 615). Runs of spring chinook salmon and steelhead were present in most of the major tributaries to the Snake River including the Pine, Powder, Burnt, Malheur, and Owyhee rivers in Oregon (Matthews and Waples 1991). Fall chinook salmon primarily inhabited the mainstem Snake River with the highest abundance upstream of the present-day Hells Canyon Dam site (Waples et al. 1991). Lamprey distribution is thought to have coincided with anadromous fish distribution. In addition to anadromous migrants, resident salmonids such as bull trout, redband trout, and whitefish and white sturgeon historically used the mainstem Snake River both for rearing and as a migration corridor.

Because the fish passage program required under the original license for the HCC failed and was abandoned, the Project effectively blocks access and upstream movement of salmon adults into the historic spawning areas above RM 247 and many important

tributary habitats. The dams further constrain the ability of smolts and juvenile fish to migrate downstream. The present day distribution of anadromous fish in the Snake River is restricted to below Hells Canyon Dam. Fall chinook, spring/summer chinook salmon, summer steelhead, and bull trout have been listed as threatened under the Endangered Species Act. These listings emphasize the need to provide mitigation that will increase or restore self-sustaining populations in historic ranges to ensure conservation of species. Furthermore, the HCC has eliminated connectivity between white sturgeon, bull trout and redband trout populations above, within, and below the Project. IPC needs to provide mitigation that will address the loss of natural fish production capability and loss of fish harvest opportunity from operation of the Project.

Rationale for Fish Passage for Native Resident Fish

Habitat fragmentation and degradation have been identified as the most likely limiting factors for bull trout throughout the HCC Recovery Unit (Draft Bull Trout Recovery Plan Chapter 13, United States Fish and Wildlife Service (USFWS) 2002). The HCC Recovery Unit includes bull trout populations from the Powder River, Pine, Indian, and Wildhorse creeks and Hells Canyon, Oxbow and Brownlee reservoirs. The three dams of the HCC lack passage and have isolated resident fish populations, reduced resident fish abundance within some segments, and disrupted resident fish movement between river segments. The HCC dams restrict movement of migratory bull trout within the Snake River and among tributaries, isolating tributaries and possibly contributing to the elimination of migratory bull trout in some streams (Grunder 1999).

IPC proposes passage of resident fish upstream of Hells Canyon and Oxbow dams once habitat and water quality are improved (DLA). IPC has not proposed measures to improve water quality outside of load allocations assigned the Project in the Snake River-HCC TMDL. Implementation and measurable water quality improvements as a result of the TMDL may take over 50 to 100 years (Tonya Dombrowski, IDEQ).

ODFW does not believe IPC's proposed measures for providing upstream passage at Hells Canyon and Oxbow dams will adequately mitigate for Project impacts to native resident fish. The proposed measures do not ensure passage above Brownlee Dam, nor are there any provisions to ensure safe downstream fish passage.

Rationale for Fish Passage for White Sturgeon

Technical Report E.3.1-6 Chapter 4 (Wittmann-Todd et al. 2001) reviewed fish passage concepts and options that are currently in use at other dams and considered applicability of these facilities for passing sturgeon at each of the HCC dams. The objective of this chapter was to provide a high-level overview of passage options that might be applicable at each dam and an "order-of-magnitude" cost estimate for each passage option. It also provided a qualitative assessment of the potential success for the various passage alternatives. However, Wittmann-Todd et al. (2001) acknowledge that further studies, backed by engineering analysis, are needed to fully investigate the feasibility of possibilities identified in the study. The authors recognize that this report was the first

step in considering potential sturgeon passage options and understanding constraints on passing sturgeon at each dam. Their lack of site-specific knowledge about downstream migrations of white sturgeon constrained their efforts to assess the viability of various options for passing sturgeon downstream.

Since their analysis was preliminary, Wittmann-Todd et al. (2001) indicate several types of research needs to be conducted: engineering concepts need to be developed and examined for engineering practicality, economic analyses need to be done to establish more precise cost estimates, and hydraulic testing and biological studies need to be done to determine how to make attraction systems at facility entrances most efficient and minimize the mortality of fish during passage. ODFW agrees with these conclusions and believes IPC should initiate such research be initiated immediately rather than postpone until license issuance.

C. Fall Chinook Habitat Protection Program

C-1. The Licensee shall implement a Fall Chinook Salmon Spawning and Incubation Protection Program. This Program should ensure stable flows in the Hells Canyon reach each year beginning October 1st through emergence of larval fish from redds. Flow should not decrease below 8,000 cfs. In addition, the Licensee should consult with ODFW, IDFG, NOAA FISHERIES, USFWS, and the U.S. Army Corps of Engineers to develop and refine specific details of the Fall Chinook Salmon Spawning and Incubation Program.

C-2. The Licensee shall fund and participate in annual spawning surveys and deep-water spawning surveys for Snake River fall chinook salmon. The Licensee shall conduct water temperature monitoring to determine timing of emergence from redds. The Licensee shall consult with ODFW, ODEQ, IDFG, NOAA FISHERIES, USFWS to identify the locations of monitoring sites and frequency of measurement.

Background and Rationale

Since 1991, IPC has operated the reservoirs of the HCC from October through May in a manner to protect fall chinook spawning and incubating. The flow program provides stable flows during the fall spawning period generally between 8,000 and 13,000 cfs. After the spawning period, IPC maintains the stable discharge levels as a minimum discharge until emergence is estimated to be complete during the following spring. The minimum discharge during the winter/spring incubation period is limited by the most critical shallow redd identified within the Hells Canyon reach. Although maintaining the minimum discharge required for winter/spring incubation, IPC operates the Project for “load following” (i.e., ramping) below Hells Canyon after the spawning period has ended.

In the DLA, IPC indicates modifications to the flow program are being evaluated and explored in cooperation with agencies involved in recovering Snake River fall chinook

salmon. Specific elements of the flow plan to be implemented in the new license have not been presented.

ODFW supports the fall chinook salmon flow program as partial mitigation for ongoing impacts of the HCC on this species. The HCC inundates 93 miles and blocks access to 118 miles of the free-flowing Snake River including the Marsing Reach, among the most productive fall chinook salmon spawning habitat in the Columbia Basin. The fall chinook flow program enhances available spawning habitat below the HCC, but does not fully mitigate for the habitat that is lost due to lack of fish passage at the Project and reservoir inundation. Additionally, ODFW is concerned that the resumption of load following operations after the stable flow releases may be having an adverse effect on anadromous and resident fish species. Large fluctuations in Project outflows often create adverse impacts to a variety of aquatic species. Thus, IPC needs to evaluate the effects of load following at the yearly conclusion of the fall chinook flow program on other fish and aquatic species.

ODFW supports IPC's continued monitoring of fall chinook salmon redds and temperature. ODFW also believes deep-water spawning surveys below Hells Canyon Dam should continue at regular intervals though less frequently than the shallow-water surveys.

D. Anadromous Fish Hatchery Compensation Program

D-1. The Licensee, in coordination with ODFW, shall prepare and implement a long-term, comprehensive monitoring and evaluation program for all four of its mitigation hatcheries. This program shall include monitoring of hatchery fish straying to natural spawning habitat.

D-2. The Licensee, in coordination with ODFW, IDFG, and federal and tribal agencies, will modify production goals to include adult returns and societal use.

D-3. The Licensee shall expand Oxbow Hatchery for fall chinook salmon broodstock collection and spawning.

D-4. The Licensee shall, in consultation with and with approval of ODFW, investigate and develop alternative fisheries in Oregon.

D-5. The Licensee shall implement facility upgrades and enhancements at each of its four hatcheries to ensure adequate water quality, the ability to warm and chill water, and sufficient numbers of containers to separate fish into test groups.

Background and Rationale

IPC's hatchery mitigation program was based on underestimates of the numbers of anadromous fish affected by the Project, and the existing program does not adequately mitigate for impacts to natural fish production and harvest opportunity in Oregon. Rather

than using trap counts to determine hatchery goals, hatchery production levels should have been developed taking into account trap efficiency, harvest, and interdam losses.

ODFW does not recommend increasing production at IPC's hatchery facilities. Rather, ODFW recommends habitat restoration measures and flow augmentation to increase natural fish production. Also, because IPC's hatchery program disproportionately affects Oregon's harvest opportunities, alternative mitigation should be proposed for the continuing loss to Oregon fishers.

Under its existing license, IPC operates and maintains four hatchery facilities and three adult fish collection traps as its primary mitigation for adverse effects of Project construction and operation. IPC proposes to continue operating these facilities with no changes in production capacity and only minor changes in structures and equipment, as necessary to improve operational efficiency and fish quality.

IPC's current mitigation hatchery program has no monitoring and evaluation component. Although IPC acknowledges that hatchery fish produced at IPC funded hatcheries are found as strays in natural spawning habitat, it has not evaluated the rate of straying for all stocks nor what measures could be taken to reduce stray rates. Ongoing monitoring and evaluation are necessary to improve the likelihood that desired program goals and objectives are attained.

ODFW's vision of successful mitigation from hatchery production is fisheries achieved, not smolts produced. Fishery opportunities in Oregon are severely limited by planting location and angler access. ODFW expects to work with IPC to make better use of the hatchery product and increase fishing opportunity for Oregon anglers.

E. Pacific Lamprey

E-1. The Licensee shall continue to collect information about Pacific lamprey that may be using tributaries below Hells Canyon Dam. Based on further analysis of project impacts on Pacific lamprey and after consultation with ODFW and other resource agencies with management responsibilities for lamprey, the Licensee shall implement measures to mitigate for impacts to Pacific lamprey caused by ongoing operations of the HCC. The measures need to be consistent with Oregon's fish passage and screening statutes as well as ODFW fish management and protection administrative rules.

Background and Rationale

Historical distribution of Pacific lamprey throughout the Northwest was similar to that of Pacific salmon. Within the Snake River Basin, these fish were observed at least as far upstream as Lower Salmon Falls. Construction and operation of the HCC has extirpated Pacific lamprey from areas within and above the Project. Hells Canyon Dam is currently the upstream terminus of migration within the Snake River.

No field studies were undertaken by IPC to determine the distribution of Pacific lamprey in the Snake River tributaries that are part of the relicensing study area below Hells Canyon Dam. Most importantly, IPC did not assess Project impacts on Pacific lamprey nor propose any mitigation measures for ongoing impacts to this anadromous fish species caused by Project operations.

F. Resident Salmonids Habitat Enhancement Program

F-1. The Licensee, in coordination with ODFW, shall identify and fund habitat enhancement measures in tributaries containing redband trout and bull trout within and above the Hells Canyon Complex.

F-2. The Licensee, in coordination with ODFW, shall fund measures to identify time and space barriers to bull trout and redband trout movement including water quality.

Background and Rationale

The HCC fragments native salmonids and other native resident fish species from populations below, within, and above the Project. The Project results in conversion of over 90 miles of free flowing river to a series of three reservoirs. Information on the extent and pattern of juvenile bull trout and redband trout migrations in HCC reservoirs is lacking.

IPC acknowledges that culverts at the four perennial streams entering the HCC are partial barriers, meaning they are likely having an adverse effect. ODFW also believes passage of resident salmonids from the reservoirs to tributaries is affected by deposition of bed materials from these tributaries into the reservoir causing streamflows to become intermittent at the confluence with the Snake River, especially at low or base flow conditions.

Flow alteration and Project operations affect available habitat and result in entrainment. Project operations also result in the proliferation of non-native species, resulting in competition for available resources. The extirpation of anadromous species within and above the Project affected resident salmonids through the loss of marine derived nutrients and an available prey base.

Violations of Oregon's water quality standards for temperature, dissolved oxygen and total dissolved gas are severe within the Project reach, and impair the populations of anadromous and resident fish, including threatened and endangered species. This issue is addressed in detail by the Oregon Department of Environmental Quality (ODEQ).

G. White Sturgeon

G-1. The Licensee shall provide mitigation for all four segments of the white sturgeon population: Swan Falls to Brownlee, Brownlee to Oxbow, Oxbow to Hells Canyon, and below Hells Canyon Dam. Mitigation should include purchasing or leasing water to

improve the chances that sturgeon will spawn and survive and measures to improve water quality.

G-2. The Licensee, in consultation with ODFW, shall conduct site-specific analysis of white sturgeon to determine potential effects of bioaccumulation of contaminants on reproductive success and recruitment.

Background and Rationale

Several factors, including degraded water quality, altered habitat, reduced flows and fragmentation by dams have been identified by the White Sturgeon Technical Advisory Committee as contributing to the decline of sturgeon productivity in the Hells Canyon Project reach. The three dams of the HCC have isolated sturgeon populations, reduced sturgeon abundance within some segments, and disrupted sturgeon movement between river segments. Three of the four reaches, Swan Falls to Brownlee, Oxbow, and Hells Canyon reservoirs, no longer support viable wild populations, and existing populations in these segments have declined to levels that make long term persistence questionable or unlikely

Simulated recruitment for white sturgeon in Brownlee, Oxbow and Hells Canyon reservoirs indicates that recruitment is limited by spawner limitations and poor summer water quality including lethal dissolved oxygen and temperature conditions (Jager et al. 2000, Technical Report 3.1-6 Chapter 3). High summer temperatures, combined with high nutrient loading, have contributed to lethal conditions in Brownlee Reservoir. In July of 1990 lethal dissolved oxygen conditions (< 1 mg/L) exacerbated by high water temperatures (25-26° C) caused the deaths of an observed 28 adult white sturgeon in the upper end of Brownlee Reservoir. Georgi (1993) noted that the chronic effects on white sturgeon spawning in “chemically polluted” water and rearing over contaminated sediments, in combination with bioaccumulation of contaminants in the food chain, is possibly reducing the successful reproduction and early-age recruitment to the Kootenai River white sturgeon population.

H. Macroinvertebrate Productivity as a Food Source for Fish

H-1. The Licensee shall provide further analysis of the causes of the reduced populations of macroinvertebrates in the 17.6 miles below Hells Canyon Dam.

H-2. The Licensee shall conduct and present results of the reservoir food habits study previously requested by ODFW. Based on the results of this study and after consultation with ODFW, the Licensee shall implement measures to mitigate for decreased macroinvertebrate productivity caused by ongoing operations of the HCC.

Background and Rationale

In ODFW’s comments on the DLA, we used data produced by IPC to conclude that the macroinvertebrate population is depressed for 17 miles below Hells Canyon Dam. We

requested that IPC test the effects of load-following and other hydropower operations on macroinvertebrate communities below the Project. ODFW also reiterated previous requests to IPC to study adfluvial populations of bull trout and redband trout to examine the food availability in the tributaries and the reservoirs to help assess whether reservoir operations affect the volume and availability of food for fish (Letter from Burchfield to Randolph, July 1999). Without the requested studies, ODFW cannot identify extent of Project impacts nor appropriate mitigation for ongoing Project impacts on macroinvertebrate populations and their availability as a food source for fish.

I. Stream Geomorphology and Sediment

I-1. Within six months after issuance of the new license the Licensee shall develop a written implementation plan that identifies measures that should be taken to mitigate for the lack of sediment transport from above the Project to the Snake River reach below Hells Canyon Dam. The plan shall incorporate all recommendations provided by the agencies during consultation.

I-2. If the plan developed in condition I-1 identifies gravel augmentation as the most effective means to mitigate for the interruption of sediment transport by the Project dams, then the Licensee shall initiate annual augmentation of bedload gravel supplies in the Snake River downstream of Hells Canyon Dam within one year of issuance of the new license. The licensee shall consult with ODFW and other state and federal resource agencies to determine the quantity, quality, and timing of the gravel augmentation.

Background and Rationale

Reductions of bedload supply and/or changes in bed stability are downstream geomorphic effects often associated with dams. Dams can reduce spawning gravel availability in downstream reaches and cause development of a coarse, relatively immobile surface layer. Dams can cause a number of changes to channel morphology or fluvial processes that can have deleterious effects on stream and riparian habitats, including channel incision and/or widening, increased bank erosion, and reduced channel migration.

The Oregon Plan for Salmon and Watersheds provides direction to state agencies to restore channel morphology to more natural conditions so as to ensure interaction with the floodplain, presence of meanders, channel complexity, and recruitment of gravel and woody debris to support habitat for rearing, holding and spawning by salmonids and other species of concern. The Oregon Water Resources Department in cooperation with other agencies will identify which hydroelectric facilities need a geomorphic analysis as part of the environmental evaluation for state reauthorization of these facilities.

In comments on IPC's DLA, ODFW identified numerous flaws in IPC's analysis of the Snake River basin geomorphologic processes and effects of the Project on sediment transport. ODFW also explained why sediment transport and deposition is important to us. Sediment composition is a critical factor in determining the effectiveness not only of

spawning habitat for fish species, but also in providing substrate for macroinvertebrate colonization, species that are essential food sources for fish species that ODFW manages. Sediment composition affects not only aquatic species but also terrestrial habitat and the species that depend on that habitat. ODFW described in our comments on the DLA that sediment transport affects the kinds of soils that have formed below Hells Canyon Dam, and that those soils facilitate or hinder the plant communities that are established in shoreline riparian areas. The diversity and number of bird, mammal and other terrestrial species are different, depending on the types of plant communities that are available in the Snake River reach below Hells Canyon Dam. Ecological communities are strongly influenced by the types and volumes of sediment that serve as essential building blocks of the landscape. (ODFW letter from Colleen Fagan to Craig Jones, January 10, 2003)

Additional analysis is needed before clear mitigation measures for Project impacts to sediment transport can be identified. In comments on the DLA, ODFW pointed out the following concerns with IPC's geomorphology and sediment transport analyses:

- There is insufficient data to substantiate IPC's "slug of sediment" theory.
- There is no documentation of sediment effects on the Snake River during the period prior to the closure of the HCC. A sediment budget has never been developed for the Snake River. IPC's conclusions are not based on any measurable sediment production information.
- The DLA does not address the downstream ecological effects of trapping more than 62,000 acre-feet of sediment and over 9 million tons of sand-size material in Brownlee Reservoir.
- The sampling strategy developed by IPC does not fully characterize the sediment deposition in Brownlee Reservoir.
- The DLA provides contradictory analysis regarding IPC's incipient motion and gravel movement hypotheses for the Hells Canyon Complex.
- ODFW believes IPC overestimated average sediment yield from tributaries below the HCC by an order of magnitude.
- The DLA utilizes unsubstantiated basin geomorphology hypotheses to draw implausible conclusions such as the "HCC neither caused sediment-starved floods, nor has been the sole, or even the primary, cause of the loss of sand-sized flood materials in the Hells Canyon Reach," (DLA).
- IPC uses unsubstantiated assumptions to discount analyses by Grams and Schmidt (1999a and 1999b) on Hells Canyon sandbar stability.

- ODFW believes IPC's assumptions regarding the mineralogy of bed materials above and below the Project do not provide conclusive evidence regarding effects of the Project on sediment transport.
- IPC's sediment entrainment estimates based on flow models and specified values of the entrainment threshold do not provide reliable estimates of spawning gravel transport and deposition.
- IPC's conclusion that operation of the HCC does not cause erosion is misleading. IPC should revise its shoreline erosion analysis.

ODFW identified the following analyses that needed to be completed in order to assess Project impacts related to sediment transport and to determine appropriate mitigation for these impacts:

- IPC needs to conduct an analysis of the effects of trapping over 9 million tons of sand that would have otherwise been available for transport and deposited downstream of the Project on sandbars and terraces and for riparian communities in Hells Canyon. This analysis should account for the sediment from several tributaries and side canyons that is trapped in Oxbow and Hells Canyon reservoirs. IPC should utilize a sampling strategy that fully characterizes the sediment deposition in Brownlee Reservoir.
- IPC needs to recalculate its average sediment yield from tributaries below Hells Canyon Dam.
- IPC needs to conduct a study to directly observe gravel motion in the field to understand gravel entrainment and transport.
- IPC needs to establish an annual sediment monitoring program to measure sediment transport into Brownlee Reservoir.

J. Water Use and Quality

General Comments

Violations of Oregon's water quality standards for temperature, dissolved oxygen and total dissolved gas are severe within the Project reach, and impair the populations of anadromous and resident fish, including threatened and endangered species. Toxic materials including mercury, Dieldrin and DDT are also of concern. While water quality issues are addressed in detail by the ODEQ, ODFW addresses specific concerns here as they relate to the beneficial uses of fish and wildlife.

Total Dissolved Gas (TDG)

J-1. The Licensee shall develop a plan in consultation with ODEQ and IDEQ for meeting the TDG allocation for the Hells Canyon Complex. This plan should include appropriate implementation measures, a timeframe and an effectiveness monitoring plan. The overall plan should be implemented prior to receiving the new license to minimize ongoing impacts. IPC should develop measures that will assure compliance with Oregon's 110% saturation standard below all three projects as required by the TMDL, Oregon water quality standards and the Clean Water Act.

Background and Rationale

Elevated total dissolved gases (TDG) can affect all aquatic organisms including fish and invertebrates. Elevated TDG can cause gas bubble disease in fish and ultimately be lethal. Lethality is dependent on the degree of supersaturation and duration of exposure. It is common for fish dying of acute gas bubble disease to die without actually showing visible external lesions. Fish may also succumb to secondary infections caused by stress or anatomical changes to body surface from elevated TDG (Weitkamp and Katz 1980).

High TDG concentrations persist in Oxbow and Hells Canyon Reservoirs and below Hells Canyon Dam for miles, often for months at a time. TDG levels up to 136% (ref: Snake River TMDL) occur below Hells Canyon Dam during spill events. At these TDG levels, juvenile and adult anadromous fish exhibit gas bubble disease symptoms and can be killed in laboratory and field experiments. Symptoms of gas bubble trauma have been identified in adult steelhead trout and chinook salmon captured at Hells Canyon Dam during periods of spill, and consequent elevated TDG concentrations. Though IPC reports that no symptoms of gas bubble trauma have been observed on juvenile fall chinook salmon in sampling conducted by the USFWS (William Connor, USFWS; Ahsahka, Idaho; personal communication) the uppermost sampling location was approximately 20 miles downstream of Hells Canyon Dam, where TDG concentrations would have dissipated to some extent.

ODFW considers symptoms of gas bubble trauma on adult anadromous salmonids returning to Hells Canyon Dam as strong evidence that TDG levels below the Project are detrimental to fish resources. Observations of both fish and TDG concentrations strongly suggest that TDG is causing impairment in the Project reach. IPC should avoid drawing conclusions about the effects of supersaturation to aquatic biota until sufficient monitoring is completed.

ODFW is not aware of any studies initiated by IPC to assess the impacts of high TDG on aquatic species within or below the HCC. IPC has not conducted any monitoring for signs of gas bubble disease, nor has it referenced ongoing research at other Columbia River and Lower Snake River projects. Additionally, IPC has not considered potential impacts to resident fish in the reservoirs and below the Project, specifically at their early life history stages. TDG levels above 110% saturation have proven harmful to salmon and steelhead in the Columbia River during monitoring of gas bubble disease, and impaired adults have been observed at the base of Hells Canyon Dam. IPC has not indicated that it intends to modify operations or structures sufficiently at Brownlee,

Oxbow or Hells Canyon dams to reduce TDG to meet Oregon water quality standards and its TMDL load allocation.

IPC cites the depth range of redband trout as being between 1 and 10 meters and a peak frequency of observations between 2 and 4 meters, and the depth range of bull trout between 1 and 8 meters and a peak frequency of observations between 2 and 3 meters, as substantiating its conclusion that redband and bull trout are not impacted by the high TDG levels below HCC dams. During spill events exceeding 2,500 cfs, total dissolved gas levels below Hells Canyon dam exceed the Oregon and Idaho water quality standards of 110% saturation. Total dissolved gas levels below Hells Canyon Dam reach as high as 136%. With IPC's reported dissipation of 10% for every meter of depth, redband trout and bull trout at 1 and 2 meters would still experience TDG levels above the state standard and demonstrated in the scientific literature to impact aquatic species. In addition, IPC did not conduct a study to examine the effects of elevated total dissolved gas levels on white sturgeon. Specifically, IPC did not sample larval or juvenile sturgeon, the life history stages where impacts and symptoms of gas bubble disease are likely to be highest.

Dissolved Oxygen

J-2. The Licensee shall immediately consult with ODEQ and IDEQ and implement measures to improve dissolved oxygen concentrations within and below the HCC. This plan should include appropriate implementation measures, a timeframe and an effectiveness monitoring plan. The plan should be implemented prior to receiving the new license to minimize ongoing impacts.

Background and Rationale

Dissolved oxygen concentrations below applicable water quality standards can persist for up to 8 miles downstream of Hells Canyon Dam during summer, and have been recorded to the mouth of the Salmon River. Between late August and mid-October, anoxic or hypoxic water is drawn into the turbine intakes, and often results in dissolved oxygen levels less than 6 mg/L for several miles. IPC reports that dissolved oxygen levels measured in the tailrace of Hells Canyon Dam can drop as low as 2.8 mg/L for several weeks during the late summer. The potential for impact to white sturgeon and other aquatic resources is significant. However, IPC has not conducted biological sampling to evaluate the site-specific effects of low dissolved oxygen concentrations on biota within or downstream of the HCC.

In July of 1990, lethal dissolved oxygen conditions (< 1 mg/L) exacerbated by high water temperatures (25-26° C), caused the deaths of an observed 28 adult white sturgeon in the upper end of Brownlee Reservoir. During the peak of summer, adult sturgeon have slow metabolic rates and they have less efficient gills than bony fishes for extracting dissolved oxygen from the water. Further, when fish are stressed, metabolic rate increases and they require more oxygen, hastening their demise in an oxygen-depleted environment.

Dissolved oxygen levels less than 8 mg/L can result in reduced size at emergence, reduced fitness, or direct death for salmon eggs and embryos. Dissolved oxygen concentrations of less than 6 mg/L can result in avoidance, delayed migration, reduced swimming speeds, reduced fecundity, reduced spawning condition, or death for juvenile and adult salmon. The absence of prespawn adults within the upper river section when observed dissolved oxygen concentrations are low may indicate that low dissolved oxygen levels affect the distribution of adults, potentially forcing them into less suitable habitats for spawning. An estimated 100 adult steelhead were killed immediately downstream of Hells Canyon Dam as a result of low dissolved oxygen concentrations after being trapped between a dam structure and the canyon wall on October 8, 2002.

Temperature

J-3. The Licensee shall immediately consult with ODEQ and IDEQ to develop and implement a temperature management plan. This plan should include implementation measures, a timeframe and an effectiveness monitoring plan. The plan should be implemented prior to receiving the new license to minimize ongoing impacts.

Background and Rationale

The presence of the Project causes a temporal shift in the thermal regime below Hells Canyon Dam. HCC project operations result in delayed fall cooling and delayed spring warming, as compared with seasonal changes in the river upstream of the HCC. ODFW is concerned with the effect of this shift in thermal regime, particularly on fall chinook salmon, resident salmonids, and sturgeon below Hells Canyon Dam.

Fall chinook outmigration timing has shifted as a result of changes in the thermal regime from HCC construction and reservoir operations. Historically, before Hells Canyon Dam and the lower Snake River dams were built, all races of chinook salmon had migrated past the Lower Granite Dam site by the end of June. The present outmigration timing for fall chinook has been artificially delayed to late spring and summer, ranging from May through August, with migration past Lower Granite Dam peaking in early- to mid-July.

Although IPC recognizes that fall chinook outmigration timing has shifted from pre-dam eras, it does not acknowledge that the HCC projects have played a key role in creating this shift. Connor et al. (2002) conclude that dam construction changed juvenile fall chinook salmon life history in the Snake River basin by shifting production to areas with relatively cooler water temperatures and comparatively lower growth opportunity. They report that on average, winter-spring water temperature for brood years 1960-1969 were 1-3° C warmer in the Marsing reach of the Snake River than in current fall chinook spawning areas during brood years 1991-1998. Mean spring water temperatures were also an average of 2-4° C warmer in the Marsing reach of the Snake River than in current spawning areas. Consequently, smolt emigrations do not begin until late spring and summer. Smolt passage in the lower Snake River reservoirs now occurs after spring runoff has ended, when summer temperatures have reached critical levels (Connor et al. 1998).

IPC reports that in addition to prolonging the fall cooling of water temperatures, the HCC has also led to generally warmer conditions during much of the incubation period for fall chinook salmon. This conclusion is based on water temperatures at the oxbow for the years 1954-1956. It concludes, based on thermal unit accumulation, the altered thermal regime below Hells Canyon Dam has shifted present emergence to an earlier date than would have been seen in the same reach before the HCC (Technical Report E.3.1-2, Chapter 5). Even with the delayed growth potential of the earlier emergers, these fish should have outmigration times similar to, if not earlier than, those reported by Mains and Smith. Yet today, on average, less than 50% of the fall chinook outmigration is complete by the end of June (Connor 2001).

ODFW believes that cooler spring temperatures likely delay incubation rates and growth rates (Weatherly and Gill 1995). Depending on flow year, delayed spring cooling below Hells Canyon Dam can delay emergence between 1-4 weeks. Smolts do not out-migrate until a critical size or temperature threshold is reached. Hence, delayed emergence is either delaying out-migration or the fish are smaller at migration, or both. Both of these impacts can result in mortality and decreased survival (Connor et al. 1998). Snake River fall chinook salmon appear to abandon rearing areas and begin active migration when temperatures exceed 17°C (Connor et al. 1999). This later migration timing may result in missing the window of migratory opportunity for making the physiological changes necessary for entry into salt water.

Construction of the HCC has extended prespawn adult fall chinook salmon exposure to water temperatures above 14.5°C by approximately two to three weeks over reaches upstream of the HCC (Technical Report E.3.1-2, Chapter 5). IPC indicates that the temperatures below Hells Canyon Dam are above the range suitable for gamete viability during holding (>13-16° C, Poole et al. 2001). IPC further indicates that during October, all monthly mean temperatures in all reaches except the upper Hells Canyon reach decline to below 14° C (Technical Report E.3.1-2, Chapter 5). It is still unclear if or when temperatures below Hells Canyon Dam cool to the same temperature as those above the HCC and in the Marsing Reach.

IPC concludes there is no apparent effect of prolonged exposure to warmer temperatures in the fall on spawn timing (Technical Report E.3.2-2, Chapter 5 and Technical Report E.3.1-3, Chapter 1). Connor et al. (2002) refer to unpublished Idaho Department of Fish and Game (IDFG) redd data that suggests fall chinook salmon in the Marsing Reach spawned at about the same time if not earlier than spawners in the contemporary areas. ODFW believes that the altered thermal regime of the Snake River downstream of the Project has delayed spawning timing or at the very least has restricted fish to spawning and rearing in habitat where the thermal regime is not as suitable as that found upstream of the project.

In the upper Hells Canyon reach, temperatures above 16° C occur on average between October 10 and 18. The literature suggests that redds constructed during this time may have lower survival rates than redds constructed later. Therefore, approximately 2% of

the redds in an average spawning distribution would be affected by elevated temperatures. Further, incubating fall chinook eggs in redds constructed early in the spawning period may be affected by the delayed cooling effect in the fall. Given that Snake River fall chinook salmon are listed as threatened under the Endangered Species Act and escapement remains low, ODFW would argue that an impact of 2% to the redds of a threatened species is a significant impact.

Despite IPC's assertion that the effects of delayed fall cooling on bull trout are negligible because of the refuge they must already seek during winter, ODFW continues to believe the shift in thermal regime impacts native salmonids. The delayed cooling results in a measurable increase in temperature and a violation of the applicable Oregon water quality standard. Delayed cooling in the fall likely delays redband trout and bull trout movement into the Snake River from adjacent tributaries. This eliminates use of the Snake River and reservoirs as migration corridors and rearing habitat for some period of time.

Mercury and Organochlorines in Aquatic Life

J-4. The Licensee shall conduct a study to determine mercury, Dieldrin, and DDT/DDE levels in fish in Brownlee Reservoir. This data should be used in biomagnification of analytes modeling, including bald and golden eagles as target species.

J-5. The Licensee shall conduct site-specific analysis of white sturgeon to determine potential the effects of bioaccumulation of contaminants on reproductive success and recruitment.

Background and Rationale

Mercury

All fish tissue data available in the Snake River-Hells Canyon (SR-HC) reach are positive for mercury and Oregon levels of concern were exceeded by 80% (0.35 mg/kg). The mercury concentrations exceed the fish tissue target established by the TMDL. Both Oregon and Idaho have issued fish consumption advisories based on these exceedances. Additional concerns exist associated with the consumption of fish by waterfowl and wildlife, particularly federally listed species such as bald eagles. However, water column data are not available to allow assessment of the use support status of aquatic life due to mercury concentrations within the SR-HC system.

Organochlorines

ODFW also remains concerned with the potential negative impacts of bioaccumulation of organochlorines in wildlife that consume fish in the HCC reservoirs. Fish containing high levels of these pesticides can pose a health threat to predatory wildlife. Most at risk are those predators of larger fish that are several years old such as bald and golden eagles, both of which inhabit areas of Hells Canyon. IPC reviewed the 1998 United States Geological Survey (USGS) study, "*Organochlorine Compounds and Trace Elements in*

Fish Tissue and Bed Sediments in the Lower Snake River Basin, In Idaho and Oregon,” to draw conclusions regarding effects of contaminants on fish and fish-eating wildlife. Additionally, biomagnification of analytes was modeled for the otter and great blue heron.

The USGS report provided data that were of limited value in predicting the potential for effects through food web exposures. The data also have a high degree of uncertainty associated with them for the purposes of food-web modeling (Technical Report E.3.2-22). Therefore, ODFW recommended site-specific analysis, including evaluation of potential effects to bald eagles (Letter from Burchfield to Kleckner, May 1997).

All fish tissue data available in the HCC reach were positive for t-DDT. Both DDT and dieldrin bio-concentrate in fatty tissues. All fish tissue samples exhibited levels above the United States Environmental Protection Agency screening level but below the United States Food and Drug Administration action level for contaminants in edible fish (USGS Clark and Maret 1998 and USGS Rinella et al. 1994). Concentrations of DDT and dieldrin were also observed to exceed the National Academy of Sciences and National Academy of Engineering criteria to protect fish and wildlife that consume fish within the Upstream Snake River and Brownlee Reservoir.

The primary sources of these compounds in surface waters are legacy deposition and continued agricultural runoff from previously treated areas. As these compounds are no longer in use today, the transport and delivery of pesticides adsorbed to entrained sediment and organic material is the most likely source of continued loading to the mainstem Snake River. IPC concludes that “contaminants accumulate in the inundation zone of Brownlee Reservoir independently of Hells Canyon Complex operations and that any risk reduction possible from remediation efforts in Brownlee Reservoir would be negligible” (Technical Report E.3.2-22). However, IPC fails to acknowledge the effect of the HCC on settling and accumulation of organic material in Brownlee Reservoir.

Georgi (1993) noted that the chronic effects on white sturgeon spawning in “chemically polluted” water and rearing over contaminated sediments, in combination with bioaccumulation of contaminants in the food chain, is possibly reducing the successful reproduction and early-age recruitment to the Kootenai River white sturgeon population. ODFW earlier recommended site-specific analysis of white sturgeon to determine potential effects of bioaccumulation of contaminants on reproductive success and recruitment, but IPC did not implement the recommendation.

Water Quality Monitoring

J-6. The Licensee shall implement water quality monitoring measures immediately in order to better inform the water quality-related PM&E measures. IPC should work with ODEQ and IDEQ and the fisheries agencies to develop appropriate and meaningful monitoring measures.

Background and Rationale

ODFW notes that IPC does not provide specific measures for monitoring water quality. Despite past requests from ODFW, IDFG, Washington Department of Fish and Wildlife, NOAA Fisheries, and the United States Fish and Wildlife Service (USFWS) to install a permanent total dissolved gas and temperature monitoring station below Hells Canyon Dam, IPC has refused to do so (June 23, 1997 letter to Steve Herndon). ODFW understands that monitoring will be required under Oregon's 401 certification, and will coordinate with ODEQ to ensure that ODFW data needs are met under future monitoring requirements imposed by the water quality certificate as mandatory conditions on HCC's new FERC license.

Terrestrial Resources

K. Ongoing Terrestrial Habitat Losses associated with HCC Operations

K-1. The Licensee shall conduct a study to evaluate alternatives, including changes in Project operations, to reduce erosion below Hells Canyon Dam.

Background and Rationale

ODFW disagrees with IPC's conclusion in the DLA that HCC operations have little or no effect on shoreline bank erosion below Hells Canyon Dam. IPC concludes that because HCC operations have little effect on flows greater than 30,000 cfs, the Project has had little or no effect on shoreline bank erosion below Hells Canyon Dam (Technical Report E.1-4).

ODFW noted in its comments on the DLA that the occurrence of 30,000 cfs flows in February increased from 11% prior to dam construction to 21% post dam construction. Moreover, evidence suggests that the greatest change to the Snake River flow regime from dam construction is in the daily and hourly flow fluctuations (Grams and Schmidt 1999). Prior to construction of HCC, the change in discharge over a six-hour period was between 250-500 cfs. Following closure of the dams, the average change in discharge over a six-hour period increased to 11,950 – 12,070 cfs. Hourly fluctuations below Hells Canyon Dam generally range between 2,000 to 3,000 cfs. These large daily and hourly flow fluctuations are likely to have a greater effect on the rate of erosion of sandbars and terraces than the frequency of high flow events.

In the DLA, IPC cites studies demonstrating that riverbank erosion is a natural geomorphic process that cannot and should not be completely eliminated (Olson 1983, Dorova and Moore 1997). While ODFW does not disagree with this statement, we add that the geomorphic process of erosion needs to be accompanied with deposition from upper reaches to truly be considered a "natural" process.

K-2. The Licensee shall establish and fund a Fish and Wildlife Habitat Mitigation Program. Early implementation of this Program shall begin as soon as possible, and credit shall be accepted for habitat mitigation prior to license issuance if the multi-

agency committee described in “c” below has pre- approved such properties for this purpose. The following elements should be included in this Program:

- a) The goal of the Fish and Wildlife Habitat Mitigation Program shall be to mitigate for habitat affected by ongoing project operations utilizing a 3:1 ratio, in which 3 acres of habitat mitigation is provided for every 1 acre that is lost by ongoing project operations.*
- b) The Fish and Wildlife Habitat Mitigation Program shall identify dedicated funds for riparian, wetlands, and riverine lands mitigation.*
- c) The Fish and Wildlife Habitat Mitigation Program shall be implemented by the Licensee with guidance and approval of a multi-agency committee, comprised of representatives from fish and wildlife agencies, federal land management agencies, Native American Tribes, and IPC.*
- d) The Fish and Wildlife Habitat Mitigation Program clearly identify fish and wildlife habitat enhancement and public access for fishing and hunting as important objectives.*
- e) The Fish and Wildlife Habitat Mitigation Program shall include acquisition and holding of lands or easements by IPC that are managed to maximize wildlife habitat and include public fishing and hunting opportunities.*
- f) The Fish and Wildlife Habitat Mitigation Program shall specify approved uses of the land to assure that the major goals of the program are not compromised. Compatible uses could include low impact recreation opportunities such as hiking trails and access to the river bank and wildlife habitat protection and improvement projects. All lands acquired for conservancy purposes should have development restrictions, limiting and controlling human access and impacts.*
- g) Property that contains degraded wildlife habitat may be considered if measures are included to restore the land to increase wildlife habitat.*
- h) Sites for potential acquisition or conservation easements should include lands around Brownlee Reservoir, the Powder River Arm, or the Lookout Mountain or Pine Creek Management Units.*
- i) Criteria for managing the Fish and Wildlife Habitat Mitigation Program shall be developed jointly by the Licensee and the multi-agency committee described above. Criteria should include, but not be limited to, numbers of species positively affected, habitat connectivity, habitat values, public access for fishing, hunting, observation, and proximity to other public lands or high value lands.*
- j) Properties that provide protection or restoration of habitat that benefits both aquatic and terrestrial species, such as riparian habitats, shall be given priority over those that benefit single species or species types.*
- k) The Fish and Wildlife Habitat Mitigation Program shall include criteria to ensure consistency with ODFW’s management policies and rules.*

Background and Rationale

Effects of Project Operations on Riparian and Upland Habitat

In the DLA, IPC reports that proposed operations, when compared with full pool run-of-river operations, would prevent 343 acres of riparian habitat from establishing in areas of the Brownlee Reservoir shoreline zone that are currently occupied by upland habitat. IPC proposes to mitigate for this impact through habitat acquisition, restoration, or development of 343 acres of riparian vegetation (DLA @ E.3-591). IPC also concludes that mitigation for 343 acres of riparian habitat would constitute mitigation for habitats of threatened, endangered, candidate, and special status species that would be affected by proposed operations of the HCC.

ODFW believes that a 3:1 ratio for habitat protection is needed to adequately mitigate for the loss of 343 acres of riparian shoreline habitat and the ongoing impacts to terrestrial resources caused by this habitat loss. Critical low elevation habitat in the Snake River canyon and winter range cannot be replaced or created. There is no land of equal value in Hells Canyon because there is no other land at that low elevation. Suitable land for wintering mule deer is already being used and “new” land does not exist. Therefore, the best approach is to manage land parcels to achieve enough *improvement* in habitat “quality” of those acres to mitigate for the negative effects of the dam and its operation. Additionally, ODFW does not agree that a 1:1 ratio provides sufficient habitat to mitigate for ongoing impacts to threatened, endangered, candidate and special status species affected by this habitat loss. The timeframe for acquisition and enhancement to meet desired habitat characteristics and site potential also needs to be considered in acreage. Until this acreage is acquired and enhanced or protected impacts to terrestrial resources will be ongoing and require mitigation.

Effects of Reservoir Fluctuation on Riparian and Upland Habitat

In the DLA, IPC supplies estimates of riparian (388 acres) and upland habitat (5,761 acres) that would be prevented from establishing in the fluctuation zone. IPC concludes, “the protection (for example, through acquisition) and enhancement of riparian and upland wildlife habitat would constitute appropriate mitigation for operational impacts to the reservoir fluctuation zones” (DLA @ 412-413).

While ODFW agrees with IPC’s concept of land acquisition and protection to mitigate for this ongoing loss, we disagree, however, with the acreage proposed for permanent protection. As stated above, a 3:1 ratio for habitat mitigation is appropriate, given the fact that low elevation habitat is limiting in the Project vicinity.

Effects of Reservoir Fluctuations on Shoreline Habitat in Oxbow and Hells Canyon Reservoirs

IPC concludes in the DLA that Project operations enhance the establishment of riparian habitat along Oxbow and Hells Canyon reservoirs’ shorelines during full pool (DLA@E.3-590). IPC draws this conclusion by hypothesizing that small and regular daily water-surface fluctuations create an irrigation effect that promotes riparian establishment (Technical Report E.3.2-44). ODFW does not agree with IPC’s “irrigation effect” hypothesis, and instead believes reservoir fluctuations restrict riparian habitat in

Oxbow and Hells Canyon reservoirs, although these impacts should be less than in Brownlee reservoir, which has larger fluctuations.

K-3. The Licensee shall develop, in consultation with ODFW and other state and federal resource agencies and Native American Tribes, a Resource Management Plan for 3,450 non-flooded acres of property owned by the Licensee within the FERC project boundary and for 1,850 acres within Hells Canyon but outside of the project boundary. The Resource Management Plan shall identify specific management priorities for Licensee properties, including habitat protection and restoration. ODFW and other state and federal resource agencies and Native American Tribes shall be invited to participate in a management advisory committee to identify which properties should be managed as habitat mitigation sites, and to advise on best management practices for those properties. The Licensee shall begin management of its properties for habitat protection and restoration prior to receiving the new license. The Resource Management Plan shall describe ongoing maintenance and improvements needed to protect habitat values through the new license term.

Background and Rationale

IPC owns 3,450 non-flooded acres of land within the FERC Project boundary and another 1,850 acres within Hells Canyon but outside the Project boundary. These Project lands are used primarily for operation and maintenance (O&M) of the complex with secondary uses such as recreation and livestock grazing. These uses, other secondary uses, and Project operations affect and impact wildlife and botanical resources. In the DLA, IPC proposes to manage certain Applicant-owned lands to 1) protect wildlife resources from potential impacts, 2) mitigate for identified impacts to wildlife resources, and 3) enhance the future value of wildlife resources.

ODFW agrees with the general concept that IPC proposes for managing properties it owns within the Hells Canyon area. However, ODFW is concerned with the decision-making structure that is vaguely described in the DLA. IPC indicates that an Interdisciplinary Team would create and implement the integrated wildlife habitat program and develop wildlife management goals and objectives for Applicant-owned lands. The Interdisciplinary Team would be comprised of IPC employees including scientists, planners and resources specialists representing all of the relevant resource issues. ODFW believes that management of IPC-owned properties cannot be considered mitigation for Project impacts for lost habitat unless ODFW and other relevant agencies are involved in development and implementation of the management plan.

L. Project Impacts to Mule Deer and Other Large Mammals

L-1. The Licensee shall establish and fund the Land Protection Plan and Program identified in condition "K-2" to include up to 53,000 acres of winter range wildlife habitat. Early implementation of this Program shall begin as soon as possible, and credit shall be accepted for properties protected prior to license issuance if the multi-agency committee has pre- approved such properties for this purpose. The Licensee's

Land Protection Program needs to be consistent with ODFW wildlife and habitat mitigation policies and objectives.

Background and Rationale

Hells Canyon has been identified as one of the most important big game winter ranges in the region. Mule deer are important ecologically and economically and much of their critical winter habitat in northeast Oregon is associated with the HCC. IPC and state and federal biologists identified upland habitats immediately adjacent to the HCC reservoirs as crucial/critical winter range for mule deer and most likely elk and other big game species. The HCC reservoirs inundated much of the lowest-elevation wildlife habitat and crucial winter range in the region. Wetland, riparian and upland plant species were inundated as well as upland and riparian associated rare plant species. An estimated 12,000 acres remain inundated by HCC reservoirs (GIS analysis conducted by Brent Grasty, Bureau of Land Management (BLM), personal communication).

Current and proposed operations permanently and completely eliminate the capability of the inundation and fluctuation zones to support quality wildlife habitat. Riparian and upland habitats inundated by the HCC reservoirs will not be available throughout the term of the next license. These riparian zones had the ability to provide high quality habitat for riparian dependent and associated species, including threatened and endangered species. This low elevation crucial winter range cannot be created nor can enhancement of adjacent land fully mitigate for its loss.

One of the major and startling findings of the Wintering Mule Deer Ecology Study (Technical Report E.3.2-32) was the unsustainably large, annual mortality rate of mule deer. For the three years of the study, there was an annual mortality rate of about 25% for adult does (or one quarter of the population). The higher documented mortality rate for fawns and bucks was expected. For does, an annual mortality rate of 7-10% is expected for an animal that has a life span of 12-13 years. Based on population modeling of deer in this area, a maximum rate of 15% is required to sustain the population, unless fawn survival becomes higher than documented in the last 20 years (George Keister, ODFW Baker District Wildlife Biologist, personal communication). Reservoir related mortality was estimated at 10%. If that mortality was removed, adult doe mortality would fall to 15%, which is the upper limit required to sustain the population. It would be erroneous to assume that because mule deer have coexisted with the dam operation for the last 50 years, they will continue to flourish there in the future. In fact, if something does not happen to improve survival rates for deer in the area, the population could crash in the foreseeable future.

IPC estimated reservoir-related mortality directly from drowning and indirectly from reservoir crossing, reservoir ice, and shoreline use (Technical Report E.3.2-32 and E.3.2-45). IPC estimated that deer, while on the HCC winter range, had a 10% annual probability of succumbing to reservoir-related mortality during years with mild to moderate winter conditions (Technical Report E.3.2-32). Using historic data reported in Technical Report E.3.2-30, IPC also estimated that, during winters with harsh conditions

(for example, winters with cold temperatures, deep snow, and extensive reservoir icing), the deer had an additional 9% probability of reservoir-related mortality (Technical Report E.3.2-45).

Therefore, IPC concluded that proposed operations of Brownlee Reservoir would negatively affect the capability of the Hells Canyon Complex winter range to support mule deer (as measured by deer mortality) by the cumulative effects of 0.10 and 0.09 habitat coefficients to the 86,408 acres of crucial winter range, IPC estimates that 16,418 acres (8,641 acres = $0.10 \times 86,408$ and 7,777 acres = $0.09 \times 86,408$ acres) of habitat would be required to mitigate for impacts to the habitat capability of crucial winter range (Technical Report E.3.2-45). IPC also concluded that both reservoir-related mortality and the loss of low-elevation winter habitat impacted deer and IPC estimated that 582 acres of habitat, in addition to 5,819 acres of low-elevation habitat prevented from establishing in the fluctuation zone of Brownlee Reservoir would be required to mitigate for winter range that is unavailable in this zone of Brownlee Reservoir.

ODFW concurs with IPC's conclusion that proposed operations of Brownlee Reservoir negatively affect the capability of the HCC winter range to support mule deer. However, IPC's analysis failed to include the reduced capability of the HCC winter range as a result of ongoing inundation of 12,000 acres.

Additionally, ODFW believes mitigation should also be provided for the effect of the Project on inhibiting migration of mule deer and other large mammals. In the DLA, IPC reports that deer successfully swim across the reservoirs during all seasons and at all water-surface elevations (DLA @ E.3-452-453). Further, IPC concludes in Technical Report E.3.2-32 that Brownlee Reservoir, even when at full pool, does not appear to prevent deer from successfully swimming between Idaho and Oregon. ODFW disagrees with IPC's conclusion that the HCC does not significantly inhibit mule deer movements. ODFW provides detailed justification for this recommendation in our comments on the DLA.

Based on the many sources of Project impacts to large mammals, ODFW believes that a Habitat Mitigation Program that will provide up to 53,000 acres of permanently protected winter range habitat for mule deer and other large mammals is warranted.

L-2. The Licensee shall plan and conduct a study of a hard winter on wintering mule deer whenever the next hard winter occurs. The study shall assess the effect of icing on passage and direct mortality. The study shall include aerial surveys over Hells Canyon the next spring to determine fawn survival relative to adults and determine habitat use.

L-3. Based on the results of the study required by condition "M-2," the Licensee shall develop and implement contingency mitigation measures that would be implemented if the study confirms adverse impacts to mule deer populations.

ODFW identified big game mortality associated with reservoir icing as an issue early in the relicensing process. Deer and elk of the Hells Canyon area traditionally migrated to

low elevation winter range in the riparian areas adjacent to the Snake River. Dam construction inundated this low elevation, critical habitat and created in its place three large reservoirs. These reservoirs may inhibit wildlife movement, particularly deer, and disrupt traditional migration routes and travel corridors between Oregon and Idaho. In years subsequent to dam construction and reservoir creation, ODFW and IDFG wildlife biologists have noted significant big game mortalities associated with stranding on reservoir ice. Additionally, it appears that coyotes actively drive deer onto the ice where big game becomes more vulnerable to predation due to unsure footing.

ODFW was very supportive of the proposed study “Effects of Reservoir Icing on Big Game Populations.” However, during the winters of this study (January 1999-December 2001), the study area experienced overall higher than average winter temperatures and lower than average precipitation and snowfall (Technical Report E.3.2-45.). Researchers were not able to determine the extent and amount of wildlife mortality associated with reservoir icing, and a modeling approach was used that could not make such predictions. In ODFW’s comments on the DLA, we provided extensive justification for repeating the study during severe winters.

L-4. To reduce and avoid adverse effects of project roads on wildlife species, the Licensee shall schedule O&M activities that utilize project roads to avoid the crucial winter range during winter months and cooperate with ODFW and federal land management agencies to initiate appropriate temporary road closures if human disturbances begin to negatively affect wildlife species.

Background and Rationale

Negative effects to wildlife species occur from roads along Oxbow and Brownlee reservoirs. The road along Oxbow Reservoir has had the most negative impacts on wildlife because the road is paved and people often drive at high speeds. Numerous collisions have occurred with mule deer and several have been documented with bighorn sheep, during both summer and winter. In addition, both roads provide considerable public access to these areas during all times of the year, which allows harassment to deer and bighorn sheep during the critical months of winter. Also, harassment precludes elk from wintering on the Oregon side of the Snake River along the Oxbow and Brownlee pools, causing damage to private properties elsewhere. In contrast, downstream of Homestead, where there is no road on the Oregon side, there have been no collisions with vehicles and big game and elk winter along Hells Canyon Reservoir.

L-5. The Licensee shall develop and implement, in cooperation with ODFW, a winter big game feeding program for Oregon wildlife populations in the project vicinity. The program shall include plans for purchasing and distributing feed.

Background and Rationale

In recent years, IPC has assisted ODFW with winter feeding of deer during hard winters. ODFW greatly appreciates this assistance and believes that it helps to offset losses to

large wildlife associated with reduced winter range habitat associated with ongoing Project operation.

M. Project Impacts to Bald Eagles

M-1. The Licensee shall prepare, in consultation with ODFW and other wildlife agencies, a Bald Eagle Protection Plan that utilizes adaptive management techniques for determining most effective measures for improving bald eagle habitat and productivity. The Plan should focus habitat management on protection of potential perch and nesting trees and roosting habitat. The Plan should identify opportunities to increase trees in the project area. The Plan should also identify mechanisms to control human activities where they conflict with bald eagle use. The Plan should include annual monitoring of bald eagle habitat utilization and reproductive success.

Background and Rationale

In the DLA, IPC concluded that perch sites were not limiting and that there was little human disturbance to bald eagles in Hells Canyon. ODFW biologists believe perching, nesting, and roosting habitat is probably limiting to bald eagles in Hells Canyon (George Keister, Vic Coggins, and Mark Henjum, ODFW, and Jim Clark, BLM, personal communication). Frank Isaacs Oregon State University(OSU)), lead author of Technical Report E.3.2-17, also believes this habitat is probably limiting (personal communication, November 2002). ODFW provides additional rationale and justification for these recommendations in its January 10, 2003 comments on the DLA.

N. Effects of Increased Human Activities on Wildlife Species

N-1. In consultation with ODFW, the Licensee shall develop and implement a public information and education program to inform the public about adverse effects of human disturbances on wildlife species and their habitat. This program shall include recommended measures that the public can take to minimize disturbances. The program shall identify strategies that the Licensee will implement to avoid and control human disturbances of wildlife, including bald eagle nesting disturbances and riparian habitat protection during passerine migration and nesting periods.

Background and Rationale

Construction of the HCC and associated parks has increased the number of visitors to the HCC. Impacts to terrestrial resources occur through dispersed recreation and damage to the riparian zone, vehicle collisions with wildlife, harassment of wildlife, and lost habitat as a result of construction of parks, facilities, transmission lines, roads, and reservoirs. Parks and dispersed recreation are located in low elevation flat areas. These are areas that are critical to deer, elk, and other wildlife species and extremely limited in extent by construction and operation of the HCC.

IPC concludes that during most years, winter recreational activities would not significantly impact big game or winter range. Nevertheless, IPC recommends developing a program for educating the public about minimizing disturbance impacts to big game and winter range during critical periods. IPC also concludes that current levels of human activities do not displace bald eagles in Hells Canyon. However, an adaptive strategy for managing bald eagles in Hells Canyon, one that includes annual monitoring, would help negate future impacts to nesting bald eagles from increased levels of human activities. ODFW agrees with this conclusion.

IPC concludes that special status passerines are probably affected by human use of riparian habitats associated with IPC's facilities and recreation sites (Technical Report E.3.2-46). ODFW agrees that special status passerines are affected by human use of riparian habitats associated with IPC's facilities and recreation sites. These bird species would benefit from management programs that enhance riparian habitat and protect this habitat from high levels of human activity during migration and nesting periods.

Human disturbance during the winter recreation period may also contribute to the excessive mule deer mortality rates documented by IPC. In addition, elk appear to avoid the Project area where roads are present on the Oregon side of the Snake River due to human recreational activities. Human harassment of two bighorn sheep populations during the winter is also of concern to ODFW.

N-2. The Licensee shall develop a plan to avoid new impacts and mitigate for ongoing impacts to low elevation habitat and terrestrial species caused by human activities at dispersed sites on licensee-owned land.

Background and Rationale

IPC indicates in the DLA that about 37 acres of vegetation have been wholly or mostly destroyed by recreation activities at dispersed sites on IPC's land. People and vehicles have trampled and compacted these lands, increasing their susceptibility to soil erosion and weed invasion.

N-3. The Licensee shall develop a comprehensive evaluation of the effects of human activities on botanical resources and plant communities. The evaluation shall include proposed mitigation for these impacts. In consultation with ODFW and other federal and state resource agencies, the Licensee shall implement mitigation measures for these impacts.

Background and Rationale

IPC indicates that there are potential impacts to botanical resources from human use activities associated with 29 of IPC's facilities, 4 Applicant-developed parks, 7 non-Applicant-developed parks, 167 dispersed sites, 26 roads and numerous trails (DLA). Some but not all facilities, sites and trails were assessed. IPC, however, does not report impacts associated with these assessments nor propose mitigation.

O. Wildlife Mitigation Measures Proposed by IPC

Powder River Arm Wildlife Management Area

O-1. The Licensee shall continue involvement, including funding, in the Murray wetland rehabilitation project in the Powder River Arm.

Background and Rationale

ODFW remains very supportive of IPC's efforts to deed 4.8 acres of its land to Mr. Richard Murray to assist with his wetland rehabilitation project. IPC indicates that it expects this wetland project to continue through the next licensing period.

Enhancement of Habitat on Four Snake River Islands in Cooperation with the Idaho Department of Fish and Game (Gold Island) and the Oregon Department of Fish and Wildlife (Huffman, Patch, and Porter Islands)

O-2. The Licensee shall pursue the acquisition of Goat Island and creation of small islands in the upper end of the Powder River arm of Brownlee Reservoir. Additionally, the Licensee shall set aside a dedicated fund to ensure cooperative management and maintenance of habitat values on the islands over the term of the new license. Within six months of license issuance and in consultation with ODFW and IDFG, the Licensee shall complete an Island Management Plan that will identify anticipated costs to cooperatively manage and maintain and provide wildlife habitat values over the term of the new license. The Licensee shall set aside the funding levels identified in the Island Management Plan, but in no case shall the annual allotment be less than \$26,000 in 2002 dollars, corrected for inflation. The fund shall be used solely for wildlife and habitat management and enhancements on the islands. Decisions regarding funding of island projects shall be made by a team comprised of representatives from ODFW, IDFG, and IPC. In addition, the Licensee shall replace equipment and machinery on mitigation islands that no longer function effectively. For Patch Island, replace wooden barge with new construction steel barge large enough to transport tractors and equipment on and off the island for repairs and maintenance. For Patch and Porter islands, replace vintage tractors with 85 horse (or greater) tractors with loaders and cab, provide 3 or 4 bottom plows, two 10' off-set disks, two 10 or 12' drills with grass seed adapters, two harrows, two culti-packers, two 100 gallon sprayers with fill pump and hose, and two 10-12' mowers. The costs to replace failing equipment shall be in addition to the dedicated fund that the Licensee shall establish for wildlife and habitat management of the islands.

Background and Rationale

ODFW identified, in its comments on the Formal Consultation Package, flooding of Hells Canyon bottom lands, loss of islands, and effects of water level fluctuation on nesting waterfowl as wildlife issues that should be addressed by IPC for relicensing of the HCC (Letter from Stephanie Burchfield to Elaine Kleckner, May 1997). The numerous islands

of the middle Snake River provided secluded riparian habitats and mid-river high points that were unique in structure and function compared to the mainland areas. Ranging in size from ½ to 8 acres in size, these riverine islands were probably used by raptors, waterfowl, colonial water birds for perching, roosting, and nesting, by beaver, muskrat, and otter for hunting and for den and lodge sites, and by big game and other species as rest sites for river crossings.

Original construction of the Hells Canyon hydroelectric project resulted in inundation of approximately 12,000 acres of critical low elevation winter range and numerous islands (75 acres), which provided waterfowl nesting and brooding habitat. IPC agreed to purchase and convey to the State of Oregon four Snake River islands to mitigate for riverine marshes and wetlands lost by bottom land inundation and provide nesting habitat for waterfowl. Patch, Porter, and Huffman islands were purchased by IPC and conveyed to Oregon as substitutes for waterfowl nesting areas lost by reservoir inundation. Goat Island was identified for purchase but never acquired. No other mitigation was required in the original license for wildlife habitat lost and terrestrial species negatively impacted by Project development. These islands were to be managed for public hunting and fishing and for the restoration, protection, and propagation of waterfowl and upland game birds.

Project operations affect the establishment and extent of riparian habitats (Technical Report E.3.2-40). This in turn impacts waterfowl brooding habitat. ODFW's 60-acre Huffman Island is 30-50% inundated when the reservoir is full. In addition, drafting of Brownlee Reservoir during the waterfowl brooding period causes riparian habitat in shoreline zones to become unavailable and increases risk to predation.

Cooperative Enhancement of Low-Elevation Riparian Habitat and Reintroduction of Mountain Quail in Areas Adjacent to HCC Reservoirs

O-3. During the initial five years after license issuance, the Licensee shall contribute up to \$20,000 each year for equipment, personnel, logistical support and expertise to cooperative restoration projects aimed at reintroducing mountain quail in the Hells Canyon area. The Licensee shall also cooperate in an ODFW mountain quail reintroduction study by providing personnel to assist with tagging and release and to monitor radio-marked quail in Hells Canyon. In addition, the Licensee shall implement the habitat protection measures identified in "L-2," "L-3," and "M-1" to ensure habitat will be available for the successful reintroduction of mountain quail.

Background and Rationale

Mountain quail are a sensitive species that has been petitioned for listing under the Federal Endangered Species Act. Proposed operations of Brownlee Reservoir would prevent the establishment of quail by decreasing the interconnectedness of shoreline riparian habitats (Technical Reports E.3.2-6 and E.3.2-41). The majority of suitable winter habitat for mountain quail is composed of low-elevation riparian areas (Technical Report E.3.2-6), areas that are especially prone to disturbance from human activities

associated with recreation, roads, and IPC's O&M activities (Technical Report E.3.2-46). These same low-elevation habitats were lost and remain lost as a result of Project construction, current and proposed operations, and inundation of approximately 12,000 acres.

ODFW supports IPC's proposal to enhance low elevation riparian habitat for the benefit of mountain quail. Cooperative efforts to enhance low-elevation riparian habitat and reintroduce a quail population would facilitate mountain quail restoration in Hells Canyon. ODFW is involved in mountain quail studies and reintroduction efforts in Wallowa County. ODFW intends to acquire birds from Douglas County, Oregon, put them in Hells Canyon in the best habitat available, and monitor/study movements, habitat use, and incidence and factors of mortality.

P. Noxious Weed Control

P-1. The Licensee shall immediately begin development and implementation of a Noxious Weed Advisory Board and a Cooperative Weed Management Plan, rather than waiting until issuance of the new license. The Cooperative Weed Management Plan should be drafted in consultation with ODFW and other management agencies.

IPC states in the DLA that ongoing operations can contribute to the spread of noxious weeds along the reservoir and downstream reaches. IPC found seven weed species to be positively associated with reservoir water level fluctuations (Technical Report E.3.2-45). In addition, there are numerous locations where operations and maintenance activities for transmission lines are directly and indirectly responsible for the establishment and spread of noxious weeds.

Treating existing weed occurrences and preventing spread of noxious weeds is needed to prevent further degradation of native plant communities and the wildlife species that depend on these communities. In the DLA, IPC proposes to expand its efforts with Cooperative Weed Management Areas to effectively manage nonnative invasive plants and noxious weeds along the Snake River corridor. This corridor runs from Weiser downstream to the confluence of the Salmon River. Part of this approach would include formation of a Noxious Weed Advisory Board and developing a cooperative integrated management plan to coordinate priorities and actions for preventing, eradicating, containing, and controlling nonnative invasive plants and noxious weeds. The plan would define the land area for these cooperative efforts, which would focus on the health of riparian species and habitats.

ODFW strongly supports formation of the Noxious Weed Advisory Board and cooperative efforts to effectively manage nonnative invasive plants and noxious weeds. ODFW believes this measure should be implemented as soon as possible. With the limited information provided, ODFW is unable to determine if the proposed measure is sufficient or if proposed funding level is adequate. Specific resource contributions for agencies, landowners, and other interested parties also need to be identified.

Q. Transmission Line Impacts

Development and Implementation of Transmission Line O&M Plan

Q-1. The Licensee shall prepare and implement a detailed plan for guiding riparian and riverine vegetation management along the Imnaha River, including measures to mitigate for unavoidable impacts to and removal of riparian vegetation. The plan shall be developed in consultation with ODFW and the USFS and shall be consistent with ODFW's Fish and Wildlife Habitat Mitigation Policy. In addition, IPC shall mitigate for its removal of snag and large trees in transmission line ROW's.

Q-2. The Licensee shall repair damage to wildlife habitats caused by routine, emergency, and major O&M activities. To improve resource conditions, reduce erosion, and minimize the spread of noxious weeds, the Licensee shall revegetate roads, structure sites, and other areas that are affected by ground-disturbing O&M activities. To reduce impacts to wildlife and to improve habitat conditions, the Licensee shall integrate monitoring and management activities into an adaptive management program. Information from monitoring activities shall be coordinated with O&M constraints and implementation of best management practices. The Licensee shall develop a list of best management practices in consultation with ODFW and other natural resource agencies.

Background and Rationale

IPC conducts numerous O&M activities (for example, line patrolling, vegetation clearing, structure repair, and road maintenance) that can disturb wildlife and degrade habitat. Extensive O&M activities are performed to ensure the structural and engineering integrity of the transmission-line system. Some of these activities affect wildlife species, wildlife habitat, or both. Impacts include habitat degradation, disturbance to wildlife during sensitive periods, displacement, and increased predation of birds, bird-structure collisions, and bird electrocutions. IPC identified upland forest resources, riparian communities, plant species of special concern, and the proliferation of noxious weeds as being most at risk from O&M activities.

Vegetation clearing occurs on about 11 miles (17 km) of Right-of-Way (ROW). Clearing of tall vegetation in the ROW has had an effect on vegetation composition and pattern. Where ROWs are cleared in the forested region, snag and large-tree resources are lacking and downed-wood resources are depleted. Additionally, trees and snags that may interfere with the transmission lines are routinely cleared from a "hazard zone" adjacent to the ROW (30 m each side; Technical Report E.3.3-4).

Within the Imnaha River corridor, vegetation clearing is required on about 0.8 mi (1.3 km) of ROW, all of which occur on the Oxbow-Pallete Junction Line (Line 907). Of this length, vegetation clearing occurs on approximately 10.6 acres (4.3 ha), of which 1.5 acres (0.6 ha) is riparian vegetation. Any major O&M activities, particularly vegetation clearing, in or near riparian habitat during the bird-breeding season, may impact neotropical birds.

ODFW supports IPC's proposal to control noxious weeds and rehabilitate habitat. ODFW recommends that IPC work with federal land management and state agencies to develop a program for noxious weed control including measures to mitigate for O&M activities that facilitate the infestation or expansion of noxious weeds. IPC needs to state goals and objectives, and specific implementation measures for control of noxious weeds.

Bird Electrocutation and Collision at Transmission Lines

Q-3. The Licensee shall develop a detailed monitoring plan and conduct active monitoring for electrocution mortalities. Modifications should be made to transmission lines if any species are reported electrocuted.

Background and Rationale

IPC concluded that although the Oxbow-Hells Canyon transmission line (Line 945) presents a potential risk for electrocuting perching raptors, especially bald eagles, electrocution risk for bald eagles and other raptors is low on the Oxbow-Hells Canyon line because of 1) limited use of structures by perching raptors, 2) abundant alternate perching sites, and 3) few reported electrocutions from this line (Technical Reports E.3.2-16). ODFW agrees that the electrocution risk for bald eagles and other raptors is probably low. However, IPC has only relied on incidental observations. Biologists from ODFW, OSU, and the BLM believe perching substrate is limited in Hells Canyon increasing the potential use of transmission line structures by perching raptors. Modifications need to occur if any species are at risk or are being electrocuted.

IPC proposes to continue monitoring bird electrocution. IPC would design and modify poles, as needed, based on reported electrocutions. ODFW believes active monitoring is needed rather than incidental observations.

Q-4. The Licensee shall implement measures to minimize risks of bird collisions with transmission lines at known collision sites. The Licensee shall conduct monitoring to determine if the number of collisions decreases after mitigation measures are implemented, and shall modify such measures further if indicated by the monitoring. The Licensee shall develop a detailed plan for monitoring collisions at suspected collision sites. If a problem is detected at suspected collision sites, the Licensee shall implement measures to minimize collisions as soon as information becomes available.

Background and Rationale

Hells Canyon Complex transmission lines impact birds by collisions. To identify appropriate mitigation needs, IPC believes that additional information is required at the two sites of confirmed collisions and at other potential collision sites. IPC proposes in the DLA that monitoring continue for one to two years. ODFW, however, believes IPC needs to fix problem areas and monitor where problems are suspected.

Mortality records were documented for 56 of 349 (16%) bird species that use the study area during at least one season of the year, based on occurrence data in Csuti (1997) and Stephens and Sturts (1998). Thirty-one bird species in the study area may be at medium to high risk of collision. Eighteen are species of special concern in Idaho or Oregon.

IPC identified eight sites having potential collision threats and verified collision at an additional two sites, one each associated with Line 923 and Line 951 (Technical Report E.3.2-20). In addition, George Keister (ODFW, personal communication) reported an eagle kill, likely due to collision, on the Idaho side of Oxbow Reservoir. This reported mortality is not included in IPC technical reports or in the DLA. Bird diverters were attached to the static wire of Line 923. IPC proposes to continue monitoring this site for an additional two years to determine whether the bird diverters have decreased the number of collisions. IPC would evaluate whether additional measures are required to minimize birds' collisions with the line.

Monitoring data have been collected at the second site, Line 951. However, IPC indicates the data do not provide clear guidance on how to effectively minimize birds' colliding with the transmission lines. Therefore, IPC proposes to continue monitoring the site for an additional two years. After two years, IPC would evaluate the data and decide what measures should be considered to minimize bird collisions. It is not clear to ODFW what information has been collected at Line 951 and why this information is insufficient to implement measures to minimize collisions. ODFW recommends that measures be implemented to minimize risks at known and suspected collision sites.

Timing and Location of Transmission Line O&M Activities

Q-5. The Licensee shall restrict the timing and location of O&M activities that may impact certain wildlife species and identified botanical resources during critical periods. Restrictions shall govern O&M activities that impact big game wintering range, sage and sharp-tailed grouse leks, nest sites of riparian birds, raptor nests, and bald eagle perching and roosting areas. In addition, while performing O&M, the Licensee shall utilize methods that avoid or minimize impacts to plant species and communities.

Threatened and Endangered Species and Species of Special Concern

Q-6. The Licensee, in consultation with ODFW, shall include the following measures in its Transmission Line O&M Plan:

- a) O&M activities within 0.3 mi (500 m) of active leks should be scheduled outside the sage and sharp-tailed grouse breeding seasons. In addition, IPC should rehabilitate grouse habitat that is degraded by O&M activities.*
- b) Development and implementation of a management plan to discourage raptor and raven nesting within 2.9 mi of active leks.*

- c) *O&M activities, other than patrols, that occur from November through March and that are within 0.25 mi (400 m) of roosts should be conducted from late morning to early afternoon.*
- d) *Major road maintenance should not occur within 0.25 mi (400 m) of bald eagle nests during the nesting period from March through July. In addition, transmission-line O&M activities that could threaten bald eagles should not occur during the nesting period.*
- e) *Development of a management program to avoid O&M activities, except for patrols, within 0.4 mi (700 m) of an occupied goshawk nest and within 0.5 mi (800 m) of an occupied ferruginous hawk nest from April through July.*
- f) *Development of a management program to minimize O&M removal of riparian habitat during April through June, the breeding season for yellow warblers. DLA @ E.3-473.*

Q-7. The Licensee shall develop and implement projects to enhance and restore shrub-steppe habitat to mitigate for unavoidable impacts to sage and sharp-tailed grouse. The Licensee shall also participate in cooperative projects with ODFW and other state and federal agencies to enhance and restore shrub-steppe habitat in the Hells Canyon area.

Q-8. The Licensee shall monitor sage and sharp-tailed grouse lek sites within 3 km of HCC transmission lines. The Licensee shall consult with ODFW on acceptable methods and timing of monitoring. The Licensee shall also inventory raptor nests that occur on transmission-line structures annually throughout the term of the license. The Licensee shall provide annual reports of these monitoring activities to ODFW and other wildlife agencies.

Background and Rationale

Sage and sharp-tailed grouse may be at risk from increased predation because of the raptor nesting and perching opportunities that are provided by transmission-line structures. Fourteen active sage grouse leks and one sharp-tailed grouse lek were identified within 3 km of HCC transmission lines (Technical Report E.3.2-8).

Information on nesting raptors would be used to assess potential predation opportunities at active sage and sharp-tailed grouse leks. All information should be provided yearly to ODFW and other natural resource management agencies.

R. Loss of *Salix exigua* below Hells Canyon Dam

*R.1 The Licensee shall evaluate opportunities, including different operational scenarios, for increasing *Salix* species below the HCC.*

R.2 The Licensee shall evaluate and recommend measures to reverse the decline of Salix and rebuild willow bars in areas of existing habitat.

Background and Rationale

The structural and floristic characteristics (species composition) of riparian habitat have changed since construction of the Hells Canyon Complex. HCC operations contribute to the continued decline of *Salix exigua* communities downstream from Hells Canyon Dam. Project operations, flow regulation, and reservoir sediment capture have affected riparian habitat including the continuing decline of native sandbar willow communities (*Salix exigua*). These changes in vegetative communities affect wildlife species density and diversity.

HCC operations contribute to the continued decline of native *Salix exigua* communities due to the widespread decline in available sand-sized sediments in the watershed. The HCC has trapped a substantial amount of sediment behind all three dams that would be useful for building root substrate and in supporting riparian species such as coyote willow (Technical Report E.1-1). With the loss of sandbars below Hells Canyon Dam, the current daily and hourly stage recession rates will not support the establishment of *Salix* species or the deposition of sediment. In the Snake River, daily and hourly flow fluctuations may be affecting riparian and aquatic plant and animal communities by increasing the rate of erosion of sandbars and terraces. The current and proposed ramping of the Project may aggravate the adverse effects on sandbar maintenance due to the lack of sediment transport through the HCC.

In ODFW's comments on the DLA, the agency provides extensive analysis of the effects of sediment trapping by the HCC on soil development below the Project, and how *Salix* species are less effective at re-vegetating along the shoreline under these conditions.

According to IPC, neatleaf hackberry, a low shrubby tree, has proliferated below the high-water mark, increasing the width of the riparian corridor (Technical Report E.3.3-3). However, *Celtis reticulata* and *Salix exigua* communities neither function similarly, nor do they have the same structure or species composition. Plant communities have different values and functions for wildlife species and populations, and hackberry associations are not as important for birds and other wildlife species as willow/cottonwood communities. IPC Technical Report E.3.2-1 concluded that bird densities were found to be higher in the cottonwood vegetation associations than in hackberry associations. IPC also reported that for the scrub-shrub wetland vegetation associations, lower bird densities were found in hackberry vegetation associations during spring and fall. The willow/cottonwood vegetation association appeared to be particularly important for birds, with densities approximately twice as high as those in other Forested Wetland vegetation associations than in the more diverse rose/snowberry vegetation association (Technical Report E.3.2-1). The only passerine to show positive correlation with hackberry was the song sparrow.

IPC concludes historic operations of the Hells Canyon Complex elevated summer base flows and induced an irrigation effect that has resulted in increased vigor of riparian hackberry stands. The “irrigation effect” scenario is not based on any known ecological theory. Fire suppression, reduced grazing, and other non-operational related affects are also likely responsible for the increased vigor of hackberry stands.

Recreational Resources

S. IPC Proposed Mitigation from DLA

Continuation and Enhancement of Road Maintenance

S-1. The Licensee shall continue funding maintenance of the Oxbow-Hells Canyon Road, 22 miles; Homestead Road from Oxbow, Oregon, to Ballard Creek, 6 miles; and Brownlee-Oxbow Road, 12 miles. If the roads are used for facilities maintenance, then ODFW believes the maintenance costs should not be credited as recreation-related mitigation.

S-2. The Licensee shall coordinate development and implementation of Best Management Practices for road maintenance with state and federal agencies.

Background and Rationale

The HCC reservoirs serve as major recreational attractions to residents of and visitors to northeastern Oregon and southwestern Idaho. In the DLA, IPC proposes continuing the funding of maintenance of the Oxbow-Hells Canyon Road, 22 miles; Homestead Road from Oxbow, Oregon, to Ballard Creek, 6 miles; and Brownlee-Oxbow Road, 12 miles. The justification from IPC is to ensure continued access to HCC recreation facilities.

Enhancement of Litter and Sanitation Plan

S-3. The Licensee shall provide information on number, location, and cost of portable and vault toilets it plans to provide at dispersed recreation sites.

Background and Rationale

In the DLA, IPC proposes providing additional portable and vault toilets at appropriate dispersed recreation sites. These sites and additional information on the litter and sanitation program are not identified.

Information and Education (I&E) Plan

S-4. The Licensee shall identify agencies it will consult in development of an Information and Education Plan. The Licensee shall also provide specific information on elements of the plan, projects to be implemented and associated costs.

Background and Rationale

In the DLA, IPC proposes to develop an I&E plan in consultation with appropriate agencies. Included in the plan would be interpretive and directional information within the HCC and related recreation facilities in the area about cultural, natural, and historical resources and about public safety. The estimated cost for this measure is \$1,380,000 total capital cost and an average annual O&M cost for years 7 through 30 of \$30,000. IPC does not provide any specific details on the I&E plan and measures to allow analysis of suitability of funding level.

Recreation Adaptive Management Plan

S-5. The Licensee shall identify agencies and entities that will be consulted and which will be involved in development of the Recreation Adaptive Management Plan. The Licensee shall identify monitoring and reporting efforts to be undertaken.

Background and Rationale

In the DLA, IPC is proposing development and implementation of a recreation adaptive management plan. Consultation with appropriate agencies and entities would occur every 6 years.

Enhancement of Copper Creek Dispersed Recreation Site

S-6. The Licensee shall develop a detailed site plan for the dispersed recreation site at Cooper Creek.

Background and Rationale

In the DLA, IPC proposes developing and implementing a site plan for the dispersed recreation site at Copper Creek in cooperation with the BLM. No specific details or justification are provided. Therefore, ODFW is unable to determine suitability of proposed measure and potential impacts to aquatic, botanical, and terrestrial resources associated with this measure.

Reconstruction of Hells Canyon Park

S-7. The Licensee shall consult with state and federal agencies regarding proposed changes to Hells Canyon Park and specify anticipated removal or modification to existing vegetation. No trees should be damaged or removed in reconstructing this park.

Background and Rationale

IPC is proposing to reconstruct Hells Canyon Park. Functional design drawings are provided, which indicate some existing trees in the park will be removed. ODFW

considers nesting, roosting, and perch trees for bald eagles to be limiting within Hells Canyon.

Enhancement of Westfall Dispersed Recreation Site, Bob Creek Section A, B and C Dispersed Recreation Site and Development of Airstrip A&B Dispersed Recreation Site

S-8. The Licensee shall develop detailed site plans in consultation with and for review by federal and state agencies.

Background and Rationale

IPC proposes to develop and implement a site plan for each of these dispersed recreation sites. No specific details or justification are provided. Therefore, ODFW is unable to determine the necessity of the proposed measures, suitability of proposed funding levels, or potential impacts to aquatic, botanical, and terrestrial resources associated with these measures.

Enhancement of Copperfield Boat Launch Area, Oxbow Boat Launch, Carters and Old Carters Landing Recreation Site, Spring Recreation Site and Reconstruction of McCormick Park

S-9. The Licensee shall consult with state and federal agencies regarding proposed changes to these access sites and recreation areas. A detailed site plan for each shall be developed. Specific measures to be implemented shall be identified and funding level specified. IPC shall specify removal or modifications expected to existing vegetation. No trees shall be damaged or removed in enhancement of this park.

Background and Rationale

ODFW generally supports IPC's efforts to improve and enhance these recreation areas and access sites. At some of the sites IPC has developed site plans and proposes to implement elements of those plans, yet it is unclear which elements will be implemented. Functional design drawings are provided, which indicate some existing trees/vegetation in the park will be removed. IPC does not provide enough information to identify potential impacts to aquatic, botanical, and terrestrial resources including damage to or removal of nesting, roosting, and perch trees for bald eagles.

Enhancement of Hewitt and Holcomb Parks

S-10. The Licensee shall develop a site plan with Baker County including a description of specific measures to be implemented, costs, and implementation schedule.

S-11. The Licensee shall fund O&M of Hewitt and Holcomb Parks.

Background and Rationale

ODFW is authorized by Oregon state laws and rules to seek opportunities to maintain and enhance public access to fishing, hunting and wildlife enjoyment activities. (ORS 496.012). Additionally, Oregon's hydroelectric reauthorization law calls for recreational opportunities to be protected, maintained or enhanced. (ORS 543A.025 (f)). The HCC has altered the types of fishing, hunting and wildlife enjoyment opportunities available in eastern Oregon. The Hells Canyon Complex attracts residents of and visitors to Baker, Malheur, and Wallowa counties. In order to ensure reasonable and responsible visitor use, it is necessary for a variety of recreation facilities to be developed. ODFW believes that IPC is the appropriate entity to develop and maintain adequate facilities to mitigate for and enhance wildlife enjoyment activities in eastern Oregon. Moreover, ODFW is concerned that these facilities be operated and maintained in a manner that minimizes new or ongoing impacts on fish and wildlife. IPC proposes to assume responsibility for a number of recreation related items; however, ODFW believes IPC's obligation should include operation and maintenance costs for Hewitt and Holcomb Parks.

Hewitt and Holcomb Parks provide significant access to Hells Canyon reservoirs. Unfortunately, County funds are limited, which potentially limits the availability of these parks to residents and visitors. From 1994 through 2000, Oregon had the highest average percentage of users (44%, all reservoirs) followed by Idaho (39%). IPC has, however, provided inequitable facilities for recreation and access in Oregon compared with Idaho.

Development of Low-Water Boat Launch at or near Swedes Landing

S-12. The Licensee, in cooperation with state and federal agencies and Baker County, shall develop, fund and implement a final site plan for a suitable boat launch at or near Swedes Landing. The Licensee shall assume full responsibility for funding, developing and implementing the site plan.

S-13. The Licensee shall develop, in cooperation with BLM, a final site plan to enhance Swedes Landing. The Licensee shall fund development and implementation of the site plan and enhancements to Swedes Landing.

Background and Rationale

About three-quarters of all reservoir users surveyed by IPC considered fishing among their primary activities, and about 70% considered it their main focus. Among all reservoir users, about 14% of all comments received in surveys pertained to water operations and reservoir level issues. Ninety-six percent to 98% of the reservoir level comments were critical of reservoir levels. Specific reservoir level comments appeared to focus on a wide variety of issues, including effects on fishing, use of boat ramps, access to parts of the reservoirs, problems with boats being left high and dry (Hells Canyon and Oxbow reservoirs), and the aesthetics of a drawn down reservoir (Brownlee Reservoir).

Angling is by far the most popular recreational activity at the HCC reservoirs. During the last decade, each of the boat ramps on Brownlee Reservoir, except for the old ramp at Woodhead Park, has been unusable at least a few times. Additionally, during the more extreme drawdowns many anglers have difficulty accessing their accustomed areas for bank angling. IPC is required to draft Brownlee Reservoir to 2,034 feet or lower by March 01 for flood control requirements. However, IPC has drafted Brownlee Reservoir lower than required to meet Army Corps of Engineers flood control requirements. This has resulted in boat ramps at Oregon parks no longer useable. Specifically, Farewell Bend State Park's boat ramp is no longer operational at reservoir elevations below 2051 feet mean sea level (msl) and Hewitt and Holcomb park's boat ramps are no longer operational below 2036.5 msl.

From 1994 through 2000, Oregon had the highest average percentage of users (44%, all reservoirs) followed by Idaho (39%). IPC has, however, provided inequitable facilities for recreation and access in Oregon compared with Idaho.

In the DLA, IPC proposes to work cooperatively with the BLM, Baker County, and the Oregon State Marine Board to find a suitable location for a boat launch that could be used during low-water periods at or near Swede's Landing. Development and implementation of a site plan would also be developed cooperatively. IPC also proposes developing and implementing a site plan for Swedes Landing in cooperation with the BLM. IPC indicates O&M of Swedes Landing and enhancements would be the responsibility of the BLM. IPC would share construction costs, contributing an estimated \$75,000 total capital cost for years 2 through 4 of the new license.

IPC does not provide estimates of funding required from Baker County, BLM and OSMB. No specific details are provided. Therefore, ODFW is unable to determine impacts to aquatic, botanical, and terrestrial resources associated with this measure. ODFW is also unable to determine the suitability of the proposed measure for improving recreational access in Oregon including funding levels.

T. Additional Recreation Mitigation

Stud Creek Trail #1781

T-1. The Licensee shall improve access to the Stud Creek Trail including the stairway and railings similar to that provided on the Idaho side of the river.

Background and Rationale

The Stud Creek Trail (#1781) begins at the Hells Canyon Visitor Center (at the Hells Canyon Creek Recreation Site) and extends downstream along the Oregon Side of the river for about 1 mile to Stud Creek (RM 246). Oregon anglers have indicated access to the trail is dangerous and that a number of individuals have fallen trying to access angling opportunities along the Snake River. IPC notes that on the Idaho side of the Snake River

below Hells Canyon Dam, metal stairways, landings, railings, and natural surfaces provide access for anglers and others.

Land Management and Aesthetics

U. Technical Report Appendix E.6-1 – Hells Canyon Resource Management Plan (HCRMP)

U-1. The Licensee shall tie the HCRMP to Desired Future Conditions and goals developed in resource work groups.

Background and Rationale

Each of the resource work groups developed desired future conditions and goals for their resource areas. It is unclear how the management directive of the HCRMP relates to these desired future conditions and efforts to obtain them.

U-2. The Licensee, in consultation with state and federal agencies, shall clearly prioritize areas for resource protection and where recreation use is determined as the primary use in specific areas, adverse effects on natural resources should be avoided and minimized and mitigation for these impacts should be provided.

Background and Rationale

In some cases, significant potential conflicts between recreation and natural and cultural resources were identified during IPC's human use study (Technical Report E.3.2-46). If studies show that recreation use is generally low and resource values high, the area is designated for **resource protection** as the primary use, rather than as **dispersed recreation**. However, IPC does not identify what the designation would be if recreation use is high and resource values are high. ODFW does not believe that resource protection should be dictated by the level of recreation use.

U-3. The Licensee shall recognize that continued recreational development will impact aquatic and terrestrial resources and that at some point expanding recreational development shall no longer be considered.

Background and Rationale

IPC states, "While the philosophy of the HCRMP is to avoid significantly expanding recreational use and development, most participants of the Recreation Resources Work Group recognize that, with population growth in the region, there must be provisions for some increase in recreational use" (DLA @ E.6-35). With this philosophy and population growth expected to continue, ODFW questions whether there is any point at which there will not be provisions for increase in recreational use. Without limiting or stopping recreational development altogether at some point, recreation use will continue

to increase and consequently so will impacts terrestrial species. Recreation use is concentrated in flat, low elevation areas. These same areas provide critical low elevation habitat for wildlife species.

U-4. The Licensee shall not designate areas in deer and elk winter range as recreation reserves.

Background and Rationale

Areas considered appropriate for developed recreation are flat, low elevation areas. These same areas are critical habitat and winter range for deer, elk, and other terrestrial species. Current doe mortality levels (25%) on the winter range in Hells Canyon are unsustainably large. Ten percent of this mortality is related to operation of the HCC.

U-5. The Licensee shall define a Special Management Area as an area which is afforded a higher level of resource protection based on the sensitivity and importance of these sites.

Background and Rationale

The special management area (or SMA) designation as defined provides the potential for the highest level of resource management, but also the greatest flexibility for considering specific, highly sensitive resources and specific site conditions. It is unclear to ODFW why a SMA allows higher levels of management than other resource areas. The definition should be, as requested by ODFW in Resource Management Plan meetings, to provide a higher level of resource protection based on the sensitivity and importance of these sites.

IPC also indicates that the SMA designation would be applied to such resources as eagles' nest and roost sites, rare plant sites, and larger areas of riparian vegetation in strategic locations. ODFW is unclear as to what IPC means by riparian vegetation in strategic locations and who determines what constitutes a strategic location. Riparian vegetation throughout the Project area and Hells Canyon is limited in extent and all is considered important by ODFW.

U-6. The Licensee shall form a multi-agency coordinating committee to review and approve management plans for lands acquired as mitigation.

Background and Rationale

IPC explains existing vegetation is not to be removed within a **resource protection area**, except as part of an approved action. However, IPC does not identify who determines what constitutes an approved action. ODFW has previously recommended that IPC form a multi-agency coordinating committee that would review and approve management plans for lands acquired as mitigation to ensure impacts are mitigated and resource

benefits realized. Such a committee is the appropriate body to determine what kinds of actions are acceptable in resource protection areas.

U-7. The Licensee shall modify the definition of a resource conservation area to clarify that a lower level of protection is provided not a lower level of management.

Background and Rationale

IPC states the **resource conservation** designation provides a lower level of management for less sensitive resources. It is unclear why less management would occur in a resource conservation designation. The definition should state that a lower level of protection is provided not a lower level of management.

U-8. The Licensee shall protect all riparian vegetation from vehicle access and other adverse human impacts. Unavoidable impacts shall be mitigated with measures consistent with ODFW's Fish and Wildlife Habitat Mitigation Policy.

Background and Rationale

IPC indicates areas of significant riparian vegetation accessible to motor vehicles from roads should be protected from vehicle access. IPC proposes that no significant human actions should be undertaken in significant riparian areas except for some necessary land management actions and resource enhancement activities. ODFW believes that all riparian habitat should be protected in the Project area because such a large portion of riparian habitat has been permanently inundated by the Project and it is important habitat for fish and wildlife species.

U-9. The Licensee shall develop policies that provide protection for shoreline and riparian habitat.

U-10. The Licensee shall prepare a land management plan to describe how decisions regarding new development and other human actions will be made, including justification for buffer widths, clarification of what constitutes "significant" actions, and how the internal IPC Team will function and interact with resource agencies. Additionally, ODFW and other state and federal resource agencies need to be consulted on all development projects and human actions planned for lands acquired or managed for mitigation.

Background and Rationale

IPC proposes to maintain a 75-foot wide reservoir shoreline buffer zone for open space and around perennial tributary streams, but provides no justification for this distance. With respect to "significant" riparian areas, rare plant sites or springs, IPC proposes that a 50 foot buffer zone be established to protect against new development, "...unless site conditions provide natural protection with a lesser setback." IPC identifies the following process to determine appropriate new development:

The Interdisciplinary Team will evaluate all development proposals on a case-by-case basis and modify the extent of the buffer as appropriate. New development, with the exception of boat ramps and docks, developed recreation areas, structures that are important for resource protection or essential for hydroelectric operations, or structures that provide public access to which streamside location is necessary, should not be permitted within the shoreline buffer area. DLA @ E.6-532.

There is no justification given for buffer widths. There are also a number of development exceptions allowed in these buffers. Further, since IPC's Interdisciplinary Team can modify the buffer on all development proposals, it appears that a buffer zone may be of little help in protecting habitat. Although it is important for land management policies to include flexibility to adjust to individual circumstances, this policy appears so flexible that it has few teeth.

IPC states all new development and other significant human actions will be sited, designed and conducted with input from the IPC Interdisciplinary Team. IPC does not mention consulting with state and federal agencies. At those areas that are included as lands managed for mitigation of terrestrial and aquatic impacts, ODFW believes it and other natural resource agencies should be included in management decisions. It is also unclear how the word "significant" will be defined.

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