KEY ISSUES

Aquatic Key Issues

Anadromous Fish (Salmonids)

Fall Chinook

Fall chinook salmon spawn in the Hells Canyon Reach of the Snake River. The loss of spawning areas above the Hells Canyon Complex has been mitigated by the Settlement Agreement of 1980. Wild chinook salmon still spawn in the Hells Canyon Reach below the Hells Canyon Complex. Delayed out-migration of wild smolt from the Snake River and the Hells Canyon Reach has been determined by NOAA Fisheries to cause poor survival. NOAA Fisheries acknowledges that a large portion of the delay is due to the federal hydropower system. This delay is believed to be related to river temperatures that are warmer in the fall and cooler in the spring than those experienced prior to dam closure. The BLM supports the NOAA Fisheries request that a flow scenario be developed that would model the Hells Canyon Complex affect on temperatures when inflow equals out-flow at minimum pool. The purpose of this modeling effort would be to determine whether temperatures could be moved closer to the pre-dam conditions. BLM also supports NOAA Fisheries point to evaluate the installation of a selective withdrawal structures to return the temperature to the historic regimes.

"E.3.1.3.1.1.1. Fall Chinook Salmon Spawning and Incubation Protection
Since 1991, the Applicant has operated the reservoirs of the HCC during fall, winter, and early spring (October through May) in a manner to protect fall chinook spawning and incubating. This flow program provides stable flows during the fall spawning period. After the spawning period, the Applicant maintains the stable discharge level as a minimum discharge until emergence is estimated to be complete during the following spring. This program provides a stable, benign environment for spawning adults, thereby reducing the potential for redd abandonment that might occur if flows fluctuated widely. Another benefit of the stable spawning and incubation discharge is that shallow redds are protected from potential desiccation, which could result in a mortality loss of 100% for any dewatered redd." (Page E.3-119, Paragraph 2)
Response: The BLM agrees with the proposal to maintain spawning and incubation flows as part of the Applicant's existing measures to protect fall chinook salmon. However, the Applicant should evaluate measures such as selective withdrawal of water from the reservoir to create temperatures that are closer to pre-dam conditions as stated above.

"The Applicant proposes to install and operate turbine-venting systems in units 1 through 4 at the Brownlee Project. Preliminary feasibility analyses conducted by the Applicant (Technical Report E.2.2-2) indicate that a passive aeration system using the existing turbine vacuum breaker system could aerate releases from units 1 through 4 of the Brownlee Powerhouse. Turbines at this project are Francis-type units with a vacuum breaker system that prevents damaging vacuum pressures from occurring during sudden closures of the wicket gates. Under certain operating conditions, the vacuum breaker system is designed to admit atmospheric air to each unit. This measure may include modifications to the units such as hub baffles or piping alterations to increase the amount of air admitted by the vacuum breaker system during operation and thereby

increase DO levels downstream of Brownlee Dam." (Page E.2-29, Paragraph 3)
Response: The BLM agrees with the Applicant's proposal to inject oxygen at Brownlee Dam. This action may alleviate oxygen depletion below Hells Canyon Dam. A kill of approximately 100 adult steelhead occurred in October 2002 due to oxygen depletion below Hells Canyon Dam. The proposal to add oxygen at Brownlee Dam has inherent uncertainties and should have a fall-back plan if it does not work. Whether the oxygenated water can carry through Oxbow and Hells Canyon reservoirs without becoming depleted provides a level of uncertainty. The injection of oxygen at Hells Canyon Dam would be a suitable fall-back option.

"The Applicant will continue to support and participate in spawning surveys to the extent that they provide data useful for managing the HCC in a manner that protects listed fall chinook salmon within the mainstem Snake River downstream of Hells Canyon Dam." (Page E.3-121, Paragraph 1)
Response: The BLM agrees with the Applicant's proposal to continue participating in fall chinook spawning ground surveys. The potential for impacts to spawning redds by hydropower operations makes it essential that this work continue. The extent of the surveys is within the discretion and authority of the NOAA Fisheries and state Fish and Wildlife agencies.

"The Applicant will continue to monitor water temperature during the early fall through late spring within the upper Hells Canyon reach to determine when emergence in that river reach is complete and protective minimum flows can be relaxed each spring." (Page E.3-121, Paragraph 3)
Response: The BLM agrees with the Applicant's proposal to monitor water temperature related to spawning and emergence of fall chinook salmon.

Summer Steelhead
"Summer steelhead has been included in the Settlement Agreement hatchery program to compensate for the loss of that species due to blockage by the Hells Canyon Complex."
Response: The BLM supports the mitigation measures to preserve the native stock of Snake River summer steelhead through hatchery propagation until such time that a means can be developed to reintroduce them into their historic habitat.

"The Applicant proposes to plant approximately 1 million triploid (reproductively sterile) rainbow trout fry in the Oxbow Bypass and the lower portions of Pine Creek (possibly including North Fork Pine Creek). Eggs certified as free of pathogens would be purchased, hatched, and reared for approximately one month at the Oxbow Fish Hatchery. Upon release, fry would be approximately 2 inches long. The Applicant would use triploid fish to reduce the likelihood that survivors could reproduce with native redband trout. The releases would be at times to reduce immediate predation by warmwater species, although all piscivorous (fish-eating) species would benefit." (Page E.3-143, Paragraph 3)

"Fry could be released in several pulses. The location of releases is based primarily on information collected during the Applicant's studies (Chapter 4 of Technical Report E.3.1-7). The relatively quiet backwater provided in the Oxbow Bypass may help keep outplants from being flushed into the reservoir where they would be less available. In addition, if fry were planted near or within North Fork Pine Creek, they should be well distributed between the outplant site and the mouth of Pine Creek. Oxbow Fish Hatchery would need additional rearing

space under this measure. The additional rearing space could be incorporated into planned expansions of the facility to rear juvenile fall chinook salmon (see section E.3.1.3.2.2.2.)." (Page E.3-143, Paragraph 4)

Response: The BLM agrees with the concept of releasing a forage species that would aid bull trout recovery. However, the use of sterile triploid rainbow trout to provide forage may be less desirable than the release of native summer steelhead fry. They would have the timing and characteristics that are closely adapted to the environment of Indian and Pine creeks. Surplus summer steelhead have been release periodically into these drainages in the past. If pathogens were going to be introduced by summer steelhead, there is a high likelihood that they would have already been introduced by the past stocking. Additionally, it would appear that the use of adult steelhead would be less expensive and time consuming in that they would migrate into all of the tributaries that are available. Many of the Pine Creek tributaries do not have good road access for stocking fry where bull trout are now found. The addition of a trap at Oxbow Dam would also provide a means for passing surplus steelhead over the dam so they could access Wildhorse River. This work must be coordinated with and concurred upon by ODFW and IDFG.

It is possible that a few of these steelhead may survive to smolt and thus contribute to the fishery in the Hells Canyon Reach.

"The Applicant proposes to install and operate turbine-venting systems in units 1 through 4 at the Brownlee Project. Preliminary feasibility analyses conducted by the Applicant (Technical Report E.2.2-2) indicate that a passive aeration system using the existing turbine vacuum breaker system could aerate releases from units 1 through 4 of the Brownlee Powerhouse. Turbines at this project are Francis-type units with a vacuum breaker system that prevents damaging vacuum pressures from occurring during sudden closures of the wicket gates. Under certain operating conditions, the vacuum breaker system is designed to admit atmospheric air to each unit. This measure may include modifications to the units such as hub baffles or piping alterations to increase the amount of air admitted by the vacuum breaker system during operation and thereby
increase DO levels downstream of Brownlee Dam." (Page E.2-29, Paragraph 3)

Response: The BLM agrees with the Applicant's proposal to inject oxygen at Brownlee Dam. This action may alleviate oxygen depletion below Hells Canyon Dam. A kill of approximately 100 adult hatchery summer steelhead occurred in October 2002 due to oxygen depletion below Hells Canyon Dam. The proposal to add oxygen at Brownlee Dam has inherent uncertainties and should have a fall-back plan if it does not work. Whether the oxygenated water can carry through Oxbow and Hells Canyon reservoirs without becoming depleted provides a level of uncertainty. The injection of oxygen at Hells Canyon Dam would be a suitable fall-back option.

Hatcheries

"E.3.1.3.2.2. Anadromous Mitigation Hatchery Facility Upgrades and Enhancements The proposal to upgrade and enhance facilities at the anadromous mitigation hatcheries includes measures for each of the four hatcheries. These measures, organized by hatchery, are detailed in the following sections." (Page E.3-149, Paragraph 5)

Response: The BLM supports the plan for the Applicant's hatchery improvements. The Snake River fall chinook, spring/summer chinook, and summer steelhead propagated by these hatcheries are the gene pool for future reintroduction above the Hells Canyon Complex, should technology for successfully passing adults and juveniles become available. The BLM believes that the hatchery program set in place to mitigate for the loss of these important runs of anadromous fish should be "state of the art".

The BLM believes that the hatchery program should continue to provide the Hells Canyon Reach with runs of salmonids that will support both Tribal and sport fisheries.

Adequacy of Analysis

The Applicant's analysis of the potential for reintroducing anadromous fish above and within the Hells Canyon Complex was well documented. It appears that the data used in some portions of the study was biased toward a worst-case-scenario. However, the technology to pass smolt downstream and adults upstream past the existing Columbia and Snake river dams is not yet sufficient to result in smolt-to-adult-returns that could sustain a naturally reproducing population. Until the time when fish passage can be substantially improved, the Applicant will continue to mitigate for the loss of spring/summer chinook, summer steelhead, and fall chinook with its established hatchery program.

The analysis of the impacts of water temperature impacts on fall chinook survival below Hells Canyon Dam was thoroughly discussed. It was acknowledged by the Applicant that the thermal regime is changed from the historic norm. However, the Applicant theorizes that this does not adversely affect fall chinook survival. The NOAA Fisheries believes that the altered thermal regime that includes warmer fall and colder winter temperatures leads to delayed smolt migration. Delayed smolt migration leads to low survival when the fish reach Lower Granite Reservoir where river temperatures are warming. The NOAA Fisheries does not believe that the Applicant's theory is correct and would like the Applicant to model a inflow-equals-outflow at minimum-pool flow scenario to determine whether temperatures in the Hells Canyon Reach could be brought closer to those at the inflow to Brownlee Reservoir (the historic norm). NOAA Fisheries also suggests a selective withdrawal structure on Brownlee reservoir be evaluated to accomplish this goal. BLM supports the need for this evaluation.

The Applicant has been researching the location of fall chinook spawning areas for less than a decade. The research data of the Applicant indicates that more than 2000 fall chinook redds could be utilized in the Hells Canyon Reach if sufficient spawners were available. The BLM agrees with that estimate. However, the Applicant states that spawning gravels in the Hells Canyon Reach are stable and are not being lost to erosion. Other investigators have reported that beaches, terraces, and sandbars are disappearing from the reach (Grams and Schmitt 1999). Since the investigations of spawning areas only began recently, it appears unlikely the Applicant

can state with certainty that the river is not gradually eroding these spawning areas for which there is no pre-project data. Furthermore, the Applicant has stated in the geomorphology Section that the Snake River bed does not mobilize and the area above Brownlee Reservoir would not contribute gravel to the spawning beds. These statements by the Applicant are not supported by scientific evidence. The Applicant acknowledges that 62,000 acre feet of sediment have been deposited in Brownlee Reservoir, a portion of which is spawning size gravel.

The fish that once were able to access BLM and other lands can no longer do so. The large runs of salmon, steelhead/ and lamprey to the Snake River provided tons of marine-derived nutrients to streams, riparian zones, and the landscape. These essential elements for growth and productivity of plants and animals on BLM lands have been lost. The Applicant has not addressed the loss of marine-derived nutrients.

Project Impacts On Salmon and Steelhead Addressed By the Applicant Studies
The Applicant addressed the loss of anadromous salmonids in the studies for reintroduction of anadromous fish. The settlement agreement that established the Applicant's hatchery program was established to address the impact on anadromous fish that are blocked by the HCC.

The Applicant addresses the issue of protecting ESA listed fall chinook salmon in the Hells Canyon Reach by maintaining stable flows from fall spawning through spring emergence of fry. The Applicant theorizes that the smolts are not being impacted by warmer fall and colder winter river temperatures caused by the HCC. The NOAA Fisheries believes that the colder winter temperatures delays incubation and cause low survival due to late smolt migration.

BLM Issues

Provide passage for anadromous and other native fish to BLM administered public lands above and within the Hells Canyon Complex.
Applicant's Response*: The Applicant will continue with the hatchery program due to limiting factors that prevent a self-sustaining run of anadromous fish from being reintroduced at this time.*

Improve water quality to meet States of Idaho and Oregon standards. State standards would provide high-quality water for migration in the mainstem Snake River.
Applicant's Response*: The Applicant is working with the states of Oregon and Idaho through the TMDL process. The Applicant will vent turbines 1-4 and possibly unit 5 at Brownlee Dam. The Applicant will aerate water in the transition zone of Brownlee Reservoir to increase oxygen levels throughout the HCC. The Applicant will install deflectors below Hells Canyon Dam spillway to reduce TDG levels and operate the lower spillgate at Brownlee Dam to reduce TDG.*

Develop new hatchery standards for production and monitoring that result in adult returns equivalent to the habitat's potential production lost by blockage of upriver Snake River runs.
Applicant's Response*: The Applicant will improve its hatchery practices to meet Columbia Basin standards. Monitoring of future production results is not specified as a mitigation measure.*

Once new hatchery standards are developed, ensure that production goals are met. Use adaptive management to change strategies if goals are not met.
Applicant's Response*: The Applicant does not address this issue specifically.*

If passage is not accomplished, mitigate the continued loss of BLM mainstem Snake River habitat inundated by the HCC reservoirs by purchasing [unspecified] miles of currently occupied habitat and/or by funding anadromous habitat improvement to state and federal land within the Grande Ronde, Salmon, and Snake River subbasins which are accessible to anadromous fish. Such mitigation may also include acquisition of non-federal lands or conservation easements for long-term protection or improvement of aquatic habitats in the above subbasins.
Applicant's Response*: The Applicant does not address this issue.*

Mitigate the continued loss of BLM tributary habitat inundated by the HCC reservoirs by funding anadromous habitat improvement to state and federal land within the Grande Ronde, Salmon, and Snake River subbasin, which are accessible to anadromous fish. Such mitigation may also include acquisition of non-federal lands or conservation easements for long-term protection or improvement of aquatic habitats in the above subbasins.
Applicant's Response*: The Applicant does not address this issue.*

Until passage is accomplished, develop a program to replace lost production of marine-derived nutrients for streams previously used by anadromous fish.
Applicant's Response*: The Applicant proposes to add carcasses to the streams in the Pine Creek drainage to enhance bull trout through the native fish plan.*

Critique Of the Applicant's Conclusions For Anadromous Salmonids
The Applicant will maintain fall chinook protective flows below Hells Canyon Dam.
The Applicant's studies indicate that the low smolt-to-adult return does not warrant an effort to reintroduce anadromous salmonids within or above the HCC.
The Applicant will continue to mitigate for the loss of anadromous fish to the streams within and above the HCC by continuing to operate the hatchery program.
The hatchery program will be upgraded to meet new Columbia Basin standards, and the facilities will be remodeled.
The Applicant's conclusions are logical, based on the data they have presented. However, the BLM believes the Applicant should address the loss of marine-derived nutrients throughout the project area. The Applicant should mitigate the continued loss of BLM mainstem and tributary habitat inundated by the HCC reservoir by funding anadromous habitat improvement on state and federal land within the Grande Ronde, Salmon, and Snake River subbasins which are accessible to anadromous fish. Such mitigation may also include acquisition of non-federal lands

or conservation easements for long-term protection or improvement of aquatic habitats in the above subbasins.

Pacific Lamprey

" the small amount of reference materials and data that do exist indicate the following:

Of the various species of lamprey established within the Northwest, only the Pacific lamprey (Lampetra tridentata) is found within the Snake River Basin.

Historical distribution of Pacific lamprey throughout the Northwest was similar to that of Pacific salmon. Specifically, within the Snake River Basin, these fish were observed at least as far upstream as Lower Salmon Falls. Hells Canyon Dam is currently the upstream terminus of migration within the Snake River.

Pacific lamprey tend to migrate upstream from late spring through late fall, overwinter, and then spawn in tributary streams during the following spring. Water temperatures during spawning are generally increasing from about 10 to 15 °C. This process is similar to what has been observed for steelhead.

Physical habitat where spawning has been observed consists of fines and gravel substrate, at depths up to 4.0 m with water velocities from 0.5 to 1.0 m/s. Pool tailouts, riffles, and glides have all been identified as spawning areas; these habitats are similar to steelhead habitat.

Given their life history, Pacific lamprey probably used the mainstem Snake River primarily as a migration corridor (as do steelhead, spring/summer chinook, and sockeye salmon). There is no evidence that Pacific lamprey used or use the mainstem Snake River for spawning or rearing.

Pacific lampreys are poor swimmers; adults have difficulty successfully migrating upstream through fish passage facilities associated with dams. Fallback rates are very high (up to 50%). Access to suitable habitat apparently has a greater effect on regional distribution of the species than distance from the ocean.

Ammocoetes spend 4 to 6 years burrowing into fine stream sediments and filter feeding on algae, diatoms, and detritus. These juveniles seem to prefer cooler water (16.0 to 21.8 °C) but have been collected when water temperatures were as high as 25 °C.

Juvenile lamprey migrate downstream after completing metamorphosis, or during its final stages, in late fall through spring. Little information exists on the time they spend in the estuary before they enter the ocean; however, it is at this time that lamprey become parasitic feeders.

While parasitic, Pacific lamprey are not associated with a specific host. And though lamprey and salmon arose concurrently within the Columbia River Basin, lampreys are not considered significant predators on Pacific salmon.

Passage and spawning data, used for assessing trends in population status, are virtually nonexistent for Pacific lamprey. Neither adult nor juvenile passage data have historically been collected specifically for Pacific lamprey. When this data was collected, methods and resulting data have been inconsistent.

Spawning surveys and juvenile density estimates have only recently been attempted and only on a limited basis. The current baseline will be useful in the future; however, data concerning the status and distribution of these fish within the Snake River Basin are significantly lacking. (Page E.3.1-4, Chapter 4, Lamprey Tech. Report, Page 8-9)

Juvenile lamprey are commonly captured in downstream salmon smolt collection facilities, indicating that the intake bypass screens probably intercept them. Because of their demersal nature, a more significant number are routed through the turbines (Moursund et al. 2000). Recent studies indicate that juveniles contacting fixed bar screens have a high probability of impingement when velocities exceed 1.5 ft/s at the screen (Moursund et al. 2000). Moursund et al. (2000) also investigated the role that turbine shear forces may have on downstream juvenile lamprey survival and determined that these forces have little consequence to the juveniles." (Page E.1-4, Chapter 4, Lamprey Tech. Report, Page 7, Paragraph 3)
Response: The BLM agrees with these study findings. However, additional important information is available that was not discussed. There is no discussion of Pacific lamprey's fidelity to their natal streams. The possibility of the Columbia River Tribes developing Pacific lamprey hatcheries was felt to be impractical due to data obtained from sea lamprey behavior in the Great Lakes, where they have low fidelity to their spawning streams (USFWS 2000).

Adequacy of Analysis
The Applicant presented a summary of information developed from a literature search on Pacific lamprey. In the draft license and technical report, they present the life history requirements and what is known about their migrations. They did not mention that Pacific lampreys are thought to have low fidelity to spawning streams. This information was obtained from NOAA Fisheries (Ritchie Graves 2002). They do mention that juveniles migrating downstream may pass through the turbines at the dams without harm.

Project Impacts On Pacific Lamprey Addressed By the Applicant Studies
The project currently blocks Pacific lamprey from historic spawning areas within and above the HCC. The Applicant does not present mitigation measures for the impacts of the project on the Pacific lamprey.

BLM Issues

Provide passage through the HCC for Pacific lamprey.
Applicant's Response: The Applicant does not provide fish passage for Pacific lamprey.

The Pacific lamprey below the Hells Canyon Dam must be maintained by providing suitable habitat in the mainstem Snake River. Determine which mainstem tributaries below the HCC Pacific lamprey use and determine if the dam operations are affecting their access to these tributaries.

Applicant's Response*: No surveys of tributaries below the Hells Canyon Dam for Pacific lamprey were conducted. The literature search revealed that Pacific lamprey only use the mainstem river for migration.*

Develop and implement a comprehensive long-term peer-reviewed research plan for Pacific lamprey. The plan will provide needed data to implement management strategies ensuring the maintenance and restoration of Pacific lamprey. This may include working with the Tribal governments states Fish and Wildlife agencies and with operators of the eight Columbia River and Snake River dams that Pacific lamprey must pass before reaching the HCC.
Applicant's Response*: The Applicant provides no plan to mitigate for the loss of Pacific lamprey.*

Critique Of the Applicant's Conclusions For Pacific Lamprey
Pacific lamprey life history and historic distribution is presented in Section E.3.1.1.2.1.4, Page 36 to 39 and 47 to 48. Pacific lamprey is also listed as a member of the fish communities in downstream areas affected by HCC. *"Currently, the distribution of lamprey on the Snake River extends upstream to Hells Canyon Dam (Close, et al. 1995), the upstream barrier to anadromous fishes." (Page E.3-66, Paragraph 1)*

The BLM agrees with the fact that Pacific lamprey migration is blocked by the Hells Canyon Complex. Mitigation for the loss of anadromous salmonids that can not pass the Hells Canyon Complex was provided by the Settlement Agreement of 1980. No mitigation for loss of Pacific lamprey was provided in the Settlement Agreement. No new measures are proposed in the draft application to compensate for this loss. Pacific lamprey is an important source of marine-derived nutrients in the ecosystem, and they provide a food source for many aquatic and terrestrial species as well as provide an important resource to Tribes. The Applicant has caused the loss of this species from BLM lands that would be accessible to them were it not for the Hells Canyon Complex, and some form of mitigation for this loss should be developed.

Based on what is know about Pacific lamprey passage at the dams, it is believed that they have difficulty migrating upstream but pass through the dams as juveniles with little harm. It is believed that they do not specifically return to their natal streams. This lack of natal stream homing specificity provides an opportunity to move them wherever there are suitable spawning areas. The Applicant should consider working with State and Federal agencies to capture Pacific lamprey adults below Bonneville Dam and transport them to tributaries above the Hells Canyon Complex. This would provide Pacific lamprey an opportunity to reproduce and, at the same time, provide a source of marine-derived nutrients as well as a forage species for many native fish. This activity would be in compensation for the blocking of migration by the Hells Canyon Complex.

NATIVE FISH

BULL TROUT

"A native salmonid plan is intended to mitigate and enhance native populations of resident salmonids. This measure primarily includes the development of a plan to recover and restore bull trout populations associated with the Pine–Indian–Wildhorse core area. This plan would be developed with state management agencies and the USFWS. The Applicant assumes that actions undertaken to recover and restore bull trout would equally benefit other native salmonids such as redband trout. The plan would in turn provide upstream access to areas above Hells Canyon and Oxbow dams; increase the forage base in the lower portions of tributaries, Hells Canyon Reservoir, and the upper portions of tributaries to enhance rearing areas; and reduce effects of degraded habitats and land uses within tributary habitats. Other elements included in the plan would address facilities for long-term monitoring of fluvial fish, experimentation to reduce the impacts of introduced brook trout into Indian Creek, and population monitoring.

Specifically, measures in the native salmonid plan include pathogen surveys in Pine and Indian creeks, modifications to Hells Canyon fish trap, design and construction of Oxbow fish trap, enhancements of tributary habitat, outplants of anadromous carcasses, enhancement of the forage and prey base, installation of a permanent monitoring weir at Pine Creek, introduction of fluvial bull trout, and long-term monitoring and removal of brook trout in Indian Creek. These measures are detailed in the following sections." (Page E.3-131, Paragraphs 2 & 3)

Response: The BLM agrees with the concepts in the Native Salmonid Plan. It recognizes that this is a long-term effort that will require adaptive management concepts. The BLM would like the Applicant to include reintroduction of bull trout to Eagle Creek in this plan. However, reintroduction of bull trout to Eagle Creek should only be attempted if the proposed plan proves effective. The bull trout that inhabited Eagle Creek are believed to be extirpated from the drainage. When Brownlee Dam closed, it blocked fluvial bull trout from entering the Powder River and Eagle Creek. The wilderness headwaters of Eagle Creek are believed to provide excellent habitat conditions for bull trout.

"The Applicant found little to no data concerning the species distribution and use of the mainstem Snake River. Historical accounts indicate that bull trout within the HCC occurred in the following basins: Powder River, Pine Creek, Indian Creek, Wildhorse River, and the mainstem Snake River (Buchanan et al. 1997). It is suspected that bull trout were widely distributed in the headwaters of the Powder River basin, but documentation of their distribution prior to the 1960s has not been established (Buchanan et al. 1997). Bull trout were documented in 1965 creel reports from Eagle Creek and West Fork Eagle Creek, but they are now believed to be extremely rare or extirpated from this basin. The most recent account of the species downstream of the Eagle Creek basin came from ODFW personnel who reported catching a 12-inch bull trout in a gill net set at Brownlee Reservoir in 1959." (Page E.3-92, Paragraph 4 and Page E.3-93, Paragraph 1)

Response: The BLM agrees that bull trout are found in the headwaters of the Powder River and that they were known to exist until after the closure of Brownlee Reservoir in Eagle Creek, a tributary of the Powder River. The Applicant makes no provision for mitigating the loss of Eagle Creek bull trout. The Eagle Creek system has excellent bull trout habitat potential. The headwater reaches have very cold wilderness streams. The BLM believes that the loss of Eagle

Creek fluvial bull trout that used the Snake River for winter habitat in the vicinity of what is now Brownlee Reservoir should be mitigated by the Applicant. The Hells Canyon Complex prevents the fluvial bull trout component from moving freely between the Snake River below Hells Canyon Dam and the tributaries within the Hells Canyon Complex. This includes Eagle Creek, a tributary of Brownlee Reservoir. A mitigation program as an extension of the one proposed for the Hells Canyon and Oxbow reservoir tributaries of Indian Creek, Pine Creek, and Wildhorse River should be considered. Introduction of fluvial bull trout to the Eagle Creek system, including necessary habitat restoration such as irrigation diversion screening, should be studied. Introduction of bull trout to Eagle Creek could be a second phase of the mitigation program proposed by the Applicant for the Hells Canyon and Oxbow reservoir tributaries. It could be implemented when the Applicant's native salmonid plan measures prove successful (see E.3.1.3.2.1 Native Salmonid Plan).

E.3-100 "No bull trout or bull trout hybrids were found above Brownlee Dam (that is in Brownlee Reservoir, on the mainstem Snake River) in any of the applicants sampling."

The presence of bull trout in the Powder Basin is well documented (Buchanan et al. 1997). Current distribution includes the North Powder subbasins in Anothany/Indian creeks and in the upper mainstem North Powder River. Several streams that drain the eastern face of the Elkhorn Mountains, including Piine, Salmon, Big Muddy, Williams, Rock and Wolf creeks contain bull trout.

E.3.1.4.1.2 Bull Trout
"The applicant fails to mention the remaining distribution of bull trout above the HCC. Historical and current distribution includes the Middle Fork and the North Fork of the Malheur River.m(Buchannonet.al 1997)

"The Applicant proposes to supplement DO by 1,450 tons annually into Brownlee Reservoir. The Applicant's proposed method of introducing the oxygen into Brownlee Reservoir is by injecting it into the transition zone or the upstream end of the lacustrine zone. Additional details regarding reservoir oxygen injection systems are presented in section 5.15.1.7. of Technical Report E.2.2-2. The Applicant recognizes that there is significant uncertainty associated with identifying specific design features of, and understanding the reservoir response to this measure at this time. Because of this uncertainty, the Applicant proposes that the specific details regarding design, location, and operation, as well as a plan for monitoring effectiveness, be developed through consultation with ODEQ and IDEQ as part of this measure. Consultation regarding these specific details would be conducted within the framework of the relicensing process." (Page E3. 2-28, Paragraph 2)
Response: The BLM believes that the oxygenation of Brownlee Reservoir, as proposed by the Applicant, will make the habitat within the reservoir more suitable for a wintering population of adfluvial bull trout.

"Radio-tagged bull trout below Hells Canyon Dam exhibited classic fluvial behavior during both years that the Applicant biologists monitored movement. Fifty percent of the individuals that we remonitored made spring migratory movements downstream to the Imnaha River after wintering in the mainstem Snake River. Of the bull trout that were not tracked to the Imnaha River, most had radio tags that probably expired before fish would have begun migrating downstream to the

Imnaha River. Thus, these fish may have made similar movements to tributaries but radio-tag life was inadequate to monitor their movements through spring. However, several bull trout that were tracked through summer did not migrate to the Imnaha River or any other tributary, possibly because they had spawned the previous year or had not reached sexual maturity. Tributary migrations for radio-tagged fish in the Snake River generally occurred in late April through May. Movement up the Imnaha River was gradual through May, June, and July, suggesting that increasing water temperatures may have been influencing upstream movement through the summer. Additional observations of bull trout tagged in the Imnaha River in summer 2001 and monitored through the winter by U.S. BLM, ODFW, and Applicant biologists (USFS, Wallowa–Whitman National Forest, unpublished data, 2002) provided further evidence for the existence of a fluvial population that spawns in the upper Imnaha River basin. These fish spawned between September and October 2001. After spawning, one of bull trout moved out of the Imnaha River sometime in November or December and remained in the Snake River from January to April 2002." (Page E.3-98 & 99)

Response: The BLM does not agree that the studies of bull trout in the Hells Canyon Reach are adequate. The Applicant has shown that bull trout are dependent on the Hells Canyon Reach of the Snake River for a portion of their life history needs. However, the fact that only a few bull trout were tagged and tracked into tributaries leaves numerous questions about their behavior and the affect of the hydropower operations on the population. The Applicant found that some bull trout remained in the mainstem reach during the summer when temperatures are considered to be unsuitable for bull trout. The relative portion of the population that remains in the mainstem Snake River during the summer was not determined. The BLM believes that the Applicant should continue to study bull trout in the Hells Canyon Reach until the behavioral patterns and distributions of the population throughout the year are known. The relative population abundance and the affect of hydropower operations on it throughout the year need to be discovered.

Adequacy of Analysis
The bull trout studies by the Applicant were adequate within the Hells Canyon Reservoir and its tributaries. They conducted a very comprehensive study that produced new and useful information.

The bull trout studies in the Snake River below Hells Canyon Dam produced new information but should be considered preliminary. They did not determine the affects of the project on bull trout using the river in the warmer months. They did not gather enough information to fully describe the life history patterns or relative abundance of the species.

The Applicant did not attempt to find bull trout in the Eagle Creek drainage where they were reported in 1965. Inventories of the wilderness portions of the drainage for bull trout presence have not been completed. The analysis should include the potential for reintroduction of bull trout to Eagle Creek and the reservoir above Brownlee Dam.

Project Impacts On Bull Trout Addressed By the Applicant Studies
The Applicant conducted bull trout studies in the Hells Canyon Reservoir and its tributaries. They have used the findings from the study to develop a plan that will help restore bull trout to that portion of Hells Canyon Complex. The Applicant proposes to implement a native fish plan

that will aid in the recovery of bull trout and other native species in Hells Canyon Reservoir, Pine Creek, Indian Creek, and Wildhorse River. The plan includes the following measures:

- Pathogen survey in Pine and Indian creeks;
- Hells Canyon Dam fish trap modification to capture bull trout;
- Construction of a fish trap at Oxbow Dam to transport bull trout over the dam so they can access Wildhorse River;
- Introduce anadromous fish carcasses to Pine Creek for marine-derived nutrient replenishment;
- Habitat enhancement in tributaries to include land acquisition, landowner cooperative agreements to enhance riparian zones, and installation of fish screens on diversions;
- Introduction of triploid rainbow fry as a prey base for bull trout;
- Construction of a permanent weir at the mouth of Pine Creek;
- Introduction of fluvial bull trout to improve genetic interchange;
- Long-term monitoring and brook trout removal in Indian Creek.

The Applicant conducted studies of bull trout below Hells Canyon Dam in the Snake River. They provided new information about migration habits of bull trout but their study is incomplete. They did not determine whether the Hells Canyon Complex affects bull trout. Their sample size was too small to draw any conclusions.

Although bull trout were known to exist in Eagle Creek, a tributary of Brownlee Reservoir, the Applicant did not conduct studies to determine whether reintroduction would be possible. They also did not conduct bull trout inventories in the Eagle Creek watershed to determine whether the species may still exist. The inventories for bull trout presence in the wilderness portion of Eagle Creek are incomplete. Eagle Creek was not included in the Applicant's native fish plan.

BLM Issues
Study and implement bull trout passage through the HCC to reconnect the populations above, within, and below the dams.
Applicant's response: The Applicant has proposed to pass bull trout over two of the three dams.

The fluvial populations below the Hells Canyon Dam must be maintained by providing suitable habitat in the mainstem river. Stream temperature, substrate, flow, and total dissolved gases must be restored to conditions that approximate those found prior to HCC closure. Restoration will include meeting Idaho and Oregon water quality standards.
Applicant's response*: The Applicant has proposed measures to improve Oxygen and TDG conditions below Hells Canyon Dam. No proposals were made to improve other habitat features*

Develop a mitigation/restoration package that addresses the decline of bull trout within the study area (metapopulation). Include the acquisition and restoration of key habitats. Acquire [unspecified] miles of bull trout habitat to replace that which will continue to be lost due to the HCC.

***Applicant's response**: The Applicant's native fish plan would address the decline of bull trout in the tributaries of Oxbow and Hells Canyon reservoirs. They propose to restore key habitats through acquisition and restoration.*

Develop and implement a comprehensive long-term peer-reviewed research plan for bull trout that will provide the needed data to implement management strategies to ensure their maintenance and restoration.
***Applicant's response**: The Applicant's plans for long-term research are undefined. They plan to build a fish weir in Pine Creek and conduct other unspecified stream work to improve native fish habitat.*

Restore the prey base provided by anadromous fish.
***Applicant's response**: The Applicant proposes to introduce triploid trout fry as a prey base for bull trout on an annual basis as part of the native fish plan.*

Develop mitigation for the 89.3 miles of mainstem Snake River bull trout habitat inundated by the HCC and the 10 miles of Powder River habitat lost that will continue to be inundated as a reservoir pool.
***Applicant's response**: The Applicant failed to address the continuing impacts to inundated bull trout habitat on BLM lands. The Applicant's native fish plan only would apply to the Oxbow and Hells Canyon reservoirs. It would not apply to Brownlee Reservoir or the Powder River habitat lost to inundation.*

Participate in the development and implementation of a bull trout recovery plan for the mainstem Snake River and its tributaries based on study findings.
***Applicant's response**: The Applicant has not addressed this issue. The native fish plan will apply to the Hells Canyon and Oxbow reservoirs and tributaries only.*

Critique Of the Applicant's Conclusions For Bull Trout
The Applicant's study findings provided valuable information about the condition of bull trout populations in tributaries to the Hells Canyon Reservoir. The native fish plan is logical and should improve bull trout habitat in that part of the Hells Canyon Complex.

The bull trout studies below Hells Canyon Dam provided new information about migratory habits of bull trout. The Applicant has not proposed any additional studies although the affects of the HCC on the population in the Hells Canyon Reach is unknown.

The Applicant did not address the issue of passing bull trout over Brownlee Dam or studying the Eagle Creek area where there may still be a remnant population. The addition of oxygen to the water in Brownlee Reservoir may create good over-wintering habitat for bull trout. If fluvial bull trout are reintroduced, they could migrate up Eagle Creek in the spring and return in to the reservoir in the fall.

The Applicant has only partially addressed the issues raised by the BLM in the ARWG meeting.

White Sturgeon

"6.1. Swan Falls–Brownlee Reach
Based on the sampling we conducted throughout the study area, the status of the white sturgeon population in the Swan Falls to Brownlee Dam reach is poor. Catch rates and overall numbers of sturgeon sampled in this reach were very low, with most fish captured near the upper end of the reach between Swan Falls and Walters Ferry. Recruitment levels appear to have remained poor since earlier IDFG surveys, and the population consisted primarily of subadult and adult sturgeon, with few fish less than 92 cm TL. The continuing presence of some small sturgeon indicates that some recruitment is occurring but at low levels. The averaged relative weights for all sturgeon captured in this reach were similar to those for the Hells Canyon population; however, sturgeon in Brownlee Reservoir had a significantly lower condition factor than other sturgeon in Snake River reservoirs. Severe water quality degradation, particularly in the lower river and Brownlee Reservoir, appears to be limiting white sturgeon in this reach. The presence of a small population currently composed of predominantly mature adults, few new recruits, and few annual spawners suggests that future recruitment will remain low, perhaps below the levels necessary to sustain the population." (Page E.3.1-6, Chapter 1, White Sturgeon Technical Report, Page 18, Paragraph 2)
Response: The BLM agrees with this finding

"The Applicant proposes to 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 HCC. For example, based on a 30-year license, a total of three stock assessments (at 10-year intervals) would be conducted for sturgeon populations in these reaches. Stock assessments in Oxbow and Hells Canyon reservoirs would probably be conducted less often since the remnant status of sturgeon in these pools has changed little over the past 30 years (Chapter 1 of Technical Report E.3.1-6)." (Page E.3-172, Paragraph 3)
Response: The BLM agrees with the proposed monitoring plan.

"The river segments between Brownlee and Hells Canyon dams are relatively short and consist primarily of impounded reservoir habitat. Reservoir habitat may provide some benefits to white sturgeon. For example, the relative weight of individuals caught in reservoirs with good water quality tended to be higher than that of individuals caught in free-flowing sections of the Snake River (Chapter 1 of Technical Report E.3.1-6). However, two commonly cited drawbacks of reservoir habitat for sturgeon are poor water quality and lack of turbulent flow conditions for spawning (Jager et al. 2001). The Applicant's stock assessment between Brownlee and Hells Canyon dams (Chapter 1 of Technical Report E.3.1-6) indicated that the status of white sturgeon within these two reservoirs has remained unchanged over the last 30 years. Welsh and Reid (1971) concluded that, although anglers have captured a few sturgeon in the tailrace of Brownlee Dam, the species is probably not abundant in Oxbow Reservoir and not present in Hells Canyon Reservoir." (Page E.3-182, Paragraph 2)

Response: The Applicant has not addressed the issue of white sturgeon habitat inundated by Hells Canyon and Oxbow reservoirs. The BLM believes that the white sturgeon population

should be recovered or mitigation measures for the continued lost production should be developed. It may be possible to improve white sturgeon productivity in the Hells Canyon Complex reservoirs through oxygenation of reservoir waters as proposed by the Applicant. However, the lack of reproduction in Oxbow and Hells Canyon reservoirs currently precludes the development of a viable population. The BLM believes that the Applicant should propose measures that would recover the white sturgeon population or mitigate the loss. The BLM believes that the population in the three reservoirs would have been comparable or greater than the one presently found in the Hells Canyon Reach. The pre-dam habitat now inundated by the reservoirs would have been similar in size and quality to the Hells Canyon Reach. The BLM believes that the Applicant should explore installation of a generator capable of handling several thousand cfs in the Oxbow Bypass to create flows sufficient to stimulate white sturgeon spawning. Water flowing through this facility could be vented to insert oxygen as is proposed for Brownlee Dam.

"Therefore, the Applicant proposes translocation as a means to improve white sturgeon productivity in the Snake River between Swan Falls and Brownlee dams. Similar actions (trawl and haul supplementation) have been implemented to improve white sturgeon productivity in the impounded reaches of the lower Columbia River (Kern et al. 2001). The Applicant acknowledges that the feasibility of this measure depends on significant improvements to water quality in the reach (see Technical Report E.2.2-2 for a description of water quality issues). A population viability analysis indicated that recruitment would not be reestablished unless water quality was improved in the Swan Falls to Brownlee reach (Chapter 3 of Technical Report E.3.1-6). The feasibility of this measure may also depend on study findings from the water quality assessment (see section E.3.1.3.2.3.2.)." (Page E.3-177, Paragraph 2)
Response: The BLM agrees with this translocation strategy if it is approved by the Oregon and Idaho fisheries agencies. However, this does not address the habitat lost due to inundation by the Hells Canyon Complex.

Adequacy of Analysis
The Applicant has thoroughly analyzed the white sturgeon population, and the BLM agrees with their findings. However the applicant has not provided adequate mitigation to restore white sturgeon to the complex.

Project Impacts On White Sturgeon Addressed By the Applicant Studies
The impacts on white sturgeon by the HCC have been addressed by the Applicant through a number of measures in its proposed white sturgeon plan. However, the loss of habitat within the Oxbow and Hells Canyon reservoirs is not adequately addressed and mitigated in the proposed plan.

BLM Issues

Provide viable habitat for a healthy population of white sturgeon on BLM administered public lands.
***Applicant's response**: The Applicant's white sturgeon plan partially addresses this issue.*

Provide passage for white sturgeon though the HCC.
***Applicant's response**: The Applicant's plan will provide trap and haul passage.*

Populations within HCC reservoirs must be returned to a viable status similar to the one below the Hells Canyon Dam. The genetic integrity of the stock must be maintained by providing a means for genetic transfer between Snake River stocks. These populations should be naturally reproducing and represented by all age classes.
***Applicant's response**: The Applicant's plan is designed to provide genetic interchange.*

Water quality in Brownlee Reservoir must be restored to levels sufficient to support a reproducing and fishable population of white sturgeon and meet state water quality standards.
***Applicant's response**: The Applicant plans to aerate the transition zone of Brownlee Reservoir.*

Acquire/provide [unspecified] miles of white sturgeon habitat to replace habitat that will continue to be lost due to adverse impacts of the HCC.
***Applicant's response**: The Applicant's plan does not address this issue.*

Critique Of the Applicant's Conclusions For White Sturgeon
The Applicant's research on white sturgeon extended from Swan Falls Dam to Lower Granite Reservoir. They determined that the population in the Hells Canyon Reach was healthy and has gradually increased in size and number. They found that the population within the HCC reservoirs have decreased in thirty years and is nearly extinct. They found that one healthy but small population exists in the river approximately ninety miles upstream from Brownlee Reservoir. The Applicant explored the possibility of constructing white sturgeon fish passage structures at the HCC dams. They concluded that such facilities were too costly, and there was a high level of uncertainty as to whether white sturgeon would use them.

The Applicant has developed a white sturgeon plan. As part of the white sturgeon plan, the Applicant has proposed a trap-and-haul operation for moving selected individual sturgeon. This would promote genetic interchange among populations that are isolated by the dams within the Snake River. The state fisheries agencies will need to agree to the plan before it can be implemented. The plan will only be practical if water quality conditions in the HCC reservoirs and the Snake River above the HCC can be improved. Low oxygen levels in the HCC reservoirs are a major problem. Lack of suitable spawning flows within the reservoirs is another limiting factor. The BLM should support the Applicant's white sturgeon plan.

Additionally the BLM believes that the Applicant should explore the possibility of installing a generating plant in the Oxbow Bypass Reach that could pass approximately 2000 cfs. This plant would improve water quality in the bypass by infusing oxygen and create flows that could encourage successful white sturgeon spawning.

Redband Trout

Distribution and Status of Redband Trout
"Our trapping, radio-telemetry, and genetics results showed that fluvial and resident redband trout populations have persisted within the Hells Canyon Complex and in the Snake River below Hells Canyon Dam." (Tech. Report, E.3.1-7, Chapter 2, Page 37, Paragraph 1)
Response: The BLM agrees with this finding.

"Redband trout home ranges were larger within reservoirs than they were in the Snake River: about half of the tagged fish used half or more of the length of the reservoirs. Larger reservoir home ranges may have been a result of reservoir trout actively searching for food, while trout over wintering in the river probably relied mostly on invertebrate drift." (Tech. Report, E.3.1-7, Chapter 2, Page 37, Paragraph 2)
Response: The BLM agrees with this finding.

"We trapped juvenile and adult redband trout migrating downstream to Hells Canyon Complex reservoirs and the Snake River during fall when water temperatures began to drop below 8 to 10 °C. Adults and juveniles were observed moving downstream, but juvenile fish dominated the catch. Significant catches of juveniles at tributary traps indicated that a significant amount of spawning occurred within the tributaries." (Tech. Report, E.3.1-7, Chapter 2, Page 37, Paragraph 3)
Response: The BLM agrees with this finding.

Life history of Redband Trout
"We found self-sustaining native redband trout populations within all of the projects of the Hells Canyon Complex, in the Snake River, and in tributaries below Hells Canyon Dam. Despite also finding an abundant and widely distributed hatchery rainbow trout component of the fishery, we found that redband trout were present throughout the
Hells Canyon Complex reservoirs and in nearly every tributary that had adequate year-round flow." (Tech. Report, E.3.1-7, Chapter 4, Page 34, Paragraph 5)
Response: The BLM agrees with this finding.

"Within the project reservoirs and in the Snake River below Hells Canyon Dam, hatchery-produced trout were three to ten times more abundant than wild rainbow trout, yet wild rainbow trout dominated tributary streams throughout the study area." (Tech. Report, E.3.1-7, Chapter 4, Page 35, Paragraph 1)
Response: The BLM agrees with this finding. The mainstem of the Snake River has a large number of residualized hatchery steelhead (those that do not migrate to the ocean).

"Juvenile trout were the predominant life stage in all of the tributaries, while both juveniles and adults occupied reservoir habitats. Juveniles emigrating from tributaries served as the primary source of redband trout for the Hells Canyon Complex reservoirs and mainstem Snake River." (Tech. Report, E.3.1-7, Chapter 4, Page 35, Paragraph 1)

Response: The BLM agrees with this finding. This is reasonable, since there are no suitable spawning areas for redband trout in the reservoirs. When redband juveniles hatched and reared in tributaries become overcrowded they are forced to seek new habitat downstream in the reservoirs.

"Hybridization between hatchery rainbow trout and native redband trout has occurred within the complex but to a lesser extent than might be expected based on historic stocking levels. Because nearly all of the reservoir tributaries were found to have pure redband trout populations while Brownlee and Oxbow reservoirs contained a mixture of hatchery rainbows and native redband trout, hatchery fish have apparently been either physically or reproductively isolated from interbreeding with native redband trout in the tributaries (Leary 2001)." (Tech. Report, E.3.1-7, Chapter 4, Page 35, Paragraph 2)
Response: The BLM agrees with this finding. The state agencies should convert their rainbow stock to redband trout or sterile triploid rainbow trout. It was noted that this process has begun with some state hatchery programs.

"Leary (2001) reported that hatchery steelhead planted below Hells Canyon Dam were genetically similar to the average redband population from the Hells Canyon study area. This similarity may explain why wild redband trout from Sheep Creek did not contain genetic information from hatchery rainbow trout, even though residualized hatchery steelhead were present throughout the Snake River and in Sheep Creek." (Tech. Report, E.3.1-7, Chapter 4, Page 35, Paragraph 3)
Response: The BLM agrees with this finding. The steelhead stock is native to the Snake River, and they are an anadromous form of the redband trout.

"....populations in Connor and Sutton creeks had characteristics closer to nonnative coastal strains of rainbow trout. Most populations examined had intermediate characteristics of redband trout and coastal rainbow trout. Redband trout collected above a barrier in McGraw Creek were characteristic of a small population isolated over a long time, a finding that suggested genetic drift from typical redband trout populations." (Tech. Report, E.3.1-7, Chapter 4, Page 35, Paragraph 4)
Response: The BLM agrees with this finding

"We also recorded the upstream return of adults with radio-telemetry monitoring. Radio-tagged adult redband trout made extensive movements into tributaries primarily during April and May."…. "Adult redband trout were probably moving to tributaries to spawn and likely remained there through the summer. Reservoir electrofishing results lent support to this hypothesis in that summer catch rates of wild trout were consistently lower than fall and winter catch rates." (Tech. Report, E.3.1-7, Chapter 4, Page 37, Paragraph 4)
Response: The BLM agrees with this finding. This finding only seems reasonable in that there is no place in the reservoirs for the redband trout to spawn and tributaries provide small gravel and riffles needed for spawning. The tributaries provide greater protection for the relatively smaller redband trout than would be available in large rivers and reservoirs. They would have greater vulnerability to predatory fish during spawning and early rearing in the larger bodies of water.

"Genetic results reinforced trapping and radio-telemetry data that pointed to the existence of a fluvial redband trout component within and below the Hells Canyon Complex. Genetics showed

that gene flow among redband trout populations from different tributaries has occurred to a greater extent than genetic exchange between some populations within the same drainage (Leary 2001). Leary (2001) suggested that this genetic structure could be explained by the existence of two different life histories. Migratory fish, present in some or all of the drainages, would spawn and rear in the tributaries and then migrate to the Snake River. Adults returning to spawn might stray from their natal drainage and therefore generate gene flow among drainages." (Tech. Report, E.3.1-7, Chapter 4, Page 38, Paragraph 2)
Response: The BLM agrees with this finding.

"In general, reservoir habitats are unsuitable for successful salmonid spawning. Habitat requirements for spawning redband trout include a range of suitable water velocities and appropriate substrate sizes. Therefore, it should not be surprising to find that redband trout in Hells Canyon Complex reservoirs use tributary habitats for spawning and rearing but reservoir habitats during fall and winter for overwintering. The specific features of suitable rearing habitat for emerging fry (including thermal regime, escape cover, and other features) may, in part, explain a natural selection toward tributary spawning. Fry survival from tributaries would likely be higher than survival in the mainstem where predators are more abundant and physical habitat conditions are less favorable. Substrate particle sizes suitable for smaller, nonanadromous salmonids could be subject to scour in larger river environments, which may further explain natural selection of smaller fluvial environments. Fluvial or adfluvial life stages are generally associated with larger individuals that migrate out of smaller tributary environments to benefit from greater forage potential in large river habitats and ultimately greater survival and fitness. And younger life stages are also known to migrate out of tributary habitats into mainstem environments, especially to overwinter." (Tech. Report, E.3.1-7, Chapter 4, Page 38, Paragraph 3)
Response: The BLM agrees with this finding. It should be noted that the young fish that do migrate into the reservoirs of the Hells Canyon Complex are subject to poor growing conditions due to poor water quality.

"Transect data at the reservoir tributaries showed that low reservoir elevations could create barriers within the lower reaches of some tributaries. We found it highly probable that Dennett Creek was inaccessible to adult trout at a low-pool elevation but that Sturgill Creek was accessible to all but the largest trout (greater than 457 mm TL). And, though travel distances were extensive, habitat conditions in Brownlee Creek were more than adequate to pass all sizes of adult trout. Water depth, water velocity, and resting habitat were the primary factors affecting access for adult trout in the lower reaches of the reservoir tributaries. Failure to meet these criteria was largely a result of an unconfined channel with sand and gravel substrates. Stream discharge might also have influenced the accessibility of these tributaries at low reservoir elevations. After many years of reservoir impoundment, channel substrates and overall channel gradient within the impounded reaches of reservoir tributaries might be affected by drainage basin size and a stream's ability to transport bed material." (Tech. Report, E.3.1-7, Chapter 4, Page 41, Paragraph 3)
Response: The BLM agrees with this finding. Basically the Applicant's study indicates that some streams are non-functional within the reservoir draw down zone. Sediment delivered to the reservoir aggrades and causes the channel to lose definition. In some cases the streams flow under unconsolidated bed material in the channel and emerge at the reservoir. Under these conditions the fish cannot find a way to pass upstream.

"Based on our tributary survey below Hells Canyon Dam, we concluded that annual precipitation, channel and drainage basin geomorphology, and extreme flow events within tributaries are probably key factors affecting habitat conditions at tributary entrances. Our observations also led us to conclude that fluctuations in discharge in the Snake River resulting from operation of the Hells Canyon Complex are unlikely to significantly affect tributary access for adult salmonids. Many of the tributaries below Hells Canyon Dam may have been historically inaccessible to trout and salmon during low-flow periods (i.e., late summer through winter) and after extreme flow events within tributaries that resulted in high gradient, shallow entrances. These streams would have been accessible only during spring runoff and possibly through early summer." (Tech. Report, E.3.1-7, Chapter 4, Page 41, Paragraph 5)
Response: The BLM agrees with this finding.

"Culvert surveys at 18 Hells Canyon Complex tributaries suggested that most were upstream barriers for adult rainbow and bull trout. The primary factors responsible for creating barriers were water depth and water velocity inside the culverts. Culvert size and lack of downstream control points appeared to be responsible for inadequate depths, while culvert gradient was responsible for the extreme velocities." (Tech. Report, E.3.1-7, Chapter 4, Page 40, Paragraph 3, Appendix, E.3.1-7).
Response: It is noted in this section that the Applicant has recommended modification of culverts on Brownlee and Hells Canyon reservoirs to provide fish passage (section E.3.1.x.x.x., 6.0 Land Management and Aesthetics). No section E.3.1.x.x.x currently exists in the draft application. The report cited above clearly notes that a problem exists. The ownership of the culverts was not stated in the report. The BLM believes that the Applicant should address this issue. The report cited below indicates redband trout in the reservoirs are being negatively affected by the project.

"The data collected in the HCC indicates that several species have W_r [weight to length ratio] *below 85, but not for all HCC reservoirs. In Brownlee Reservoir, bridgelip sucker was the only sampled species having a W_r less than 85. In Hells Canyon Reservoir, common carp, largescale sucker, mountain whitefish, rainbow trout, and yellow perch had low W_r. Of species sampled in Oxbow Reservoir, only rainbow trout had a W_r less than 85." (Tech. Report, E.3.1-7, Chapter 4, Page 3, Paragraph 4 Appendix 3.3.1-5)*
Response: The BLM agrees with the findings and believes *a W_r less than 85* is symptomatic of the low oxygen and high water temperatures that adversely affect native redband trout. The BLM believes that the Applicant should develop a plan to provide access to all coldwater tributaries blocked by culverts or other obstacles within the project area to provide redband trout with refugia from inhospitable conditions in the reservoirs during the summer. The addition of oxygen may improve the conditions for trout, but the extreme thermal temperatures cannot be controlled and will adversely affect trout growth and condition factor (W_r).

Limiting Factor for Redband Trout

"…several factors can be identified as potentially limiting redband trout populations. Such factors for redband trout associated with the Hells Canyon Complex include habitat degradation, habitat fragmentation, genetic introgression, competition and predation from

nonnative species, and reduced tributary productivity." (Tech. Report, E.3.1-7, Chapter 4, Page 42, Paragraph 3)
Response: The BLM agrees with this finding. However, this is a generic statement that does not address the effects of the Hells Canyon Complex on redband trout. Water quality in the reservoirs may be a larger problem for redband growth and survival than tributary condition.

"In a large system such as the Snake River, diurnal fluctuations are not as large and as such would force fish to endure longer periods of suboptimal conditions. These prolonged exposures likely prompt fish to migrate and seek thermal refuge in tributary systems. Temperature conditions and low dissolved oxygen levels in the mainstem Snake River and even in the lower end of larger tributaries are likely critical in limiting the production potential of redband trout (Chandler 2001)." (Tech. Report, E.3.1-7, Chapter 4, Page 42, Paragraph 4)
Response: The BLM agrees with this finding.

"Habitat alterations related to land-use practices within tributary basins could have negative effects on redband populations. For example, activities that increase sediment and decrease flow to a stream might lead to reduced spawning success and lower survival of redband trout fry from redds. Multiple land-use practices occur in most major drainages containing redband trout within the Hells Canyon Complex. Many of these activities could negatively impact prime spawning and juvenile rearing habitats. These tributaries may also be used extensively by adult redband trout as thermal refugia during summer. Protection and restoration of these habitats are probably essential to the continued persistence of the species on a local scale." (Tech. Report, E.3.1-7, Chapter 4, Page 43, Paragraph 1)
Response: The BLM agrees with this finding. However, the effects of the Hells Canyon Complex on rearing and wintering fish may have an equal if not greater affect on limiting trout production.

"Redband trout demonstrate a complex of different life history forms. The species displays varying degrees of potamodromy (migration, spawning, and feeding entirely in freshwater), and anadromy is prevalent throughout much of its range (Behnke 1992, Currens 1996). Maintenance of various life history forms also appears to be critical to the persistence of some populations."…. "Within the Hells Canyon Complex, redband trout exhibit resident and fluvial life histories. Connectivity among drainages in the complex is necessary to maintain these life history forms. All major drainages in the complex appear to be accessible to the fluvial form, but a number of smaller tributaries may be periodically or permanently inaccessible because of culverts, fluctuating reservoir levels, and naturally low stream flows. Restoring connectivity to many of these smaller tributary populations when flows are adequate could help to ensure persistence of the two life histories and genetic diversity." (Tech. Report, E.3.1-7, Chapter 4, Page 43, Paragraph 2)
Response: The BLM agrees with this finding.

"Genetic hybridization between native redband trout and hatchery-planted coastal rainbow trout could also be a significant limiting factor among redband populations associated with the Hells Canyon Complex."…. "Even though genetic analyses showed
that nearly all of the tributaries in the complex possessed pure redband trout, continued stocking of hatchery rainbow trout could threaten existing pure populations. This risk would become even greater if connectivity among smaller tributaries was improved. Limited access to these

tributaries historically may have protected native redband trout from becoming hybridized with hatchery stocks. State fisheries managers have begun to reduce the risk of introgression in some areas by planting only sterile triploid rainbow trout into waters containing native cutthroat or redband trout. If the IDFG and ODFW adopt this management strategy in the Hells Canyon Complex, the risk of hybridization would be significantly reduced." (Tech. Report, E.3.1-7, Chapter 4, Page 43, Paragraph 3)
Response: The BLM agrees with this finding.

"Competition and predation from introduced nonnative fish species may also be a significant factor influencing native redband trout populations associated with the Hells Canyon Complex. Introduced species such as rainbow trout, crappie, pumpkinseed, bluegill, yellow perch, smallmouth bass, and channel catfish compete with juvenile and adult redband trout for food and space. Predation by largemouth and smallmouth bass and channel catfish may also be a nonnative species may have on redband trout populations and attempting to compensate for their effects by establishing refuge areas may be critical for ensuring the persistence of some populations and life history forms." (Tech. Report, E.3.1-7, Chapter 4, Page 43, Paragraph 4)
Response: The BLM agrees with this finding. However, it is not stated how these refuges can be created.

"Reduced tributary productivity resulting from the loss of anadromous salmonids within tributaries in the Hells Canyon Complex may also be a limiting factor for redband trout populations. Marine-derived nutrients that had previously been imported to tributaries every year in the form of salmon carcasses are no longer present. Effects of this loss probably vary among drainages, depending on other sources of nutrients available through natural basin characteristics or human activities. The loss of nutrients may have directly affected the productivity of redband trout and other native salmonids, especially within the rearing areas." (Tech. Report, E.3.1-7, Chapter 4, Page 44, Paragraph 2)
Response: The BLM agrees with this finding. There may be opportunities to add nutrients to these streams artificially to compensate for the loss of anadromous fish marine-derived nutrients.

Adequacy of Redband Trout Analysis
The Applicant's analysis of redband is adequate. The following information was developed from their research:

Distribution and Status:
Within the Hells Canyon Complex Redband populations are both resident and fluvial within the Hells Canyon Complex. They are well distributed throughout the planning area. The redband trout appear to be smaller than their counterparts below Hells Canyon Dam. Wild redband trout are greatly outnumbered by hatchery rainbow trout stocked by ODFW and IDFG. Connor and Sutton creeks have rainbow/redband hybrids present. However, this is a relatively limited number, considering the extensive stocking of hatchery rainbow trout that annually takes place.

Below the Hells Canyon Dam:
The populations are both resident and fluvial below the Hells Canyon Dam. They are mixed with large numbers of residual hatchery steelhead that are also of redband genetic origin. The redband trout found in tributaries are pure strain with the exception of Sheep Creek where they have hybridized with cutthroat trout in the extreme headwaters. The population is widespread and

abundant. The study also found that a few redband trout radio-tagged above the dams were found in the Snake River below Hells Canyon Dam. It is believed that they were entrained during periods when water was being spilled.

Life History:
Within the Hells Canyon Complex; The redband trout within the Hells Canyon Complex exhibit two life history strategies. One strategy is to remain in the small tributaries and reproduce without migrating. The second strategy is to migrate into the reservoirs of the Hells Canyon Complex to rear. When redband trout rearing in the reservoirs become sexually mature, they return to their natal streams in the spring to spawn.

Below the Hells Canyon Complex:
The redband trout below the Hells Canyon Dam exhibit two life history strategies. One strategy is to remain in the small tributaries and reproduce. The second strategy is to migrate into the Snake River to rear. When they become sexually mature, they return to their natal streams in the spring to spawn.

Tributary Access
Within the Hells Canyon Complex;
Redband trout migrate into a number of tributaries for spawning. Four tributaries are known to be accessible to redband trout at some flow stages. Of the 18 tributaries checked by biologists, 11 were ephemeral. Redband trout were present in 4 of the 7 with perennial flow. It was found that some tributaries have poor access because they lack the ability to move sediment that accumulates in the reservoir confluence zone. The low discharge from these tributaries is inadequate to clear the channels of sediment and they remain impassible.

Below the Hells Canyon Complex:
Tributary access below Hells Canyon Dam is limited by steep slopes and limited flows. Access by redband trout to some tributaries below the Hells Canyon Dam is affected by periodic blockages that occur when large quantities of bedload are discharged. Drought years that cause low flows may prevent redband trout from entering some small tributaries. The study concluded that redband access to Snake River tributaries below Hells Canyon Dam is not affected by fluctuation of the Snake River level related to hydropower operations.

Limiting Factors
Within the Hells Canyon Complex:
The tributary habitat has been altered by anthropogenic activities to the point that many are nearly unsuitable for the production of redband trout. The reservoir environment provides low quality habitat and extensive competition by nonnative fish. The redband trout rearing in the reservoir have a lower than normal weight ratio that indicates they are either unable to feed efficiently or there is an insufficient food base. Water quality and temperature in the reservoirs are unfavorable to redband trout during the summer months. Hybridization is a known threat but has been relatively limited at this point in time. The population is generally abundant and not in jeopardy, but it shows signs of stress.

Below the Hells Canyon Complex
The redband trout below the Hells Canyon Complex may be affected by water quality in the Snake River and habitat alteration in the tributaries. Overall, the population of redband below Hells Canyon Dam is relatively healthy and abundant.

Project Impacts On Redband Trout Addressed By the Applicant Studies
Within the hells Canyon Complex:
The tributary habitat has been altered by anthropogenic activities to the point that many are nearly unsuitable for the production of redband trout. The reservoir environment provides low quality habitat and extensive competition by nonnative fish. The redband trout rearing in the reservoir have a lower than normal weight ratio that indicates they are either unable to feed efficiently or there is not enough food available. Water quality and temperature in the reservoirs are unfavorable to redband trout during the summer months. Hybridization is a known threat but has been relatively limited at this point in time. The population is generally abundant and not in jeopardy, but it shows signs of stress.

Below the hells Canyon Complex
The redband trout below the Hells Canyon Complex may be affected by water quality in the Snake River and habitat alteration in the tributaries. Overall, the population of redband trout below Hells Canyon Dam is relatively healthy and abundant.

BLM Issues

Redband rainbow trout passage through the HCC should be implemented to reconnect the sympatric redband rainbow trout population, below, within, and above the dams.
Applicant's response*: The native fish plan will provide passage over Hells Canyon and Oxbow dams but not Brownlee Dam.*

The populations below Hells Canyon Dam must be maintained by providing suitable habitat in the mainstem river. Stream temperature, substrate, flow, and total dissolved gases must be restored to conditions that approximate those found prior to HCC closure in order to maintain redband rainbow trout lifecycle functions.
Applicant's response*: The Applicant's plan to increase oxygen and reduce TDG will address water quality issues below Hells Canyon Dam. The fall chinook protection flows are believed to benefit redband trout through most of the winter period.*

Restoration will include meeting Idaho and Oregon water quality standards.
Applicant's response*: The Applicant is working with the two states to implement TMDLs, improve oxygen, and reduce TDG's.*

Develop and implement a comprehensive research plan that will provide the needed data ensuring maintenance and restoration of redband rainbow trout below the HCC.
Applicant's response*: The Applicant has developed a native fish plan that includes a weir at the mouth of Pine Creek for monitoring redband trout and bull trout.*

Critique Of the Applicant's Conclusions For Redband Trout
Based on the Applicant's findings, the BLM has reached the following conclusions:
Redband trout in the reservoirs should have all culverts that pose a barrier to their migration corrected by IPC.

Hatchery stocking of the reservoirs should use sterile triploid rainbow or redband trout to prevent Hybridization if ODFW and IDFG concur.

The water quality of the reservoirs should be improved to provide longer periods of suitable rearing for the migratory form of the redband trout. This could improve their weight ratio to an acceptable level. IPC must meet water quality standards for Oregon, Washington and Idaho.

Hells Canyon Complex tributary habitat should be improved wherever possible to enhance spawning and rearing success of redband trout.

Non-Native Sport Fish

The following are conclusions of the Applicant concerning smallmouth bass and crappie spp. in the Hells Canyon reservoirs:

- *"In most years smallmouth bass spawning peaked from May 19 to June 1.*
- *In most years crappie spawning peaked from May 10 to 21 and again from June 8 to 24.*
- *The duration of the smallmouth bass spawning period is related to the rate of temperature increase during the prespawning period.*
- *The duration of the crappie spawning period is related to the date of the first nest observation.*
- *Nesting habitat has not been limited in Brownlee Reservoir at observed water elevations.*
- *Water level drafts of more than 1.2 m (4 ft) during active spawning period have a severe negative effect on nest success.*
- *Water level filling during the active spawning period does not have an affect on nest success." (Technical Studies, E.1-5, Chapter 1, Page 34, Paragraph 3)*

IPC has exceeded reservoir level drafting requirements of the Army Corps of Engineers for spring flood control in at least the following years, 1994, 1999 and 2000 which has probably affected warm water fish populations. IPC should disclose this, and discuss why and what impacts this has had on warm water fisheries. The primary findings document that water level drafts of more than 1.2 meters during active spawning have a severe negative effect on nesting success of all three species. The report also documented by species the thermal affects on spawning as well as the range and peak of spawning. The method used and data collected are

based on sound aquatic science. The research data indicated that nest densities were in low numbers or not observed in many years in Oxbow and Hells Canyon reservoirs. The minimal amount of information on nest sites in Oxbow and Hells Canyon reservoirs does not diminish the conclusion but does leave a question as to why the populations were so low that few nests were found. The number of channel catfish nests sampled was limited but appears to be adequate to substantiate the fact that they can be negatively affected by reservoir drafting.

The knowledge that drafting of the reservoirs can severely limit reproduction of smallmouth bass, crappie and channel catfish (based on their spawning timing, depth, and thermal requirements) can be used to either enhance the reservoir sport fishery or reduce their numbers if they are considered to be a major threat to native species' recovery or maintenance.

"As part of the warmwater fish plan, the Applicant implements actions to protect resident centrarchids during spawning periods and to monitor populations."(Page E.3-127, Paragraph 1)

"For the proposed operations scenario, the Applicant would use a series of target elevations on specific dates as operational guidelines. A target elevation (minimum) of 2,069 feet mean sea level in Brownlee Reservoir would be set for May 20. Once the elevation of Brownlee Reservoir reached 2,069 feet on or after May 20, a 30-day period would be protected during which the reservoir would not be drafted more than 1 foot from the highest elevation reached during the 30-day period. The exception would be for system or economic emergencies. From the end of the 30-day period though July 4, the reservoir could be drafted more than 1 foot, but an elevation of at least 2,069 feet mean sea level would have to be maintained through July 4. The 30-day period beginning on or after May 20 would allow the Applicant to protect peak spawning periods identified for smallmouth bass (May 19 to June 1) and crappie (May 10 to 21 and again from June 8 to 24) in Brownlee Reservoir (Chapter 1 of Technical Report E.3.1-5)." (Page E.3-128, Paragraph 3)

Response: The BLM tentatively agrees with the concepts in the warmwater fish plan as long as it meets ODFW and IDFG standards for warmwater fisheries. However, the exception for *"system or economic emergencies"* needs to be defined before the BLM fully agrees.

Adequacy of Analysis

The Applicant's analysis of non-native sport fish focused on smallmouth bass, crappie spp., and catfish. The analysis is adequate to develop plans to manage the species for optimum sport fish production in the Hells Canyon reservoirs. The studies concluded that the Applicant could regulate spawning conditions to promote nesting success but the water year would determine whether a year class survived following hatching.

Project Impacts On Non-Native Sport Fish Addressed By the Applicant Studies

The regulation of reservoir levels can impact the nesting survival of smallmouth bass, crappie and other non-native fish. The Applicant's warmwater fish plan may improve spawning success of these species if it meets warmwater fish species needs.

BLM Issues

Implement operational and management strategies that favor ESA listed salmonid species over non-native fish if the two management schemes are not compatible.
Applicant's response*: The Applicant has implemented plans to improve bull trout and fall chinook survival. The Applicant proposes to implement a warmwater fish plan to ensure small mouth bass and crappies spp. nesting success that will be compatible with plans for the above ESA listed species.*

Reservoir habitat for warmwater game fish species should be optimized to provide a sport fishery of the magnitude that existed prior to 1995 if it is determined that this is not likely to adversely affect ESA listed species or other native species.
Applicant's response*: The Applicant's warmwater fish plan will provide optimum spawning conditions for warmwater fish. Flow years that are beyond the Applicant's control will determine the survival of crappie year classes.*

Manage reservoir water levels and draw-down to encourage crappie reproduction if this is compatible with ESA listed species recovery.
Applicant's response*: The fall chinook plan and the warmwater fish plan appear to be compatible.*

Pursue elimination of spring flood control drawdown.
Applicant's response*: The Applicant does not address this issue.*

Critique Of the Applicant's Conclusions For Non-Native Sport Fish
The BLM tentatively agrees with the Applicant's conclusions and proposed warmwater fish plan recommendations as long as it meets ODFW and IDFG standards for warmwater fish management. The Applicant has used the findings of its research to develop a warmwater fish plan that will improve nesting and spawning survival of smallmouth bass and crappie spp. The Applicant plans to maintain water levels in the reservoirs during the nesting period to ensure spawning success. The Applicant found that there is an inverse relationship between hydrologic year magnitude and survival of year classes of crappie spp. They found that once the crappie larvae become pelagic they move to the center of the reservoirs where they are entrained over the dams during high flow years. During low flow years they are able to remain in the reservoir and survive to produce a strong year-class.

Food Base and Invertebrates

"The Snake River above the inflow to Brownlee Reservoir (the upstream reach) supports a benthic macroinvertebrate community dominated by a few species of mayflies, worms and leaches. Based on results of research, we believe that this community is shaped by an environment reflecting the effects of regulation, agricultural effluent, and livestock practices. The environment is further affected by the input of five major tributaries to the Snake River, three of which flow through urban areas and agricultural land." (Tech. Report E.3.1-8, Page 24, Paragraph 3)

Response: The BLM agrees with this conclusion. The Snake River and its tributaries above Brownlee Reservoir are documented to have a serious pollution problem. The only organisms that can survive or thrive are those that are adapted to the types of pollutants in the system. The Applicant reported that no salmonid species were found in the free-flowing river above Brownlee Reservoir, which may be a reflection of the pollution problems.

"The macroinvertebrate community of Brownlee Reservoir appears to be highly tolerant of nutrient and sediment." [Brownlee Reservoir receives, processes, and retains agricultural runoff and eroded soil. It has high levels of organic matter and suspended sediment.] "This productive system probably maintains the bulk of its macroinvertebrate biomass as zooplankton, which serves as food for many fish communities in the reservoir." (Tech. Report E.3.1-8, Page 24, Paragraph 4)

Response: The BLM agrees that the macroinvertebrate community of Brownlee Reservoir is highly tolerant of nutrient and sediment. The lack of species diversity is symptomatic of a highly polluted system. The population of zooplankton provides an abundant food base for fish, but at times the pollution levels that create this food base depletes oxygen levels and cause fish mortality.

"The Macro- or microinvertebrate community probably bears little resemblance to the community that existed in the river before Brownlee Reservoir was formed."(Tech. Report E.3.1-8, Page 24, Paragraph 4)

Response: The BLM agrees with this conclusion. Invertebrate communities are highly responsive to the habitat type provided. The benthic communities that inhabited a clean, free-flowing Snake River would have been much more diverse than the ones now found in Brownlee Reservoir.

"The macroinvertebrates in Oxbow and Hells Canyon reservoirs belong to a transitional community with characteristics between the communities of the Brownlee and Hells Canyon tailwaters. In fact, for most of the metrics used in this study—richness, index of biotic integrity, and percentage of dominance—these communities fall in the middle range. Because the individuals are a mix of riverine and lake/reservoir species, the aquatic macroinvertebrates reflect the HCC reaches, which are geographically and ecologically mixed between reservoir and riverine." (Tech. Report E.3.1-8, Page 25, Paragraph 1)

Response: The BLM agrees with this conclusion. The conclusion correlates well with the habitat type that is created by Oxbow and Hells Canyon reservoirs.

"The macroinvertebrate community below Hells Canyon Dam (the downstream reach) is resilient and persistent. When applied, the biometrics described a structure in the downstream reach that indicated a more diverse habitat template, with more niches and probably better habitat conditions for benthic macroinvertebrates than conditions in and upstream of the reservoirs. The community is not characteristic of communities associated with an undisturbed or unimpounded river: many of the organisms are robust and able to deal with a dynamic ecosystem, as is true of communities in the reaches above the HCC." (Tech. Report E.3.1-8, Page 25, Paragraph 2)

Response: The BLM agrees with the statement that the communities are resilient and persistent but not characteristic of communities associated with an undisturbed or unimpounded river. However, to say the population is resilient and persistent is somewhat misleading. Aquatic

organisms will inhabit any body of water that is not completely toxic. There is a greater diversity of species below the dams because it has cleaner water and is a free-flowing river with fewer pollutants than above Hells Canyon Dam.

To state that many of the organisms are robust and able to deal with a dynamic ecosystem is another euphemism for saying that only those communities that can tolerate existing impaired water quality and unnatural fluctuations created by the Hells Canyon Complex are doing well. They represent only a small spectrum of the species diversity and abundance that probably existed prior to dam closure.

"The fluctuation zones produced the highest taxa richness. Those zones, coupled with daily fluctuations, may allow a wider variety of habitats to be used. In addition, various species may benefit from the increased light in the wet or damp areas and stranded pockets of water. As discussed in Cazier 1998, inhabitance of these areas probably depends on the consistency and duration of dewatering, not on whether the areas are actually dewatered." (Tech. Report E.3.1-8, Page 25, Paragraph 3)
Response: There may be more taxa but that does not necessarily mean there would be an abundance of the organisms. It is important to note that the productivity of the fluctuation zone is dependent on the duration of de-watering. If ramping does not occur at regular intervals many of the macroinvertebrates may die of desiccation and colonization would have to begin anew when the water again rises.

"Daily, the macroinvertebrate community experiences fluctuating water levels and changes in velocities. The inhabitants move downstream, upstream, and probably from side to side within the river, again on a daily basis. In one year of collecting up and down these reaches, we found that macroinvertebrate communities persisted in richness and density with little change in the structure of each community. Functioning at these levels of efficiency enabled the invertebrates to fill the niches and occupy the habitats accessible to them. Therefore, their mass in the biological component of the system and their availability in the trophic hierarchy are not likely to be limiting to the ecosystem." (Tech. Report E.3.1-8, Page25, Paragraph 3)
Response: The conclusion that macroinvertebrates can move upstream, downstream and side to side within the river on a daily basis is not documented in this study. It is clear from sampling that the organisms persist in available habitat, but it is speculation to say that "their mass in the biological component of the system and their availability in the trophic hierarchy are not likely to be limiting to the ecosystem." It has been stated previously by the author that there is no preimpoundment data with which to compare the existing population.

The condition of fish living in the system would indicate that there are no food deficiencies. Due to the opportunistic feeding of fish, it is probable that they are able to adjust to changes in the invertebrate food supply.

"The benthic community represents an important group of organisms in the studied reaches of the Snake River. Although their environment is one of a large regulated river—interrupted linearly by dams and reservoirs and linked by intermittent, complex free-flowing reaches—they persist in communities of great diversity. The dams and reservoirs of the HCC represent additional features or conditions in the ecosystem, and each different condition provides

opportunities for macroinvertebrates to maximize." (Tech. Report E.3.1-8, Page 25, Paragraph 4)
Response: The BLM agrees with this statement. The macroinvertebrates present have probably changed from their original diversity and abundance but are able to adjust and utilize the habitat available. However, the species diversity and abundance are not the same as prior to dam construction.

"Analyses of the relationships between the physical environment and the macroinvertebrate species collected during this study did indicate significant relationships. Whether these relationships diminished the integrity of benthic macroinvertebrates in the free-flowing reaches or the reservoirs is difficult to say without understanding preimpoundment conditions." (Tech. Report E.3.1-8, Page 25, Paragraph 4)

"The NMS analysis revealed significant relationships between the benthic community structure and several physical and chemical variables, in particular dissolved oxygen, temperature, and aquatic habitat for Plecoptera, Bivalves, Turbellaria, and Trichoptera. These same relationships are found in rivers worldwide and considered resident, 'normal' relationships. It may be that dissolved oxygen, temperature, and volume of water are the important drivers in the downstream reach for species distribution, diversity, and abundance. However, these same variables in any aquatic system vary widely according to season." (Tech. Report E.3.1-8, Page 25, Paragraph 4)
Response: The BLM agrees with this statement. However, the sampling results indicate that the population in the tailrace and tailwaters below Hells Canyon Dam, a distance of 17.6 miles, has a much lower abundance of macroinvertebrates (Figure 14) than further down river. There is a high probability that the depressed population is caused by the poor water quality associated with the HCC. There is an oxygen deficiency during late summer.

"Spatial relationships over the entire study reach—specifically the patterns in tolerant to intolerant or intolerant to tolerant species, as measured by taxa richness and other metrics—were apparent. But those relationships were probably complicated by distance and other river dynamics, such as velocity, gradient, and water volume, and were not only related to impoundment of the river." (Tech. Report E.3.1-8, Page 26, Paragraph 1)
Response: The BLM agrees with this statement.

"Because the increasing taxa richness and decreasing percentage of worms did show recognizable patterns below Hells Canyon Dam (Table 6), dissolved oxygen could be an important determinant of the Snake River benthic community in the tailrace of Hells Canyon Dam. The NMS analysis also indicated that dissolved oxygen, temperature, and aquatic habitat were the highest contributors to axes explanation of species ordination in space. Since dissolved oxygen levels, together with nutrients and sediment, are affected as water passes through reservoirs and dams, the benthic community is probably affected indirectly by the projects, especially in the tailrace of Hells Canyon Dam. The additional factors of linear distances and dilution may have complicated results in these analyses. In any case, organisms that tolerate and are supported well by these conditions have colonized the system (including the tailrace and tailwaters) and appear to be stable." (Tech. Report E.3.1-8, Page 26, Paragraph 1)
Response: The BLM agrees with this statement. However, it should be noted that only those organisms that are tolerant to the perturbation caused by the HCC and upriver pollution dominate these communities that remain in the system. It was stated in the *Tributary Pollutant Sources to*

Hells Canyon Complex study that large amounts of ammonia are being generated in the deep water areas of Brownlee Reservoir. The release of ammonia if in sufficient concentration in the threshold range of 0.53 to 22.8 mg/L can be lethal to aquatic organisms, including fish. Toxic levels are both pH and temperature dependent. Levels were recorded as high as 0.34 mg/L below Hells Canyon Dam on December 9, 1997. The State of Illinois has proposed a chronic exposure limit for non-ionized ammonia of 0.025 mg/L during the winter and 0.057 during the summer (Illinois Serraclub.org, 2002). These levels are exceeded much of the time below HCD (*Tributary Pollutant Sources to Hells Canyon Complex,* Page 91).

"However, the presence of the New Zealand mudsnail or a subsequent population increase of mudsnail will probably affect the aquatic ecosystem of the HCC." (Tech. Report E.3.1-8, Page 26, Paragraph 1)
Response: The BLM agrees with this statement. Monitoring of this species should be included in the terms and conditions unless it can be shown that the HCC has no affect on the mudsnail distribution or reproduction.

Bliss Rapid Snail
"Conversely, the Bliss Rapids snail appears to be a very minor component within the aquatic ecosystem downstream of Hells Canyon Dam. Despite relatively extensive sampling downstream of Hells Canyon Dam, only two Bliss Rapids snails were collected (Technical Report E.3.1-8). Because these two individuals were collected approximately 300 river miles downstream of the species' historical range or of any other documented colonies, their importance to continued species survival or as indicators of ecosystem integrity is questionable. Continued operation of the HCC, as proposed by the Applicant, would most likely not affect the survival and persistence of the Bliss Rapids snail. It may even benefit the species by being a factor in providing additional suitable habitat beyond its historical range." (Page E.3-231, Paragraph 1)
Response: The BLM does not agree with this statement. The Applicant does not propose to conduct additional sampling, and the existing sampling appears to be inconclusive. The extensive area of the Hells Canyon Reach may provide habitat for populations of the Bliss Rapids snail. The Applicants sampling was not designed to target the Bliss Rapids snail habitat. The snail was found in the large aggregate of samples and the exact location of the collection site is not known The affects of the Applicant's operations on the snail are unknown. The BLM will rely on the USFWS to provide direction to the Applicant on measures to protect the ESA listed Bliss Rapids snail in the Hells Canyon Reach.

Adequacy of Analysis
The BLM accepts the adequacy of the Applicant's analysis of benthic macroinvertebrates. However, the conclusions reached by the Applicant are couched in language that puts the best light on the results. The study covers a large area from Swan Falls to the Salmon River and a number of tributaries. The number of samples collected and the techniques for analysis appear to be adequate to provide an overview of species abundance and distribution. However, it is likely that the results of the study cannot be considered statistically significant in all aspects, due to the large area covered. There are too many variables that must be considered in such a long distance.

Project Impacts On Food Base and Invertebrates Addressed By the Applicant Studies
The Applicant found that the macroinvertebrate community was affected by project operations. They found that while the community was diverse and abundant it was represented by taxa that are tolerant of the water fluctuations caused by hydropower operations. They also found that a depression in the population for 17 miles below Hells Canyon Dam that is likely caused by low oxygen levels during summer months. Studies of fish in the reservoirs found that food was abundant, but some species such as rainbow trout and yellow perch had low body weight. This condition may be more related to poor water quality than food availability.

BLM Issues

Develop and implement a long-term monitoring plan to evaluate project effects on the aquatic food-base both within the reservoir and downstream in the Snake River to ensure an adequate food-base for aquatic and riparian dependent species.
Applicant's response*: The Applicant does not address this issue.*

If additional species become ESA listed due to project operations, a "re-opener" clause in the plan will be provided to allow for the alteration of management to recover the species.
Applicant's response*: The Applicant does not address this issue.*
Develop a plan to restore marine-derived nutrients.

Applicant's response*: The Applicant addresses this issue in the native fish plan. However, plans to restore nutrients by using hatchery salmon carcasses are only targeted on Pine Creek to enhance bull trout.*

Critique Of the Applicant's Conclusions For Food Base and Invertebrates
The tailrace and tailwaters below Hells Canyon Dam have a macroinvertebrate population that is depressed for 17 miles. This is likely caused by low oxygen levels and temperature. Ammonia production from the reservoirs is another factor that may contribute to this low population.

The macroinvertebrate populations in the river above Brownlee Reservoir are heavily influenced by pollution from urban and agricultural practices.
Brownlee Reservoir acts as a trap for sediment and chemical pollution. These pollutants create a nutrient rich area that produces high densities of zooplankton and have reduced the diversity of taxa.
The Oxbow and Hells Canyon reservoirs have a mix of both riverine and lake/reservoir taxa. This is probably due to increased flow through the reservoir and less pollution.
The Hells Canyon Reach has a richer mix of taxa, but it does not resemble that of a natural, unregulated river.
The study provides documentation of a depressed macroinvertebrate population below Hells Canyon Dam that is most likely related to dissolved oxygen, pollutants, temperature, or a combination of these factors. This information will be useful in requesting modification of the dam to improve oxygen levels that are important to fish as well as macroinvertebrates.

Bliss Rapid Snail should be further studied to determine whether additional populations are present in the Hells Canyon Reach.

Flows and Water Quality

Flow
The Applicant presented two flow scenarios: 1) Current Operations and 2) Run-of-River Full Pool to compare the impacts on aquatic resources.

"After our evaluation of the approaches, we recommended a hybrid approach for developing inflow hydrology to address various issues and level of detail required for subsequent analyses." (E.1-4, Chapter 2, Development of Inflow Hydrology, Page16, Paragraph 2)

- *"Use IDWR adjusted flows at Weiser with fish augmentation flows (June 2000) from 1928 through 1992—disaggregated to a daily time step—as a basis for representing future conditions and assume current basinwide projects and operations." (E.1-4, Chapter 2, Development of Inflow Hydrology, Page 16, Paragraph 3)*

- *" Include recent historic data (1992 to the present) to extend the record and include associated water quality, aquatic, and other data that are correlated to flow (using a daily or sub-daily time step, depending on the needs of each analysis). From these years of historic data, the following were selected to represent a wide range of hydrologic conditions for which reservoir operation modeling will be conducted using detailed (sub-daily) time steps: 1992, 1994, 1995, 1997, 1999." (E.1-4, Chapter 2, Development of Inflow Hydrology, Page 16, Paragraph 4)*

- *"Conduct stochastic analysis (based on 1928—1992 IDWR-adjusted flows with fish augmentation) to evaluate the completeness of the record with respect to long-term droughts and high-flow periods. If warranted, use selected traces of stochastically generated monthly data (potentially disaggregated to daily) to supplement the adjusted data for extreme flow condition for some specific analyses." (E.1-4, Chapter 2, Development of Inflow Hydrology, Page 16, Paragraph 5)*

Response: The BLM agrees with the approach. This approach was discussed with the ARWG on July 19, 2000 and the NOAA FISHERIES hydrologist in July 2000. No significant modifications to the approach were suggested.

"Modeled habitat for white sturgeon spawning in the HC Reach increased with flow throughout the range of modeled discharges and was the highest in availability of any sturgeon life stage. Modeled spawning habitat, as a percentage of total reach area, increased steadily from 16% at 5 kcfs (or 5,000 cubic feet per second) to 79% at the maximum modeled discharge of 100 kcfs." (E.2.3-2, Instream Flow Hydrology, Page 1, Paragraph 3)
Response: The BLM agrees with the results produced by the model. The current studies that indicate a healthy white sturgeon population support this finding.

"Modeled habitat in the HC Reach for white sturgeon incubation increased sharply with discharge up to 30 kcfs and then decreased steadily through the remaining modeled discharges." (E.2.3-2, Instream Flow Hydrology, Page 1, Paragraph 3)

Response: The BLM agrees with this finding. Existing white sturgeon research tends to support the logic of this modeled finding.

"Modeled habitat for white sturgeon larvae in the HC Reach showed nearly the same relationship with discharge that the incubation life stage exhibited." (E.2.3-2, Instream Flow Hydrology, Page 1, Paragraph 3)
Response: The BLM agrees with this finding. Existing white sturgeon research tends to support the logic of this modeled finding.

"Modeled habitat availability for the early white sturgeon life stages (spawning, incubation, and larvae) was proportionate to the magnitude of hydrologic year in the HC Reach." (E.2.3-2, Instream Flow Hydrology, Page 1, Paragraph 3)
Response: The BLM agrees with this finding. Existing white sturgeon research tends to support the logic of this modeled finding. It is known that white sturgeon in the Columbia and other rivers have higher spawning success in years of high flow.

"Proposed Operations and Run-of-River Full Pool (RRFP) Operations--showed that Proposed Operations reduced modeled habitat for these early life [spawning, incubation, and larvae] stages during extreme low and low flow years." (E.2.3-2, Instream Flow Hydrology, Page 1, Paragraph 3)
Response: The BLM agrees with this finding. White sturgeon require high flows to have good reproductive success. Extreme low and low flow years can be expected to reduce their habitat and reproduction success. Hydropower proposed operations would store water during low years and reduce the higher flows needed for white sturgeon reproductive success.

"Proposed Operations also impacted modeled habitat for the spawning life stage during medium high and extreme high flow years." (E.2.3-2, Instream Flow Hydrology, Page 2, Paragraph 1)
Response: The BLM agrees with this finding. The flood control measures and hydropower proposed operations storage of water during high water years reduce the high flows needed for sturgeon reproductive success.

"Modeled habitat in the HC Reach for the young-of-the-year (YoY) white sturgeon life stage remained relatively unchanged with discharge...." (E.2.3-2, Instream Flow Hydrology, Page 2, Paragraph 2)
Response: The BLM does not agree with this finding. This is an unsupported assumption. White sturgeon researchers did not capture fish of this age class. Therefore, their behavior and habitat could only be assumed when building the model. The fact that there is generally good reproduction would indicate that the habitat is adequate in the Hells Canyon Reach under current operations, but there is no real way of knowing how their specific life stage is affected by discharge.

"The availability of modeled juvenile white sturgeon habitat changed little with discharge in the Snake River below HC Dam...." (E.2.3-2, Instream Flow Hydrology, Page 2, Paragraph 2)

Response: The BLM does not agree with this finding. This is an assumption. White sturgeon researchers did not capture fish of this age class. Therefore, their behavior and habitat could only be assumed when building the model. The fact that there is generally good reproduction would indicate that the habitat is adequate in the Hells Canyon Reach under current operations, but there is no real way of knowing how their specific life stage is affected by discharge.

"The availability of adult white sturgeon habitat modeled in the HC Reach was essentially equal between Proposed Operations and RRFP Operations across the five hydrologic years." (E.2.3-2, Instream Flow Hydrology, Page 86, Paragraph 3)
Response: The BLM agrees with this finding. The numbers generated by the model are not significantly different.

"The protective flows of the fall chinook program (initiated by IPC in 1991) under the Proposed Operations scenario provide near-maximum habitat availability to spawning fall chinook." (E.2.3-2, Instream Flow Hydrology, Page 2, Paragraph 3)
Response: The BLM agrees with this finding. However, water quality issues associated with the HCC may negate the benefit to the initial survival associated with these flows. The cold water produced by HCC delays emergence and subsequent migration. NOAA FISHERIES studies of test groups of fall chinook smolt indicate that late migrants have very poor survival.

"Modeled fall chinook spawning habitat available under Proposed Operations exceeded habitat available under RRFP Operations during all five hydrologic years analyzed." (E.2.3-2, Instream Flow Hydrology, Page 2, Paragraph 3)
Response: The BLM agrees with the model finding. The proposed operation scenario will regulate spawning and incubation flows to provide optimum habitat while the RRFP scenario does not.

"Our 2D modeled estimate of fall chinook juvenile habitat showed that there was no difference between the two operational scenarios during the extreme low and low flow years. Modeled habitat was increased under Proposed Operations an average of between 19.6% and 44.7% during the medium, high and extreme high flow years." (E.2.3-2, Instream Flow Hydrology, Page 2, Paragraph 5)
Response: The BLM agrees with this finding. The proposed operation scenario will control peak flows that could adversely affect fall chinook embryos and emerging fry. The RRFP scenario would exert less control on high flow events, which could result in gravel movement and loss of eggs and fry.

"Modeled habitat for redband trout in the HC Reach was highest in availability at the lowest modeled discharges. Modeled habitat accounted for about 24% of the HC Reach at a very low discharge of 5 kcfs and declined significantly to about 10% of the HC Reach at a discharge of 30 kcfs." (E.2.3-2, Instream Flow Hydrology, Page 2, Paragraph 6)
Response: The BLM does not completely agree with this finding. The assumptions used to develop this model are not substantiated with field research on redband trout in the Hells Canyon Reach. The radio-telemetry equipment was unable to track redband trout into deeper waters. Therefore, modeling assumptions about their behavior during some flow stages may not be correct.

"....the availability of bull trout habitat modeled in the HC Reach decreased steadily with increasing discharge and declined from 24% of the reach area at 5 kcfs to 6% of the reach area at 100 kcfs." (Tech. Report, E.2.3-2, Page 2, Paragraph 6)

Response: The BLM does not agree with this finding. The assumptions used to develop this model are not substantiated with field research on bull trout in the Hells Canyon Reach. There was very little research conducted by the Applicant that could be used to estimate the amount of habitat that would be provided for bull trout by the various flow scenarios. No research on population levels was conducted and their abundance remains unknown. Projecting the affects of flow on a population of bull trout that is virtually unknown in its habits or abundance may result in incorrect assumptions.

"Minimum flows associated with the fall chinook program are important for both redband and bull trout modeled habitat because they protect the range of discharges at which the habitat for these native salmonids is maximized and are influenced the most by load--following operations. Minimum flows from the fall chinook program provide this protection for about three-fourths of the modeled overwintering period for redband and bull trout in the HC Reach." (Tech. Report, E.2.3-2, Page 2, Paragraph 6)

Response: The BLM does not agree with this statement. The fact that little is known about the over-wintering habitat of bull trout and redband trout in the Hells Canyon Reach prevents confirmation of these assumptions. Protection offered for three-fourths of the over-wintering period may not offset the adverse affects that could occur in the other one-fourth of the wintering period. The Applicant should have conducted over-wintering studies to verify the assumptions they have used in the model. The Applicant clearly acknowledges that the radio-telemetry equipment could only penetrate the river to a limited depth. The Applicant provides no information concerning the affect of flows on bull trout and redband trout throughout the rest of the year. It is known that both species are present in the river throughout the entire year. Their abundance and distribution is not adequately documented.

Water Quality

Idaho Power delineated the Hells Canyon Complex into five distinct reaches:.... *"Brownlee Reservoir (RM 343.0 to 284.6), Oxbow Reservoir (RM 284.5 to 272.5), the bypassed reach below Oxbow Dam (RM 272.5 to 270.0), Hells Canyon Reservoir (RM 270.0 to 247.6), and the Snake River below Hells Canyon Dam (RM 247.6 to 168.4) (Figure E.2-1). In addition, Brownlee Reservoir exhibits three longitudinal zones. The first of these zones is the riverine zone, located farthest upstream. This zone is highly influenced by inflow from the Snake River. Another zone is the lacustrine zone, located farthest downstream. This zone exhibits properties most characteristic of a lake, including thermal stratification. The last zone, the transition zone, is located between the lacustrine and riverine zones. Unless otherwise noted, statements and conclusions concerning water quality in these five reaches and three zones are based on technical data presented in Technical Report E.2.2-2." (Page E.2-3, Paragraph 4)*

Response: The Hells Canyon Complex has a history of water quality problems. Currently the HCC water does not meet TMDLs for Idaho or Oregon. Brownlee Reservoir acts as a "sink" for pollutants carried into the HCC. The accumulation of high levels of nutrients creates algal blooms that deplete oxygen levels in all three reservoirs of the complex during the summer months when water temperatures warm. The low dissolved oxygen level attributed to these blooms has caused fish kills. Numerous other water quality problems exist. The BLM has

selected the following quotes (E.2.2.2.2.-E.2.2.2.9.3.) from the text of the draft license to illustrate water quality problems that impact national resource lands:

"E.2.2.2.2. Temperature
Water temperatures change longitudinally as water passes through the Hells Canyon Complex. Outflow from Hells Canyon Dam is cooler than the Snake River inflow, meaning that the complex has an overall cooling effect during the summer. Most of this summer cooling can be attributed to Brownlee Reservoir. As the Snake River continues to flow through Oxbow and Hells Canyon reservoirs, it warms slightly. This trend reverses in the fall when outflow is warmer than inflow. Again, most of the delayed cooling is related to Brownlee Reservoir, but the other reservoirs account for a small part of the delayed downstream cooling." (Page E.2-7, Paragraph 1)

"E.2.2.2.3. Oxbow Bypass*….*
During 100-cfs minimum flows, stratification of the water column was evident at a deep-water site approximately 0.2 river miles downstream of Oxbow Dam. The pool that contains the deep-water area comprises approximately 4 hectares of the total 50-hectare bypass reach. Because the stratified area is very small in relation to the entire Oxbow Bypass, it probably had a minimal effect on water quality. The water column became fully mixed at flows of 1,350 cfs; however, within 25 hours of flows returning to the 100-cfs minimum, it restratified." (Page E.2-8, Paragraph 3)

"E2.2.2.2.5. Snake River Below Hells Canyon Dam….
Therefore, summer temperatures in the Snake River downstream of the Hells Canyon Complex are cooler than temperatures of inflow to Brownlee Reservoir. The river downstream of the Hells Canyon Complex exhibits slightly delayed fall cooling and delayed spring warming, compared with seasonal changes in the river upstream of the complex." (Page E.2-9, Paragraph 1)

"E.2.2.2.3 Dissolved Oxygen….
There is also a relatively strong longitudinal trend through the Hells Canyon Complex: water entering the complex has higher DO concentrations than water leaving the complex. Most of these changes in DO concentrations occur in Brownlee Reservoir." (Page E.2-9, Paragraph 3)

"E.2.2.2.3.1. Brownlee Reservoir….
Areas of the transition zone, however, regularly exhibit hypoxic (< 2 mg/L) and anoxic (< 0.5 mg L) conditions."…. " The hypoxic zone generally originates near the bottom of the reservoir, probably caused by sediment oxygen demand, but it can expand to encompass nearly the entire transition zone and at times reach the surface. Fish mortality associated with depressed DO concentrations has been documented for the transition zone of Brownlee Reservoir. However, similar mortalities have not been documented throughout the rest of the Hells Canyon Complex." (Page E.2-10, Paragraph 2)

"E.2.2.2.4.1. Below Hydroelectric Facilities In the Hells Canyon Complex
Total dissolved gas concentrations in the tailraces of both Brownlee and Oxbow dams generally range from 120 to 125% saturation during spill episodes. Little of the dissolved gas is dissipated downstream through Oxbow and Hells Canyon reservoirs. In the tailwater of Hells Canyon Dam, total dissolved gas peaks at about 135% saturation." (Page E.2-13, Paragraph 1)

"E.2.2.2.4.2. Snake River Below Hells Canyon Dam
Total dissolved gas supersaturation declines in the Snake River as water flows downstream of Hells Canyon Dam. It dissipates at a rate of about 0.3% saturation per river mile when levels of total dissolved gas exceed 120% saturation in the releases from Hells Canyon Dam. Levels exceeding the 110% criterion (see Table E.2-3) can persist downstream to the confluence of the Snake and Salmon rivers." (Page E.2-13, Paragraph 2)

"E.2.2.2.9.1.2. Tailwater Temperatures
Temperature data were measured in the tailwaters of Brownlee and Oxbow dams and in the penstock for Hells Canyon Dam. The 17.8 °C criterion was exceeded below each of the facilities. As with in-reservoir measurements, most of the exceedances occur during high-flow years, while the fewest occur during the extreme low-flow years." (Page E.2-23, Paragraph 1)

"Waters below Hells Canyon Dam are below the 6.5-mg/L standard an average of 92.5 days per year. However, measurements of DO concentrations show that the water is reaerated relatively rapidly as it moves downstream. In September, DO concentrations in Hells Canyon Dam releases are typically 4.0 mg/L, but they rise to over 6.0 mg/L within about 10 miles downstream." (Page E.2-24, Paragraph 2)

"E.2.2.2.9.3. Total Dissolved Gas
Total dissolved gas is not to exceed 110% saturation (IDEQ and ODEQ 2001). Measurements indicated that Brownlee Reservoir complied with this standard (Technical Report E.2.2-4). However, elevated levels of total dissolved gas in the Brownlee Dam releases dissipate very little through the remainder of the Hells Canyon Complex, resulting in total dissolved gas saturation levels that exceed 110% in Oxbow and Hells Canyon reservoirs whenever water is spilled at Brownlee Dam.

Noncompliance with the 110% saturation level for total dissolved gas is also evident below Hells Canyon Dam whenever water is spilled. Generally, levels again comply with the standard by the confluence of the Salmon and Snake rivers about 60 miles downstream." (Page E.2-24, Paragraphs 3 & 4)

"The TMDL has identified a water temperature target of 17.8 °C for the Snake River (IDEQ and ODEQ 2001) to protect coldwater biota. However, the TMDL also includes a determination that temperature conditions were not a result of controllable human activities, so no temperature-specific improvements are expected under the TMDL. Therefore, despite measurable improvements to downstream temperature conditions for coldwater biota caused by the presence of the Hells Canyon Complex, water temperature may continue to exceed the standard for coldwater biota throughout the Snake River system and exceed the standard for salmonid spawning where that use occurs." (Page E.2-33, Paragraph 1)
Response: The BLM does not agree that water temperatures below Hells Canyon Dam can not be improved by the Applicant. A selective withdrawal structure located at Brownlee Dam could pull cold water from the bottom of Brownlee Reservoir and pass it through the generators. This is likely to significantly improve temperatures in Oxbow and Hells Canyon reservoirs as well as in the tailrace of Hells Canyon Dam.

The TDG is elevated from Brownlee Dam all the way to Lower Granite Reservoir during periods of spilling when the capacity of the generating units is exceeded. The TDG levels commonly exceed state standards of 110% during spilling. TDG is documented to adversely affect fish. Reduction of TDG by placing deflectors on the dams has been a standard practice on Columbia River dams to protect fish. The Applicant proposes to place a deflector on Hells Canyon Dam. This would not alleviate the elevated TDG caused by spilling at Brownlee and Oxbow dams. The Applicant should propose installation of deflectors on all three dams to meet state standards and protect fish.

Oxygen levels are depleted throughout the Hells Canyon Complex during the warm summer months. Oxygen is not replenished until the river flows over Wild Sheep Rapids in the Hells Canyon Reach approximately seven miles below Hells Canyon Dam. The oxygen depletion in Brownlee Reservoir has been documented to create fish kills. In October 2002, due to low oxygen and warm temperatures, a kill of adult summer steelhead occurred in the tailrace of Hells Canyon Dam.

The Applicant proposes to vent Brownlee Dam units 1 through 4 and possibly unit 5. Venting will oxygenate the water as it passes through the turbines. The Applicant also proposes to aerate water in the transition zone of Brownlee Reservoir. The Applicant is working with the states of Oregon and Idaho to develop TMDLs for the Snake River above the HCC to reduce nutrient loads coming into Brownlee Reservoir. However, it is expected that it will require up to 75 years for full implementation and benefit from the TMDLs.

The BLM agrees with the Applicant's proposal to vent turbines and aerate Brownlee Reservoir but believes that other alternatives should be explored and available should these measures prove inadequate.

The BLM believes that the Applicant should study the possibility of installing a generating unit in the Oxbow Bypass Reach that would oxygenate the flows and create opportunity for white sturgeon spawning.

Adequacy of Analysis

Flows

The Applicant has not adequately analyzed a reasonable range of alternative flow scenarios. The Applicant has presented two flow scenarios: 1) current operations and 2) run-of-river full pool. The ARWG requested that numerous other flow scenarios be modeled. The NOAA Fisheries would like to have an inflow-equals-out flow at low pool scenario developed for fall chinook water temperature management. NOAA Fisheries will also require a flow augmentation beginning in July. IPC must analyze this.

Water Quality

The Applicant's analysis of water quality is adequate. They have adequately analyzed their data on the pollutants, oxygen levels, TDG and water temperature.

Project Impacts On Flows and Water Quality Addressed By the Applicant Studies
Flow
The Applicant has not addressed the range of potential flow scenarios that have been recommended by the ARWG and NOAA Fisheries. The impact of flow scenarios that were tested were designed to favor the proposed operations (current operations).

Water Quality
The project impacts on water quality have been addressed by the Applicant. They include pollutants in Brownlee Reservoir, oxygen and water temperature throughout the HCC, and TDG downstream from Brownlee Dam.

BLM Issues

Modify facilities and dam operations to restore a thermal regime that fully supports the identified beneficial uses, with emphasis on listed TES species of fish, in the Snake River below Hells Canyon Dam.
Applicant's response*: The Applicant does not plan to address temperature issues.*

Recommend that the Applicant fully cooperate with Idaho and Oregon Department of Environmental Quality in the states' Total Maximum Daily Load process to reduce pollutant loading to the reservoirs and pollutant processing within the reservoirs by:

- Identifying the pollutant load reduction needed to protect biological communities within Brownlee, Oxbow, and Hells Canyon reservoirs.

- Providing mitigation for the identification, planning, and implementing of upstream restoration activities. This would reduce transport of nutrients, organochlorine compounds, and trace elements from upstream sources.

- Developing operational guidelines to reduce the processing and recycling of nutrients, organochlorine compounds, and trace elements from the bed sediments within the reservoirs.

- Develop and implement a monitoring plan to evaluate compliance with water quality objectives set for the reservoirs and in the Snake River below Hells Canyon Dam.

Applicant's response*: The Applicant is working with Oregon and Idaho Departments of Environmental Quality to develop a TMDL plan. The extent of the Applicant's portion of the plan is not clear.*

Modify existing facilities with all known engineering measures to reduce TDG levels during spills from the HCC dams.
Applicant's response*: The Applicant will install flow deflectors on Hells Canyon Dam spillway but not on those at Brownlee and Oxbow dams. The upper two dams are known to create TDG levels in excess of state standards.*

Modify operations to reduce TDG supersaturation in the reservoirs and in the Snake River below Hells Canyon Dam by reducing the size, duration, and frequency of water spillage over the dams.
Applicant's response*: This is not addressed by the Applicant.*

Develop and implement a long-term monitoring plan to evaluate the TDG levels in Oxbow and Hells Canyon reservoirs and downstream in the Snake River.
Applicant's response*: It is believed that the Applicant will continue to monitor TDG levels but it is not specifically stated that it will do so.*

Provide funding for studies to assess the impacts of the project-operation induced TDG levels on aquatic biota in the Oxbow and Hells Canyon reservoirs and downstream in the Snake River.
Applicant's response*: The Applicant did not address this issue.*

Critique Of the Applicant's Conclusions For Flow and Water Quality

Flow
The Applicant has not presented a full range of potential flow scenarios as recommended by the ARWG and others. The BLM considers the two flow scenarios presented as inadequate. A full range of modeled flow scenarios need to be presented for review.

Water Quality
The Applicant's water quality studies are adequate for defining the problem and developing solutions. The Applicant does not intend to address temperature problems. The Applicant is working with the Oregon and Idaho DEQs to resolve pollution problems. The algal blooms that deplete oxygen in the Hells Canyon reservoirs will be addressed by oxygenating the water in two ways. The Applicant has developed a proposal to aerate Brownlee Reservoir in the transition zone and vent oxygen into the turbines at Brownlee Dam.

The BLM does not believe that the mitigation measures proposed by the Applicant will fully address TDG problems. The Applicant will install spill deflectors on the spillway at Hells Canyon Dam but not Oxbow and Brownlee dams. The BLM believes that spill deflectors are needed at Oxbow and Brownlee dams. Brownlee and Hells Canyon dams are documented to exceed the 110% state standard for TDG. Without installation of deflectors at these two dams, the water passing over Hells Canyon Dam will exceed state standards during spilling periods.

Geomorphology and Sediment

The following statements by the Applicant in the geomorphology and sediment section are challenged by the BLM. The BLM has found that the Applicant portrays the Hells Canyon Reach of the Snake River in a manor that does not meet the rigors of scientific analysis. The Applicant has further ignored the established body of scientific knowledge concerning river functionality.

"In addition, geomorphic processes tend to occur on geologic time scales (thousands to tens of thousands of years or more), rather than on historic time scales (decades to hundreds of years)." (Page E.3-3, Paragraph 1)

Response: The BLM disagrees with this statement. The functions of watersheds and rivers can change the local geomorphology in a very short span of time. Landslides and stream erosion frequently alter relief features instantaneously or within a few years. The Applicant begins this section by trying to set the stage for its premise that the Snake River below Hells Canyon Dam was formed thousands of years ago and has been essentially unchanged since that time. The BLM acknowledges that the majority of the landform in Hells Canyon has not substantially changed form at the grand scale. That is to say, the mountains and valleys probably have looked about the same for the last several thousand years. However, the erosion of small but extremely important terraces, beaches, islands, and bars within the Hells Canyon Reach has been significant. The areas of concern comprise less than 1% of the entire landform of Hells Canyon, but they are the features that are most productive biologically. The high level of productivity of these very limited areas has created a concentration of human activity from prehistoric time to the present. These relatively small areas are currently being eroded by hydropower operations. Brownlee Reservoir is trapping sediment that is necessary to replenish them.

"In the last 150 years, human-caused, or anthropogenic, disturbances throughout the watershed first caused significant additional sediment supply to the system and then subsequent decreases in sediment supply, in part because of multiple water resource projects such as the diversion and storage of water. The combination of these factors produced a "slug" of sediment that worked its way through the system but may now have mostly disappeared. Visitors to Hells Canyon in the early to middle twentieth century likely observed the effects of this slug of sediment working its way through the system. The previously established stable channel probably continues to serve as a conveyance for smaller sediments that reach the mainstem and are capable of being transported by current hydrology." (Page E.3-3, Paragraph 2)

Response: The BLM disagrees with the "slug" theory. There is no reference material cited or scientific evidence to corroborate this theory. This unfounded speculation is designed to justify the Applicant's position that the trapping of 62,000 acre feet of sediment in Brownlee Reservoir has had no affect on the Hells Canyon Reach. The BLM believes that the loss of archeological sites, recreational beaches, and spawning gravel is directly related to entrapment of sediment by Brownlee Reservoir.

"Although conditions before Euro-Asian settlement and water regulation are not well known, evidence strongly suggests that the Snake River has been a largely static river system for at least 1,000 years, if not longer (Hydrocomp 1990). Therefore, the HCC has had few effects on stream flows, sediment dynamics, and channel morphology in Hells Canyon." (Page E.3-6, Paragraph 3)

Response: The BLM does not concur with this statement. The resource management scale that the BLM is addressing in the Hells Canyon Reach is focused on relatively small-scale river and riparian features of the landscape (vegetation, beaches, terraces, sandbars, and spawning bars) while this statement is only applicable at the massive features scale (mountains, river valleys, and landscapes). Also, see response number 2 above.

"In terms of sediment dynamics, many of the potential channel responses to differing sediment inputs simply cannot compete with the larger geologic controls at work in the canyon. For example, decreased sediment loads generally cause riverbeds to armor [2] a response that decreases the zone of active sediment transport. In this case, the bed was already well armored long before the HCC was built, so only a minimal response would be expected." (Page E.3-6, Paragraph 4)

Response: The BLM disagrees with this statement. It is misleading. Much of the Hells Canyon Reach was well armored; however, the small localized patches of sediment deposition are the issue. In fact, only a "minimal response" is enough to disrupt the delicate balance that previously existed when the Snake River was supplying sediment from upstream sources. Once again, the Applicant fails to address the issue at the proper scale.

"Results of this study indicate that bedload during the last 70 years or more has been restricted to sand and gravel sizes with a d_{50} of 30 millimeters (mm) or smaller [3] (Osterkamp 1997). The average d_{50} of the surface layer in the reach from Hells Canyon Dam to the Salmon River is 144 mm. To move material of this size through the reach of the Snake River between the Weiser River and Brownlee Reservoir, the Snake River would have to flow at a depth of over 200 feet." (Page E.3-7, Paragraph 1)

Response: The BLM finds this statement to be irrelevant. Despite the modeling and study results of Osterkamp, 62,000 acre feet of sediment are reported by the Applicant to be trapped in Brownlee Reservoir. Although much of the material is finer than sand size, there was a substantial amount of coarser size particles that would have contributed to replenishing areas that are now being eroded in the Snake River Reach.

"Since the geologic framework for the Snake River system was formed, more recent anthropogenic disturbances have affected physical processes in the study area and Hells Canyon specifically. By the 1880s, land uses varied by river reach, but overall the following activities substantially increased sediment supplies over conditions before Euro-Asian settlement (Technical Report E.1-2).

Trapping—As a result of widespread trapping in the 1800s, beaver populations dwindled. Failing beaver dams, which released trapped sediment, likely caused significant downstream sediment pulses.

Mining—By the 1860s, large dredge and hydraulic mining resulted in sedimentation rates up to 1,500 times higher than rates under natural erosion. For example, in Hells Canyon, placer mining activities were common and caused the creation of new gravel bars. During cultural surveys, archaeologists working for the Applicant noted a distinct lack of soil horizons at Salt Creek. The lack of these horizons strongly indicates that the entire area has been reworked in historical times, possibly through hydraulic mining activities.

Forest Management—Sediment yields in timber production areas along tributaries are estimated to have increased by an order of magnitude (increased by a factor of about 10) by the 1860s. Roads, which were built to access timber through river valleys and riparian areas, typically produce between 26 and 346 times the sediment volume that undisturbed areas produce.

Wildfire—Fire generally increases erosion into adjacent creeks and rivers. Prior to settlement by Euro-Asians, Native Americans supplemented wildfires by starting their own fires. Although fire was routinely prevented by the early 1990s, high-intensity fires and associated erosion in the region increased dramatically between 1970 and 1995.

Agricultural Development—From 1890 to 1992, Idaho's irrigated acreage increased from 0.2 to more than 3.0 million acres. Early irrigation practices severely eroded agricultural lands within the Snake River Plain. Current sediment yields, which are improved, range from 0.67 to 51 cubic yards per acre per year.
Grazing—Livestock grazing during the late 1800s and early 1900s was unrestricted. This grazing also caused surface erosion and mass wasting in riparian zones throughout the watershed.
Urbanization—Within the last 40 years, the net change in sediment loading that has resulted from replacing agricultural land with urban land uses in the Snake River basin has not been well quantified. Current land uses that continue to affect the river are rangeland, forests, cropland and pasture, and recreational uses. Recreation uses within the canyon specifically include rafting, boating, fishing, hunting, camping, and hiking.
Therefore, sediment supplies to the Hells Canyon reach of the Snake River have been substantially modified by activities upstream of and prior in time to the construction and operation of the HCC. Any accurate assignment of impact on sediment and geomorphology below the HCC must take these other factors into account." (Page E.3-8, Paragraph 4 to Page E.3-10, Paragraph 3)
Response: The BLM disagrees with the "slug" theory. There is no reference material cited or scientific evidence presented to corroborate this theory. Undoubtedly there was an increase in sediment production in the Snake River Basin due to anthropogenic activity. The disposition of this material over the course of more than 100 years is not quantifiable nor is its location known. This unfounded speculation that a "slug" of sediment created the beaches, bars, and terraces in the Hells Canyon Reach is designed to justify the Applicant's position that the trapping of 62,000 acre feet of sediment in Brownlee Reservoir has had no affect on the reach. The BLM believes that the loss of archeological sites, recreational beaches, and spawning gravel is directly related to entrapment of sediment by Brownlee Reservoir.

"Evidence that the size of sediment transported in the reach of the Snake River upstream of the HCC is very small is confirmed by samples taken in Brownlee Reservoir. The Applicant collected approximately 14 sediment samples throughout Brownlee Reservoir, plus 3 deep-core samples. The 14 sediment samples were taken underwater, but on the surface of the sediment layer. Approximately 96% of the sediment trapped in Brownlee Reservoir consists of fine sand, very fine sand, and silt-clay (Appendix B to Technical Report E.1-1). This reservoir contains only about 8% of all sediment that was trapped upstream of Hells Canyon between 1901 and 1999. Approximately 1,550 acre-feet of fine sediments from upstream of Brownlee Dam would have been transported downstream into Hells Canyon annually if the HCC had not been constructed. Because nearly all of the sediments in Brownlee Reservoir are of silt and clay sizes, they would flush through the Hells Canyon reach: with steeper slopes, the transport capacity of the Snake River in Hells Canyon is much greater than the transport capacity upstream of the HCC. Reservoir sediments could probably not significantly affect bed material or sandbars downstream of the HCC." (Page E.3-11, Paragraph 4 to Page E.3-12, Paragraph 2)
Response: The BLM does not concur with this statement. The sampling procedure is inadequate to accurately quantify the sediment stored in Brownlee Reservoir by size class. The spacing of the samples five miles apart in the transition and riverine zone of the reservoir where the majority of the larger particles accumulate may substantially underestimate the amount of fine sand and larger size particles. The sampling was conducted on a longitudinal axis of the river and

did not sample the cross sectional axis. The distribution of particles is affected both longitudinally and across the river/pool during bedload movement. This was not considered.

Additionally, the silts and clay particles carried down river would have been trapped by the narrow margin of riparian vegetation that was present in those locations along the river where deposition did occur. As the river crests and water levels begin to recede, it is anticipated that sand and finer particles would be filtered by vegetation as is common along all rivers. The balance achieved between the riparian vegetation, the flow, and the sediment was eliminated when the Hells Canyon Complex began trapping sediment in Brownlee Reservoir. The clear water flows exiting the Hells Canyon Dam have since eroded the beaches and eliminated the substrate needed for survival by riparian vegetation that was distributed along the margins of the river.

"The Pine Creek drainage area is almost twice the drainage area of Wildhorse River (304 square miles and 177 square miles, respectively). However, transport calculations show that within the 1% exceedance flow, Pine Creek does not mobilize its bed, but Wildhorse River does. Therefore, Pine Creek does not contribute any sand-sized and larger sediments, while Wildhorse River does. Although Pine Creek did mobilize its bed during the 1997 flood event, the flows during this event far exceeded the 1% exceedance flow (calculated as the daily average by month, not as annual peak) used in our analysis. Technical Report E.1-1 discusses and explains these results in more detail." (Page E.3-12, Paragraph 2)
Response: The BLM does not concur with this statement. The Applicant has modeled streams as though they were steady state systems with the high and low flows being the only variable. The statement by the Applicant that "Pine Creek does not mobilize its bed, but Wildhorse River does" points out the inaccuracy of the Applicant's sediment delivery estimates. Pine Creek did mobilize its bed during an extremely high-flow event. In fact, it delivered thousands of cubic yards of bedload into Hells Canyon Reservoir along with much of a secondary highway. The area of mobilization was over twenty miles long. There have been numerous landslide events that mobilize large quantities of bed materials in moderate to high flow events in most of the watersheds in the Snake River Basin. The fact that many relatively small tributaries "pulse" massive quantities of sediment periodically when rain-on-snow events or localized thunderstorms hit is not taken into account by the Applicant. Annual mobilization of bed material during low to high flow events may only account for a fraction of the sediment that is contributed to the Snake River during pulse events caused by fire, rain-on-snow, and thunderstorms.

"The tributaries for which the sediment supply was calculated (between the HCC and the Salmon River [not including the Imnaha River drainage]) account for approximately 55% of the total watershed area. The average sediment yield from these tributaries was applied to the remaining 45% of that area, for an estimated total sediment supply of 16.6 million tons per year (Technical Report E.1-1). The same calculations for sand- and spawning-size gravels, respectively, are 2.52 million tons per year (15% of the total) and 7.06 million tons per year (42% of the total). To put these quantities in perspective, the annual quantity of sand that the tributaries supply is over six times the average annual load of sand-size material trapped in Brownlee Reservoir. Visual observations of the tributaries following high-flow events support the findings that the tributaries do supply substantial quantities of sediments of all sizes to the mainstem Snake River" (Page E.3-13, Paragraph 2)

Response: The BLM disagrees with this statement. The BLM believes that the Applicant greatly over-estimates the quantity of sediment being delivered by the tributaries located between the Salmon River and Hells Canyon Dam. This estimate greatly exceeds the sediment quantity produced per acre by tributaries of the Colorado River of the Grand Canyon, a sediment rich environment. The amount of sand and gravel size material in the sediment being delivered to Brownlee Reservoir, based on the Applicant's estimate, could create numerous bars the size of Pine Bar.

"The concentration of the suspended sediments coming into Brownlee Reservoir is several orders of magnitude below what would be necessary to affect the transport capacity downstream of Hells Canyon Dam (Technical Report E.1-1). Therefore, trapping sediments in Brownlee Reservoir does not make the river downstream any more "sediment hungry" than it would be if the sediments in Brownlee Reservoir were available downstream. Additionally, the vast majority of particles trapped in Brownlee Reservoir are too small to contribute significantly to channel features in the Hells Canyon reach." (Page E.3-13, Paragraph 3)
Response: The BLM disagrees with this statement. The trapping of sediment in Brownlee Reservoir causes the water entering the Hells Canyon Complex to be "cleaned" of transported sediment. The basic laws of physics related to friction have proven that clear water is more erosive than sediment-laden water. This phenomenon has been well documented below many reservoirs. The Applicant's freeze-core sampling of spawning bar gravels shows that the gravel bars closest to Hells Canyon Dam have the least amount of fines and spawning bars further from Hells Canyon Dam progressively increased in the amount of fines present. This would indicate that the gravels are being stripped of fines by clear-water flows in the "sediment hungry" portion of the river closest to Hells Canyon Dam. It is also likely that the gravels are gradually being eroded, but this cannot be proven since spawning areas were not quantitatively documented prior to the last decade.

"The lithology and mineralogy of armored surface and subsurface sediments indicate that the majority of bed materials downstream of Hells Canyon Dam have been locally derived over the same geologic time frame." (Page E.3-14, Paragraph 2)
Response: The BLM agrees with the finding but disagrees with the intent of this misleading statement. The lithology and mineralogy of sediments in the majority of the bed materials downstream of Hells Canyon Dam would logically be from local sources after nearly 50 years of river erosion in a system now limited only to contributions from local tributaries. It would be illogical to assume otherwise. This statement is designed to prevent the reader from reaching a conclusion that the sediment trapped above Brownlee Dam was an important component of the materials that once helped replenish beaches and bars in the Hells Canyon Reach.

"The analysis of sandbars in Hells Canyon yields or confirms several important points. The majority of the sediments found in the sandbars fall within the sand-size range (0.062 to 2 mm), with less than 7% of the material falling into the silt and clay-size range (< 0.074 mm) (Technical Report E.1-1). Therefore, supplies over this full range of sizes are necessary to maintain the sandbars. Most of the sediments stored in Brownlee Reservoir are smaller than those found in sandbars throughout the Hells Canyon reach. Of the sand trapped in Brownlee reservoir, over 72% is fine sand or smaller (< 0.25 mm) (Appendix B to Technical Report E.1-1). Therefore, under current watershed development, sources upstream of Brownlee Reservoir do

not provide the full range of sediment sizes required to maintain these sandbars." (Page E.3-15, Paragraph 3)
Response: The BLM disagrees with this statement. The sediment in the sandbars has been subjected to the erosive forces of the river for nearly 50 years with no input from above the Hells Canyon Complex. It is unreasonable to presume that the composition of the sandbars would be the same now as they were before the closure of the Hells Canyon Complex. It is highly likely that the majority of the sandbars are now composed of local material contributed by tributaries in the Hells Canyon Reach. The particle size in the bars may have become more coarse because there is only a limited amount of fine sediment delivered by the tributaries within the Hells Canyon Reach.

"The Applicant has monitored sandbars at four locations between Hells Canyon Dam and the Salmon River for several years. The monitoring consists of physically surveying the size and shape of the sandbars on a regular basis. The monitoring began shortly after the highest recorded flow downstream of Hells Canyon Dam in early 1997. After this high flow and the following high-flow periods in 1997 and 1998, several of the tributaries had deposited large amounts of materials at their confluence with the mainstem river. The data also show that the elevation at the top of the bars generally coincides with a regularly occurring high flow (approximately 30,000 cubic feet per second). Analysis of survey data collected to date, together with aerial photography from various years before and during construction of the HCC, indicates that sandbars have been, and continue to be, dynamic features of the river system, features that grow, shrink, and change shape in response to varying flows and sediment loads in the river." (Page E.3-15, Paragraph 3)
Response: The BLM disagrees with this statement. The Applicant's statement implies that the sandbars are relatively stable and simply change form rather than being eroded from the Hells Canyon Reach as Grams and Schmitt have asserted in their studies. The Applicant has collected information for a period of four years out of nearly 50 with no pre-dam closure information. The Applicant has collected insufficient data in four years concerning sandbars to make any credible assumptions about sandbar stability in the Hells Canyon Reach.

"We used two methods, incorporating cross section measurements and calculations of incipient motion, to evaluate bed stability in the Snake River downstream of the HCC. According to the results of both of these methods, the downstream riverbed is predominantly stable. The USGS gauging station immediately downstream of the dam (13290450) has been in operation since 1965. The Snake River near Joseph gauging station (13209500) was established downstream of China Bar in 1955, although it was discontinued in 1971. Neither actual measurements of the cross section at each station nor the rating curves used for gauge operation show any trend in river bottom changes." (Page E.3-17, Paragraph 1)
Response: The BLM agrees that the main bed of the Snake River Reach is stable, but it does not agree that the Hells Canyon Reach was in the same condition prior to dam closure. Once again, the Applicant fails to address the finer scale that is of extreme importance to the resources managed by the BLM. The quality of the environment affected by fine material transport would not necessarily be apparent when measuring the gross cross section of the river. The finer sediments that made up terraces, sandbars, and spawning bars are unlikely to be identified because they are relatively minor components of the reach and they only occur in limited locations. There is a likelihood that the riverbed has reached equilibrium during nearly 50 years

of hydropower operation. Most of the finer sediments that were vulnerable to erosion have been lost, thus leaving a stable and armored riverbed.

"The incipient motion methodology was also used to evaluate spawning sites where Applicant biologists had done some modeling (Technical Report E.1-1). Gravel sizes on the small end of the scale of spawning gravel sizes (1 and 2 inches) were used in the analysis. Flows experienced in the study area moved gravel at only one spawning site, and this movement occurred for only the 1-inch material. For the remaining sites, computations indicate that gravels of all sizes are stable. Since the larger gravel sizes do not move, they tend to shield the smaller 1-inch materials and prevent them from moving. This tendency, in turn, enhances the stability of the spawning sites. The stability analysis for spawning sites shows that these sites can be stable even when the bed shows some signs of mobility (using values averaged across the cross section)." *(Page E.3-18, Paragraph 2)*

Response: The BLM does not agree with this finding. The freeze-core samples suggest that finer particles are being eroded from the spawning bars. Those bars closest to Hells Canyon Dam have lost the largest amount of fine particles. Spawning bars sampled farther from the dam have more fine particles indicating less erosion to date. The loss of fine particles that act to bind the gravel suggests that gravel bars are less stable than the modeling by the Applicant supposes. The studies by Grams and Schmitt, using aerial photos and field reconnaissance, concluded that visible sand and gravel bars were being lost due to erosion in Hells Canyon Reach. It is likely that the submerged spawning bars in the river are subject to the same erosion as those more visible bars and beaches studied by Grams and Schmitt. The Applicant provides no evidence of pre-existing conditions to substantiate their modeling theory that the spawning gravels are stable and do not move.

"Grams and Schmidt (1999b) did acknowledge that the operations of the HCC could not be unequivocally linked to terrace erosion: they stated that the largest peak flows since 1964 could not have overtopped terrace surfaces. One example of where something other than river processes influenced a terrace area is found at Salt Creek. Archaeologists noted that the soil column had been recently disturbed. Apparently, soil that had been removed during historical placer-mining operations had been redeposited. Given that placer mining was conducted before the HCC existed, these changes, as well as others, to beach and terrace areas did not result exclusively because of river processes, including river processes influenced by the HCC." (Page E.3-19, Paragraph 2)

Response: The BLM disagrees with this statement. The terrace erosion does not have to be associated with being overtopped by a flood. The erosion of beach material at the base of terraces removes the support and protection for the terraces. The up-ramping of the river by hydropower operations saturates the fine textured terraces and the down-ramping leaves the base of the terrace saturated. Hydrostatic pressure within the terrace from the saturation then causes collapse of the terrace as the down-ramping causes the pressure to become unequal. Additionally, the lack of sediment to sustain the beaches at the base of the terraces, and the steady erosion by clear-water flows, causes terrace collapse. Prior to dam closure, it is also highly likely that a narrow margin of riparian vegetation such as coyote willow bound the base of the terraces and protected them from high flow while capturing fine sediment from the muddy river. Additionally, the hydropower ramping ensures that no seedlings of riparian vegetation can become established because the water rises or falls too frequently and rapidly for the roots of riparian plants to become established.

"(Technical Report E.1-1) looked at both the supply to the mainstem and the stability of spawning gravel sizes (1 to 6 inches) in locations where the Applicant's biologists identified and described spawning areas for fall chinook salmon (Chapter 3 of Technical Report E.3.1-3). Results of the Applicant's studies indicate that these spawning beds are stable and that significant supplies of new material are available in a broad range of sizes (including sands and spawning gravels)." (Page E.3-20, Paragraph 1)

Response: The BLM disagrees with this statement. The Applicant has significantly overstated the amount of spawning size material delivered to the Hells Canyon Reach from local sources. Based on the Applicant's freeze-core samples there is evidence that fine materials are being removed from the spawning bars. The Applicant has no evidence that would quantify the original amount of spawning gravel available. In fact, the Applicant states that spawning surveys were only initiated within the last decade and some spawning locations are still being found as the fall chinook population increases. The study by Grams and Schmitt documents the significant loss of visible bars from the Hells Canyon Reach. There is no reason to believe that if the visible bars are being lost that those below the surface used by fall chinook salmon are not also being lost. The movement of bedload is a normal function of rivers. The smaller size particles used for spawning are subject to river processes that move gravel downstream. The loss of spawning size material that is trapped above the Hells Canyon Complex is significant.

"Fall chinook rearing habitats are also defined in part by sediment size, although sediment size is generally less important than other habitat features, such as shoreline gradient and water velocity. Rearing juvenile fall chinook generally use substrates smaller than 240 mm that are associated with shallow, low-gradient, and low-velocity shoreline areas (Garland et al. 2001, Tiffan et al. 2002). These local habitat features are influenced largely by channel morphology and gradient in the reach. The amount of rearing habitat for fall chinook salmon increases in availability with distance from Hells Canyon Dam (Technical Report E.2.3-2). This increase corresponds to changes in confinement and gradient features of the river channel (Technical Reports E.1-2 and E.2.3-2)." (Page E.3-20, Paragraph 2)

Response: The BLM agrees with this statement. The Snake River downstream from the Salmon River was found to have substantially more rearing habitat than the reach above it. This is the area where the Snake River widens and has a flatter gradient.

"Specifically, Applicant studies show that the HCC neither causes sediment-starved floods nor has been the sole, or even the primary, cause of the loss of sand-sized materials in the Hells Canyon reach (Technical Report E.1-1). Furthermore, the river is largely stable, and much of the erosion identified at archaeological sites (Technical Report E.4-1) appears to occur at flows greater than the plant capacity of HCC (approximately 30,000 cfs). These flows are therefore outside the range of flows that can be controlled by the operation of the HCC." (Page E.3-21, Paragraph 3)

Response: The BLM does not agree with this statement. As previously stated, the stability of the Snake River at the local scale is being misrepresented by the Applicant. The loss of sediment captured by Brownlee Reservoir coupled with the ramping has caused damage to beaches, terraces, and bars in the Hells Canyon Reach. The peak flows are not carrying the sediment needed to replenish these unique features that have been used by people for several thousand years. The high flow events may be doing even greater damage because these flows are stripped of their sediment load prior to their entry into the Hells Canyon Reach. This clear water flow has

much greater erosive power. The Hells Canyon Complex now prevents the river from processing sediment and growing bank stabilizing riparian plants as it once did.

Adequacy of Analysis
The analysis of geomorphology and sediment is not accurate. The Applicant clearly attempts to deny responsibility for the loss of sediment and the resultant impacts to the Hells Canyon Reach. The study does not withstand scientific scrutiny. Furthermore, many of the assertions in the study are contrary to the body of scientific findings documenting river functions.

Project Impacts On Geomorphology and Sediment Addressed By the Applicant Studies
The Applicant's study is deceptive and designed to deny any responsibility for project impacts on the Snake River below Hells Canyon Dam. The Applicant's study of geomorphology and sediment indicates that most sediment above Brownlee Reservoir has been cut off by other dams long before the HCC was constructed. It also indicates that very little if any sediment is mobilized in the Snake River above Brownlee Reservoir and would not contribute to the sediment in the Hells Canyon Reach.

BLM Issues

Modify facilities and dam operations to maintain and enhance alluvial and fluvial features downstream from Hells Canyon Dam.
Applicant's response*: The Applicant denies the project has any responsibility for impacts on alluvial or fluvial features below Hells Canyon Dam.*

Replace 313 acres of riparian habitat that will continue to be inundated by the reservoirs through BLM acquisition on the Grande Ronde River.
Applicant's response*: The Applicant does not address this issue. Land acquisition is proposed for bull trout habitat in Pine Creek.*

Restore deteriorated riparian and aquatic habitat through the preparation and implementation of a mitigation plan.
Applicant's response*: The Applicant has a plan for riparian restoration and acquisition.*

Compensate for habitat degradation caused by flow and erosion-induced losses where restoration is not possible.
Applicant's response*: The Applicant does not address this issue.*

Develop an erosion management plan for the reservoirs. Implement needed management changes.
Applicant's response*: The Applicant does not address this issue.*

Develop a plan to restore and mitigate the HCC-induced loss of fluvial and alluvial features in and along the Snake River below Hells Canyon Dam.
Applicant's response*: The Applicant denies the project has any responsibility for impacts on alluvial or fluvial features below Hells Canyon Dam.*

Critique Of the Applicant's Conclusions For Geomorphology and Sediment

The geomorphology and sediment section of the draft license should be designed to lay the foundation for all of the vegetation, hydrologic, and biological information. However, the Applicant has produced a document that is deliberately deceptive. It presents information at a scale that is geologic in scope and time. The Applicant makes every effort to deny that the HCC has any effect on the sediment supply that is extremely important to the maintenance of riparian zones, beaches, sand bars, and gravel bars in the Hells Canyon Reach. On the other hand, they deny that any sediment moves within the study area. At the same time their data estimates 62,000 acre feet of sediment has been accumulated in Brownlee Reservoir since dam closure. The Applicant makes a concerted effort to refute the findings of Grams and Schmitt, who have published three reports documenting substantial erosion of sediment from the Hells Canyon Reach. In summary, the geomorphology and sediment study produced by the Applicant is inaccurate and scientifically unfounded.

Terrestrial Key Issues

BLM provided two employees to the IPC terrestrial resources work group. We participated from the initial scoping of issues in 1997 through the last field trip in 2002. We have great respect for the professionals that conducted the research. The terrestrial work group spent extensive time working through anticipated desired future conditions (DFCs), and anticipated impacts and even some protection, mitigation and enhancement (PMEs) measures. However final studies results and potential PMEs were not shared until after the draft license application (DLA) was released. Therefore these PMEs do not necessarily represent TRWG concurrence BLM sent IPC a letter on December 19, 1999 that discussed BLM issues, questions, DFCs and land use plan (LUP) guidance. IPC has only partially responded to these issues.

General

IPC utilized a drafting depth of 5 feet rather than 10 feet to estimate project impacts on riparian habitat, although proposed operations envision a 10 foot drafting in Oxbow and Hells Canyon reservoirs.

Response: IPC estimated the effects of the proposed operation on riparian habitat in the fluctuation zone of Hells Canyon and Oxbow reservoirs based on a maximum drafting depth of 5 feet (Technical Reports E.1-4 and E.3.2-40). However, on page B-13, IPC indicates "the proposed and current normal maximum reservoir elevation at Oxbow Reservoir is 1,805feet msl, while the proposed minimum reservoir elevation is 1,795 feet msl". Additionally , on page B-16, IPC states that "currently and for proposed operations , the elevation of Hells Canyon Reservoir is cycled within a 5 vertical-foot operating range to manage load-following flows through Brownlee, Oxbow, and Hells Canyon power plants. However, under certain load conditions, and maintenance and construction activities, IPC proposes to use up to an additional 5 vertical feet to meet power demands". Based on these statements in Exhibit B, the fluctuatuion zone in both Oxbow and Hells Canyon reservoir is 10 feet, the amount that should have been used to determine impacts to riparian vegetation. IPC should assess and estimate riparian habitat in the fluctuation zone based on a maximum drafting of 10 feet for Oxbow and Hells Canyon reservoirs.

E.3.3.4. Anticipated Impacts on Botanical Resources

Response: These sections are consistently inconsistent in discussions of impacts to wildlife and botanical resources. IPC periodically addresses some impacts directly in this text, but frequently references impact discussions in one or another technical report rather than consistently integrating report findings into this part of the DLA. These sections need to be better constructed, with more consistent integration of potential impacts to wildlife and botanical resources from past operations, proposed operations, full pool run-of-river, and other suggested operational scenarios.

E.3.3.4. Anticipated Impacts on Botanical Resources

Response: Throughout this section there is a distinct implication that the reservoir-bank morphology (slope, topography etc.) is somehow equivalent to the riverbank morphology above the Brownlee reservoir. It appears that this implication is presented to suggest that vegetation responses to full pool or other consistent flows would be similar to that found in the free flowing sections of the river toward Weiser ID, or the shallower (headwater) sections of the Brownlee

reservoir. However an explanation of just how the steep banks of the reservoir edges would respond in the same manor as a river with sand bars and wider flood plains was not clearly developed (bottom E.3-592). The vagaries of this text often stem from the poorly differentiated effects discussions of the reach locations, the shoreline zone, fluctuation zone, and riparian zone. Often, proposed species responses are too lumped for the conclusions being presented, or are proposed for a reach that is out of context with the effects being discussed.

E.3.2.4.1. Hells Canyon Complex and Vicinity

E.3.2.4.1.1. Reservoir Operations

Identifying impacts to wildlife is an important concern for relicensing the Hells Canyon Complex (FERC 1990, IPC 1997). During the Applicant's relicensing consultation, state and federal resource agencies identified several issues and expressed concerns about potential impacts to wildlife habitat (IPC 1997). Primary issues were that operations of the reservoirs 1) accumulate contaminates that are potentially toxic to wildlife in the portion of Brownlee Reservoir that is permanently inundated (also known as reservoir inundation zone); 2) prevent perennial low-elevation wildlife habitat from becoming established between reservoir maximum operational drafting depths and full-pool shorelines (known as operational fluctuation zones); 3) prevent the establishment of perennial riparian habitat along full-pool reservoir shorelines (reservoir shoreline zones); 4) fragment patches of riparian habitat in the reservoir shoreline zones; 5) limit waterfowl brooding habitat in the shoreline zones; 6) decrease habitat for threatened, endangered, candidate, and special status species in the shoreline zones; and 7) reduce the capability of winter range (winter range zone) to support mule deer (IPC 1997).

Response: In a letter sent to IPC in December 1999, BLM identified eight issues relating to terrestrial vegetation and animals. These issues are as follows:

- What are the landscape features and important habitats that are now absent from the ecosystem if any?
- What is the loss of low elevation big game winter range (mule deer, elk, bighorn sheep, mountain goats) in acres flooded?
- What is the loss of low elevation cliff habitat (peregrine falcon nesting habitat, bighorn sheep lambing areas) in acres of each.
- How much and what types of riparian habitats and wetlands have been lost because of flooding of the reservoirs? For example, has there been a loss of large stable, low elevation, complex riparian habitats (were there any large cottonwood galleries, mature/old willow habitat, mature/old white alder habitat, other stable riparian complexes)?
- What historic habitats, now known to be key habitats for special status species, have been lost?
- What has been the loss of native upland shrub lands and perennial bunchgrass?
- What is the effects to the terrestrial resources due to the changes in water quality and temperatures?
- What changes has occurred to wintering species (bald eagles, waterfowl, ect.)?

The scope of the area delineated by BLM was from Weiser, Idaho to Captain John Creek north of the Grande Ronde River. Some of the issues have been addressed with the exception of low elevation deer winter range, loss of upland shrub and the loss of island habitats. Comparisons with pre-1950's habitats were very incomplete. The study areas did not include the Snake River from the mouth of the Salmon River to Captain John Creek making all studies that included the free flowing river incomplete.

BLM's primary concern is that IPC is only displaying and discussing issues they enumerated in their Initial Consultation Document (ICD) and not the issues that were identified in response to IPC's ICD and during the TRWG meeting (1997 to 2000). As the DLA now exhibits, only a limited number of issues are enumerated and the discussion on continued project impacts is limited to those issues. It is not a comprehensive discussion of identified terrestrial and botanical issues and their associated impacts.

As part of the consultation record for the TRWG meetings, the January 18, 2000 TRWG executive summary/meeting record reported IPC's (Frank Edelmann) developing a process for tracking terrestrial and botanical issues through PM&E development. The matrix was to be arranged by issues, with every issue ever brought up or on the record represented. This was the last reported discussion regarding this process.

The BLM recommends that IPC complete the tracking matrix and fully disclose all identified issues to evaluate on-going and continued project impacts, and how IPC will mitigate these impacts. IPC by limiting the issue identification and impact analyzes in the DLA also limits its suggested PM&E measures to mitigate those issues/impacts.

E.0. CONCEPTUAL OVERVIEW OF INTEGRATION

The Applicant modeled two operational scenarios: proposed operations and full pool run-of-river operations. For comparison purposes, operational analyses use the proposed operations scenario of the HCC as the base case scenario. It defines the operational parameters under which the complex would typically operate. The other operational scenario analyzed is the full pool run-of- river operations scenario, for which inflows to the Hells Canyon Complex, as well as tributary inflows, equal outflows from the complex, with water-surface elevations of the three reservoirs held constantly at full pool (that is, no load following would occur).
E.0-1

E.3.2.4.1.1. Reservoir Operations
The Applicant evaluated and compared operational impacts to wildlife for two potential operational scenarios: 1) proposed operational scenario for the complex and 2) full pool in which hydroelectric operations would not influence reservoir water-surface elevations (see Technical Report E.1-4 for a description of operational scenarios).

E.3-439

Response: IPC in their evaluation of their two operational scenarios did not fully address nor disclose all on-going/continued impacts to BLM lands and resources. IPC did not evaluate and analyze pre-impoundment conditions to existing conditions (current project operations).

The proposed operational scenario is only an alternative to be considered and should not be used as the primary base scenario, rather current project operations should be used as the baseline to describe project impacts on BLM lands and resources.

The BLM, as a member of the TRWG supported, helped develop and proposed a study for identification of pre-project habitat conditions of the HCC (06.12.98). The intent of the study was not to hold IPC liable for past project impacts but rather to develop a baseline to identify resource trends and to develop appropriate mitigation for the on-going/continued impacts during the new license period.

The study was designed to address project impacts that are occurring in the present and have been on-going since the original license period. These on-going impacts include inundation of the river environments, loss of riverine habitat, loss of habitat complexity, loss of habitat accessed through migration, loss of nutrients deposited by migrating and spawning anadromous fish, impacts to water temperature and quality, loss of deer wintering range, changes in species composition, and increased proportion of fine sediments to the lower river. These and other on-going impacts are some of the most significant project impacts to BLM lands and resources.

To help assess these impacts, and the mitigation needed to address them, IPC must address and disclose the on-going and continued impacts to BLM lands and resources.

In legal opinions discussing the Commission's baseline policy, both the Commission and the Ninth Circuit Court of Appeals recognized the practicality of utilizing information and data regarding on-going impacts to conduct an NEPA analysis that displays a project's impacts in light of the mitigation needed to address those impacts. In the relicensing of the Leaburg-Walterville hydroelectric project, while recognizing that the existing environment was the appropriate "context" for its NEPA analysis, the Commission also determined that its NEPA analysis would be informed by information and data that allow for an assessment of the proposed mitigation in light of past environmental impacts. *Eugene Water & Elec. Bd.*, 81 F.E.R.C. ¶ 61,270 at pp. 62,326-27 (1997). The Commission stated, "Of course, the past environmental impacts are relevant in determining what measures are appropriate to protect, mitigate, and enhance natural resources." *Id.* at p. 62, 327.

Moreover, in an appeal of this proceeding, the Ninth Circuit Court of Appeals approved of the Commission's use of past conditions to inform its environmental analysis. *American Rivers v. FERC*, 201 F.3d 1186, 1195-99 (9th Cir. 1999). Recognizing the Commission's need to evaluate the proposed mitigation in light of past impacts, the court stated that, "[t]o the extent a hypothetical pre-project or no-project environment can be recreated, evaluation of such an environment against current conditions . . . serves to describe the current cumulative effect on natural resources of these historical changes." *Id.* at 1197 (citations omitted). In addition, the Court agreed that, "the adoption of an existing project baseline does not preclude consideration and inclusion of conditions in a license that enhance fish and wildlife resources and reduce negative impacts attributable to a project since its construction." *Id.* at 1198 (citations omitted).

E.3.2.3. APPLICANT'S EXISTING AND PROPOSED MEASURES AND FACILITIES

E.3.3.3. APPLICANT'S EXISTING AND PROPOSED MEASURES AND FACILITIES

E.3.2.3.2. New Measures or Facilities Proposed by the Applicant

Response: The BLM objective in relicensing is to mitigate the on-going continued impacts of the HCC on BLM lands and resources. The BLM's focus is BLM lands adjacent to Brownlee Reservoir, Oxbow Reservoir ,Hells Canyon reservoir, the river reach downstream from the Hells Canyon dam below the mouth of the Salmon River, and the transmission-line right-of-ways. The BLM asserts that IPC did not fully disclose the impacts of on-going continued project operations to BLM lands and resources by its limited analysis of the two operational scenarios. Therefore, when the BLM recommends lands to be acquired to mitigate for the on-going continued impacts of the HCC over the new license term, the BLM will stipulate mitigation for the inundation zone as well as for the shoreline and fluctuation zones.

The BLM agrees with the applicant on the areas identified for protection, mitigation and enhancement of BLM lands and resources. Applicant identified areas include the project reservoirs, the river reach downstream of HC dam, and the transmission-line right-of-way. However, the applicant's proposed PM&E's are insufficient and in some cases lacking to meet BLM objectives and to mitigate the on-going continued impacts of the project to BLM lands and resources.

T&E and Special Status Species

ESA listed threatened or endangered species living in the HCC include the southern Idaho ground squirrel, bald eagle and peregrine falcon, wolf and lynx. Other special status species that may pass through the HCC or be impacted by project operations include the wolverine, mountain quail and sage grouse. IPC must conduct section 7 consultation for all listed species on BLM lands with the appropriate regulating agencies (FWS / NOAA Fisheries).

The southern Idaho ground squirrel habitat is in poor condition (E.3.2-38) due to loss of habitat. Transmission line access roads crossing ground squirrel habitat are an issue. Public access to these roads should be restricted to prevent the shooting of this rare species. IPC crews should limit their activity near and through the ground squirrel colonies during the spring and early summer squirrel activity period.

Bald Eagles are the most visible endangered species and maybe the most common in the HCC. Study report (Exhibits E.3.4-47) states there will be no impacts from operations but that the proposed transmission line from Oxbow to Brownlee Dam will potentially affect eagle perching and nesting. The effect of DDT on eagle nesting success was not investigated even though it was identified as a contaminant in the Brownlee sediments. A study should be conducted to address this contaminant which may be present in the project area and could potentially impact bald eagle productivity and long term survival. Protection of all potential roost and nesting trees is

necessary to maintain necessary habitat. An extensive tree planting, maintenance and monitoring program needs to be implemented. IPC must include provisions of the bald eagle recovery plan.

Isaacs et al.(2000) (Technical Report E.3.2-17) concludes that management of habitat for bald eagles should focus on maintaining or enhancing the prey base, providing perches where necessary in foraging areas, protecting roosts from timber harvest or other habitat degradation, and controlling human activities in areas where they conflict with bald eagle use. Food habitats and the effects of human activities on eagles were recorded opportunistically. Fish and large mammal carrion were the most frequently observed food items. They reported that a variety of foraging opportunities exist in NE Oregon and adjacent states for migrant and wintering bald eagles, because the area is large and contains diverse habitats. Those opportunities are based on the abundance and availability of prey, which changes seasonally and by habitat. IPC should focus habitat management on protection of potential perch and nesting trees and roosting habitat. Opportunities to increase trees in the project area should be developed and include as PM&Es. IPC should also control human activities where they conflict with bald eagle use.

The one known peregrine falcon most likely would not be affected by HCC project operations, as the nest is high on the west canyon wall below Hells Canyon dam. A more complete falcon search is needed since the studies did not search habitats to the north of the present nest.

The wolf, lynx and wolverine likely use the HCC rim country as travel corridors to more suitable habitat. Wolves could be attracted to wintering deer along the reservoirs of the HCC during the winter. Reservoir management generally should not impact these species.

Mountain quail and sage grouse are affected by transmission lines. Mountain quail are affected by the continuing impact of the loss of riparian habitat. Further documentation of impacts to these is needed by IPC.

E.3.3.4.1.6.1. Rare Plants
(E.3-598)
The Applicant evaluated occurrences of 23 species of rare plants in Hells Canyon. No federally listed plant species were found in the study area (Technical Report E.3.3-2). Sixty-seven occurrences of 12 rare plant species were near sites of human activities (Technical Report E.3.3-4). Of these occurrences, 3 at locations where the Applicant has management responsibility or authority were considered to be at risk of disturbance. These three occurrences are located in riparian areas along reservoir margins near dispersed recreation sites. Two occurrences of Carex hystricina are located along Oxbow Reservoir, and one occurrence of Cyperus rivularis is along Brownlee Reservoir. The Applicant recommends continued monitoring of occurrences at risk from its facilities or maintenance activities and also recommends developing protection measures in coordination with appropriate state or federal agencies, if warranted.

Response: This paragraph of text is location information, but does not discuss impacts or effects. It needs to discuss effects of past operations, proposed operations, and full pool operations. What kind of monitoring is proposed for what risk? The risk needs to be identified. The BLM notes and supports the proposal to coordinate with the appropriate land management agency.

IPC has avoided the issue supported by the BLM regarding the continued project effects to riparian habitat when changing from a free-flowing river to a large slack water reservoir.

E.3.3.4.2.3. Downstream Operations and Threatened and Endangered Plant Species (E.3-605)

Potential impacts to these four special status plants are summarized in Technical Report E.3.2-45.Just one of several factors that potentially affect occurrences of these four plant species is water level fluctuation. Differences between the Applicant's proposed and full pool run-of-river scenarios are expected to be minimal. In general, the Applicant recommends working cooperatively with federal land management agencies to protect rare plant sites that are threatened by disturbance activities.

Response: The impact discussion in E.3.2-45 (actually 2-43) is entirely of a hypothetical nature. This contract report did not have a discussion of any operational scenario to specifically address. A discussion of impacts needs to be developed in this document integrating E.3.3-2. It is not enough that IPC "expects" minimal differences in proposed and full pool run of river scenarios, IPC needs to address these differences as they affect rare plants. IPC has avoided the issue raised by the BLM regarding the continued project effects to rare species when changing from a free-flowing river to a large slack water reservoir.

Upland Habitats and Big Game

Principle big game species within the HCC include mule deer, white tailed deer, Rocky mountain elk, Rocky mountain bighorn sheep, mountain goat, pronghorn antelope, cougar and black bear. Bighorn sheep and mountain goat have been re-introduced to the HCC. The mountain goat has been present in Idaho and continues with no re-introductions. According to ODFW, prior to the construction of HCC, mountain goats moved across the river freely. The bighorn sheep re-introductions have been successful with limited hunting taking place.

Mule deer and elk are the most abundant big game species and are hunted in both Oregon and Idaho. Deer populations have declined from 30 years ago making small gains during mild winters. Elk are common throughout the project area but few comments were made in the DLA regarding winter impacts on elk. The road system has the largest impact on elk by providing avoidance areas within the HCC. Most elk use is in Oregon along the Hells Canyon reservoir but elk could winter along Brownlee in Oregon if the Huntington-Richland road were not present. Reservoir impacts on wintering elk was not addressed in any of the studies. Four studies were conducted regarding mule deer winter habitat use, habitat selection and reservoir ice-deer mortalities. All four studies must be taken as a whole to see that most of the habitat issues and habitat losses have been addressed. The ice problems were not addressed fully since collapsing ice,(the result of reservoir draws downs), which prevents deer from leaving the ice surface was not discussed. This event did not occur during the past mild winters in the canyon. When the next river freeze-up occurs, a concerted effort must be made by IPC to document ice entrapment of deer.

Mountain goats occupy habitats, that for most of the year, lie outside the HCC but during the period of March through April an occasional goat may come to river level near Hells Canyon

Dam. The most likely conflict that may occur would be interaction with fisherman walking the Idaho side of the river trail.

Rocky Mountain bighorn sheep have been re-introduced to all areas in the HCC. Roads and range condition do have negative impacts on sheep with sheep killed by vehicles. Those portions of the habitat with noxious weeds produce little forage, Sheep do browse especially during the winter and summer. Improved riparian areas would provide better forage increasing sheep condition and winter survival.

Cougar, a species native to the HCC has seen its population increase throughout N.E. Oregon. The HCC has very little impact negative or positive upon the cougar population. One road killed cougar was found near Brownlee Village.

Black Bear, another species native to the HCC has been impacted by recreation areas. The bears forage in refuse cans and campers ice chests reducing their wild nature and posing a threat to humans.

(Exhibit 3.2.1, page 281) states that antelope are extinct in HCC.
Response: This is not true they are present along Brownlee Reservoir from the Burnt River to Farewell Bend.

E.3.2.1.3.11.3. Black Bear

On the Oregon side, black bears are hunted only during the fall season (ODFW 1997).

E.3.312
Response: ODFW allows spring bear hunting on a limited permit basis. Refer to ODFW Big Game Regulations, 2002, page 34. There are several spring hunts allowed in Hells Canyon.

E.3.2.1.3.11.5. Rocky Mountain Mule Deer

Population Status and Abundance
E.3.316
Response: Discussion of population and abundance does not relate current population densities to either Oregon or Idaho management objectives for wintering deer herds, let alone identify what those objectives are;

Having unique vegetation, elevation, and climate, Hells Canyon provides much of the crucial 2 winter range (Hells Canyon Complex winter range) within the region. In Hells Canyon, 250,911 ha of mule deer winter range were delineated (Table 5 in Technical Report E.3.2-31). Crucial winter range accounted for 135,282 ha (54%), and regular winter range for 115,629 ha (46%). The USFS (99,224 ha), private landowners (78,908 ha), and the BLM (49,996 ha) manage winter range habitat. In addition to the Hells Canyon Complex, numerous issues potentially impact mule deer habitat on the Hells Canyon Complex winter range: noxious weeds, human disturbance, and forage competition from domestic livestock (Technical Report E.3.2-31).
E.3-320
Response: Federal, state and private, including IPC's ownership of crucial and regular winter range needs to be displayed in a figure or table.

E.3.2.1.3.11.6. Rocky Mountain Elk

Estimates of the total population of elk in Hells Canyon (on the Oregon and Idaho sides) are not available. Data from Oregon and Idaho are not directly comparable due to different configurations and establishment of management units.

E.3-326

Response: Management objectives for each state were not identified nor discussed in relation to current wintering population densities. IPC needs to address the current population status compared to state management objectives and what are the potential project impacts to the elk herds.

Hells Canyon has been identified as having the most important big game winter habitat in the region (Technical Report E.3.2-31).

Response: As the most important big game winter range in the region, IPC needs to do a better job of quantifying current winter population densities, limiting factors affecting population densities, impacts attributable to HCC and compare these figures to the state's management objectives. In addition IPC needs to address the continuing effects of (inundated habitat) on loss of habitat on deer.

The upland habitats within the Hells Canyon Complex (HCC) provide very important winter habitat for big game, various song and upland birds and small mammals. The most critical were the lands at lowest elevation,are now flooded by the reservoirs. These areas contained more diverse habitats, gentler slopes and provided critical refuge for wintering big game during times of severe weather along the Snake River.

Range condition declined in the early 1900's due to excessive domestic livestock grazing but as land managers changed grazing practices the land condition improved. In the mid to late 1900's numerous noxious weeds invaded, reducing range productivity. Noxious weeds now dominate large areas of the remaining critical big game winter range that is not inundated by the project. Recreation users from the project area contribute to the spread of Noxious Weeds with vehicles and OHV's.

The flooded acres plus the remaining lands in poor condition have reduced the winter range carrying capacity. Deer losses even during moderate winters are excessive (personal communication with George Keister, ODFW) to the point that herd reproduction is near the maintenance level. Mitigation for the continuing impacts of flooded acres will require land acquisitions of suitable lands with the capability of producing diverse forages and riparian vegetation. Comparable habitat will be difficult to find therefore at least a 2:1 ratio for mitigation well be necessary.

Erosion/Roads/Recreation

Roads have significant impacts on many resources and limit the productivity of habitats and wildlife populations. All roads in the immediate vicinity of the reservoirs area result of and contribute to project impacts regardless of whether IPC claims them as project roads or not. These roads include but are not limited to; the Snake River Road, the Oxbow reservoir to

Cambridge road, the Hells Canyon road, the homestead road and the unnamed dirt roads on the Idaho side of the reservoirs. The service roads associated with the transmission lines are also included. Roads contribute to erosion, fragmentation, loss of habitat integrity and enhance the spread of noxious weeds. Roads and road caused erosion have impacts not only along the reservoirs, tributaries to the reservoirs but also on the uplands. Vehicle use during the rainy season or when daily freezing and thawing take place results in soil movement. Road management must be implemented to gain control of soil movement and shoreline vegetation must be re-established to stabilize riparian zones. It is expected that control of undesirable vegetation will be necessary and likely require more than one treatment to allow for the establishment of shoreline trees and shrubs. These efforts should be conducted along the reservoir and the reservoir tributaries. To gain control of upland erosion, roadbeds and shoulders may need seeding and seasonal road closures. If IPC roads are not needed for Operation and Maintenance they should be closed permanently. Road resurfacing could have a negative effect on big game winter range. An all weather surface could increase vehicle traffic along the Snake River road disturbing, harassing, and killing deer that winter along the reservoir. During severe winters deer could be chased on to reservoir ice increasing deer mortality. Mitigation could include closing the road during the winter for 6 or 8 miles near Swedes landing or maybe not plowing snow on this road in severe winters thus allowing snow to close the road.

IPC should disclose a detailed list of all roads (whether they are claimed by IPC or not) their surface states, erosion impacts, use levels length by state. Mitigation and O&M should be addressed.

Roads increase habitat fragmentation and result in the loss of habitat integrity for songbirds on their habitats (study 3.2-1) along Hells Canyon and Oxbow reservoirs. Although a good riparian area exists, especially along Oxbow Reservoir, it does not provide the quality or quantity of habitat needed for birds to reproduce or for winter survival. These same riparian habitats are also key for big game and other wildlife use during winter. The roads along Oxbow and Hells Canyon also reduce big game use on riparian vegetation, and vehicle traffic actually kills many animals.

Dispersed recreation can have negative impacts on terrestrial resources by causing erosion, damaging riparian habitat and harassment of wildlife. The primary problem is un-restricted camping and recreational uses that damages vegetation. Vegetation removal occurs when vehicles drive off roadways, or humans dig holes for toilets or fire pits, cut trees or shrubs for various reasons and create pathways by foot traffic. Riparian vegetation is limited by soil compaction by vehicles and foot traffic and by cutting and removal. By reducing vegetation densities, erosion can increase from wind or water. Recreational use especially in or near riparian vegetation limits or displaces wildlife use. Uncontrolled camping along Hells Canyon reservoir has reduced mountain quail habitat effectiveness. The open road below Homestead also reduces big game winter range security and effectiveness. Limiting dispersed camping and improving developed campsites would improve habitat if roadsides were fenced to restrict vehicle uses. Songbird use of riparian habitat has also been reduced with increased recreation use.

E.3-572. *With water fluctuations necessary for flood control, anadromous fish*

spawning and protection, downstream navigation, and hydroelectric generation, the Applicant concluded that eliminating negative impacts to shoreline erosion from human activity is impossible at the HCC (Technical Report E.3.2-42). Because many of the factors that influence shoreline erosion are interrelated, it is impossible to attribute the cause of erosion at any specific site to any single influence. With regard to HCC operations, erosion cannot be attributed only to one operational influence.
Response: The absolute nature of this statement is inaccurate. This discussion appears to be an attempt to distract the reader away from the elements of human use and erosion sources that IPC does have the ability to control, entirely or to some degree. In their PM&Es, IPC needs to address actions that relate to their contribution to shoreline erosion, not just say that everything is causing shoreline erosion, so they don't know how to reduce it. An adaptive monitoring program is essential because each corrective action will have an effect.

Transmission Lines

Transmission lines and the transmission line roads often have an negative affect upon terrestrial resources. Service roads can be responsible for erosion, weed spread and harassment of wildlife as mentioned in the road section. Limiting public use of these roads would reduce impacts and stress on wildlife.

An extra effort must be made to determine the extent of impacts of power lines to raptors and other large birds. More research may be necessary with people frequently checking areas of high bird use to locate dead birds before scavengers remove them. Incidental observations are not adequate to document the extent of this impact to avian wildlife. A program to determine line visibility and then implement mitigation could help to reduce bird collisions with power lines. Erection of nesting poles for raptors as well as changing design or modifying existing problem poles could reduce electrocutions.

It has come to BLM's attention that IPC has currently filed for a Right-of-Way(ROW) on 5 transmission lines that are in the DLA. In the event that IPC removes the HCC transmission lines from their FERC license and seeks to authorize them under Title V of the Federal Land Policy and Management Act of October 21,1976 (FLPMA), the BLM may require IPC to provide additional information in order for the BLM to comply with various federal laws and mandates (National Environmental Policy Act (NEPA), Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Federal Land Management Policy and Management Act (FLPMA, etc.). Additional information may also be required from IPC for the BLM to develop performance stipulations in a right-of-way grant(s) to mitigate impacts of the transmission lines to various resources and programs on the public lands including, but not limited to, visual resources, fire prevention/control, noxious weeds, public access, soils, wildlife, special status species, cultural resources, fisheries, water resources, vegetation, hazardous waste, and conflicts with other uses/users.

E.3.3.4.3.2. Operation and Maintenance Activities and Noxious Weeds (E.3-610)
Noxious weeds are common throughout the transmission-line corridors and throughout the surrounding regions. O&M activities play a role in the spread of noxious weeds along transmission-line service roads and at tower locations. However, because most disturbance

factors are interrelated, attributing the potential cause of noxious weed occurrence and spread to any single influence is difficult, if not impossible.
Response: IPC overstates the difficulty of ascertaining causes of noxious weed spread. Maintenance of early seral stages and travel corridors (roads/trails) are known to be the most common factors in the spread of noxious weeds.

E.3.2.3.2.2. Transmission Lines and Associated Service Roads
One new measure is associated with transmission lines of the Hells Canyon Complex: development and implementation of a transmission-line O&M plan. This measure is primarily a management program action with cooperative project components; it requires no acquisition of land.

E.3.3.3.2.2. Transmission Lines and Associated Service Roads

One new measure for botanical resources …"

Response:The BLM in meetings with IPC reviewed and commented on IPC's draft O&M plan for project transmission lines. The BLM will require the plan to address communication and coordination between IPC and the BLM to implement, monitor and adapt all aquatic and terrestrial resource specific restoration, protection, and management strategies associated with the transmission lines. IPC, at a minimum shall include the following sections in the O&M plan for the transmission lines:

- Communications between interested parties,
- Project Notification, Review and Approval procedures,
- Environmental Protection Measures including but not limited to:
- Riparian Habitat Restoration and Management;
- Vegetation Management;
- Erosion Control;
- Travel and Access Management;
- Exotic and Invasive Vegetation Management;
- Protection of Threatened, Endangered, Proposed for Listing and Sensitive Species,
- Fire Protection,
- Cultural Resource Protection,
- Aesthetic Resource Protection,
- Avian Collision and Electrocution Hazards; and
- Aquatic and Terrestrial Resource-Specific Monitoring Plans and Schedules.

Additional sections or components for inclusio n in the O&M plan may be identified in consultation and coordination with the BLM.

IPC needs to consolidate all resource (wildlife, botanical, cultural, etc) PM&E measures associated with the transmission line into one PM&E and provide that PM&E in one location in the license application.

6.4.1.6 Utility Corridors
The existing utility corridors also provide alignment opportunities for new and expanded utility transport that would minimize further resource impacts. These alignments would hopefully be designed by federal land management agencies as recognized utility corridors.

Response: IPC was at one time preparing a transmission lines management plan. What has become of that plan? Please include this in the FLA as well as with any ROW application. IPC should work with BLM to establish the exisiting transmission lines as utility corridors with in the Land Use Plans.

Noxious Weeds

Noxious Weeds have serious impacts on the Idaho ground squirrel, big game habitats, upland bird habitats and riparian vegetation. All land management agencies, counties and private landowners face serious problems and consequences if noxious weeds are not controlled. It is incumbent upon IPC and land management agencies to work together to prevent and control infestations. Just as the county governments work with private landowners for weed control, IPC and land management agencies should attempt further cooperative efforts with the counties.

Upland habitats have been seriously impacted by medusa head wild rye and other exotic weeds reducing the productivity of big game winter range and upland birds habitat. Range re-habilitation efforts would require control of medusa head and other weeds. A key method for weed spread is motor vehicles (pickups, cars, OHV's etc.). Restricting off road vehicle use would aid in reducing the spread of noxious weeds. Also, regular control of weeds on roadways would reduce weed spread.

E.1.6.1. Wetland and Riparian Communities

E.1-18

… Most weedy exotic species grow at and above the headwaters of Brownlee Reservoir (Technical Report E.3.3-1).
Response: IPC needs to integrate this discussion with the findings in Technical Report E.3.3-2, *Inventory of Rare Plants and Noxious Weeds Along the Snake River Corridor in Hells Canyon*. The conclusion above is not consistent with that report. It is not accurate according to BLM surveys and adds little utility to this discussion.

In their vegetation discussions, IPC consistently mismatches species group comments and their scope of occurrence, with the concept of a given section. IPC needs to construct their discussions such that the context of each statement relates to the thesis of the heading and paragraph. For example, when discussing wetland communities, maintain the discussion of weed influences relative to that habitat (weedy riparian species) and not insert general weed statements that have little bearing on the thesis or conclusion of the paragraph.

E.3 pg. 285 "most weed species identified in Hells Canyon were apparently present before Hells Canyon Complex was constructed…"
Response: Yellowstar, skeletonweed, leafy spurge, purple loosestrife were not present.

E.3.3.1.1.1.
Pg. 547

Most of these weedy riparian assemblages occur in the upstream Weiser reach and along the headwaters of the Brownlee Reservoir reach. The reach below Hells Canyon Dam had relatively few weedy riparian assemblages. Based on the distribution, abundance, and life history characteristics of many riparian weedy species in the study area, it appears that the large fluctuations in water levels on Brownlee Reservoir from current operations may help restrict downstream infestation of several weedy riparian species through riverine processes (Technical Reports E.3.3-1 and E.3.3-3).

Response: This section needs better integration with Technical Report E.3.3-2. The BLM notes the effects of reservoir fluctuation on the establishment of riparian vegetation, in this case noxious weeds. The BLM questions the degree of this effect below Brownlee reservoir itself, as weed distribution in the Oxbow and Hells Canyon reach suggest otherwise (Technical Report E.3.3-2). A later discussion of noxious weeds (E.3.3.1.1.2.) reports the central reservoir reaches contained moderate to high levels of both upland and riparian weeds. The use of the phrase several weedy riparian species provides enough vagaries for the statement to be partially accurate. This discussion needs to discuss which species, with what life history attributes, could be restricted, and by what mechanisms. Some of this discussion does surface later in this document but any conclusion based on distribution correlation is specific to a given species and looses utility when lumped. There is no mention of the mechanism by which "riverine processes" would restrict downstream flow below Hells Canyon dam, as this is likely the result of available habitat. There is no discussion of the fate of weed species seed or vegetative parts in the watercourse to support the claim that downstream weed infestations are restricted. The BLM contends that a better description of the action might be to retard establishment rather than restrict dispersal of the weed seed. The BLM also believes that IPC has ignored the fact that many herbaceous noxious weeds which are heavily established in the Brownlee area have also become established along Oxbow and Hells Canyon reservoir shorelines. These species include dalmation toadflax, rush skeletonweed, knapweed, leafy spurge and others.

E.3.3.3.2.1.1. Acquisition of Upland and Riparian Habitat
E.3-571

Past project operations that caused successive drying and flooding because of large drawdowns of Brownlee Reservoir have probably prevented many introduced noxious and weedy perennial species from spreading and establishing downstream (Technical Reports E.3.3-1 and E.3.3-3). Because proposed operations are not conducive to establishing seedlings of weedy perennials, these operations would continue to restrict downstream invasion through riverine processes (Technical Report E.3.3-3).

Response: The BLM notes the effect on the establishment of perennial vegetation (in this case noxious perennials) via fluctuating water levels. This section is insufficiently integrated with TR E.3.3-3. This section also lacks any discussion of noxious riparian vegetation that is not perennial. See previous response on weed species list.

E.3.3.3.2.1.2. Cooperative Noxious Weed Control, Site Monitoring, and Reseeding

E.3-573

Although large fluctuations on Brownlee Reservoir have helped reduce downstream spread of noxious weeds from upstream reaches under riverine processes (Technical Reports E.3.2-40, E.3.3-1, and E.3.3-3), ongoing operations can still contribute to the spread of riparian noxious weeds along the reservoir and downriver reaches (Technical Reports E.3.3-1 and E.3.3-2).

Although correlative studies can suggest a theory for the influence of reservoir fluctuation on noxious weed spread downstream, they do not establish cause and effect sufficiently strong to absolutely attribute this effect to that action. "May have helped reduce downstream spread", is a more accurate statement IPC Should also be clear these are tree or woody species. This is irrelevant to herbaceous weeds which are present throughout the HCC.

The BLM concurs with the conclusion that ongoing operations can still contribute to the spread of riparian noxious weeds along the reservoir and downriver reaches.

Riparian

A unique habitat that has been lost and will continue to be impacted is the islands. Islands are important for riparian, nesting and resting birds, and wintering big game. Islands are valuable for wildlife habitats but also as a refuge from predators. Islands could be constructed in the west end of the Powder River arm that would help replace the islands lost.

The most limited habitat is trees with height such as cottonwood and pine trees along Oxbow and Brownlee Reservoirs. These are important for raptors, especially bald eagles. Eagles use the trees for perching, roosting and nesting. The scarcity of trees and clumped distribution may be a limiting factor for nesting by large raptors. A concerted effort must be made to restore this limited habitat, as most trees along Oxbow reservoir are very old and few trees exist along Brownlee reservoir. It will be many years before cottonwood reach a height with limbs large enough to be effective perch or nest trees and an even longer time for pine trees to provide these habitat components. IPC should start soon by planting trees along the reservoirs.

Riparian vegetation along the three reservoirs differs greatly from one end of the complex to the other. There are fair riparian plant communities providing reservoir bank stability on Oxbow and Hells Canyon reservoirs and very poor riparian development on most of Brownlee. However, much of the riparian on Oxbow and Hells Canyon is not useable by wildlife due to the encroachment of roads. Opportunities for riparian enhancement may be limited on Brownlee but tributaries to the reservoir and alluvial fans could support riparian vegetation. The current project operations have nearly eliminated riparian habitats along the tributaries due to reservoir fluxuations. The west end of the Powder River Arm offers the best opportunity to expand riparian but IPC would have to purchase of the shoreline. Until a concerted rehabilitation effort is made, potential for success in replanting riparian plant communities around Brownlee pool will remain unknown. Professional ecologists familiar with rehabilitation should conduct the documentation of riparian species planted and techniques used and monitor until success is

achieved. Upland riparian areas may be improved by protecting plants and water sources from impacts created by OHVs, and other human activities.

E.3.3.1.1.4.3. Oxbow Reservoir and Hells Canyon Reservoir Reaches
E.3-561 & 562

... Ninety percent of the time, Oxbow Reservoir fluctuates on a daily basis within 5.6 ft of the normal maximum elevation and Hells Canyon Reservoir is operated within 3.8 ft of the normal maximum elevation (Technical Report E.1-4). Although shorelines are steep in the canyon, relatively stable pool levels at both Oxbow and Hells Canyon reservoirs enhance establishment of riparian habitats.

Response: This section needs better integration with TR E.3.3-3 and TR E.3.3-1. What are the "enhancement" elements, and compared to what? Three to five feet may be "relatively" stable in terms of measuring average water levels in terms of height, but the BLM contends that this amount of daily fluctuation has a large effect on the ability of vegetation to establish and persist. The discussion of 90% of the time… is misleading in this paragraph as "the time" is left undefined, and the timing and degree of fluctuation of the remaining 10% is not discussed.

Additionally, *enhance riparian habitats* is too vague to illuminate actual effects to the vegetation. There are several kinds of riparian communities, and they are not all equal in terms of their quality or ability to function in the riparian system. Community type and species richness are not discussed here. One would not expect the vegetation that occurs in the ecotone between water and upland habitats to be the same in areas subject to daily/hourly fluctuations (ongoing or propose operations) as that found under the fluctuations of a natural seasonal climatic cycle. Annual species with less root development tend to be more opportunistic in the ecotone experiencing daily peaks and ebbs, and these species are less able to provide substrate stability.

IPC has avoided the issue raised by the BLM regarding the continued project effects to riparian habitat when changing from a free-flowing river to a large slack water reservoir.

E.3.3.4.1.6.2. Riparian Habitat
(E.3-599)
Riparian habitat is limited in Hells Canyon (Technical Report E.3.3-1). Human activities associated with recreation or project operations can be especially detrimental to habitat when they occur within riparian habitats. Therefore, the Applicant evaluated potential impacts to riparian habitats having human activities present or nearby (Technical Reports E.3.2-45 and E.3.2-46).
Response: The BLM notes the contribution to riparian impacts from recreational activities. However, it would make sense to also discuss the impacts to riparian vegetation from reservoir/dam operations. Why was this discussion truncated here, when it has been discussed to various degrees in other parts of this section?

Below the Mouth of the Salmon River
No Studies except those on bats were conducted below the Salmon River along the Snake River to the Grande Ronde River. Issues to be resolved are erosion, riparian changes, nesting

waterfowl and upland vegetation. All of these issues can be effected by fluctuating water levels as well as loss of sediment. Although the Salmon River supplies important sediment it does not replenish all that which remains trapped in the HCC. Personal communication with Rogersburg residents, suggest sand bars below the mouth of the Salmon have declined since project construction. IPC needs to complete this analysis. (at the mouth of the Grande Ronde River)

E.3.2.1.4. Wildlife Resources Downstream of the Hells Canyon Complex

Influences of the Hells Canyon Complex on wildlife resources are most associated with the three reservoirs of the complex (see section E.3.2.4., Anticipated Impacts on Wildlife Resources). Conversely, the Hells Canyon Complex has relatively less influence on wildlife associated with the unimpounded section of the Snake River downstream of Hells Canyon Dam. Therefore, the Applicant conducted a less comprehensive review and investigation of wildlife resources downstream of Hells Canyon Dam.

E.3-375

Response: While this statement notes the difference between the impounded and unimpounded areas of HCC, the BLM asserts that IPC's operation of the HCC has a large influence on riparian habitat downstream of Hells Canyon dam. As noted in "E.3.2.1.3.11.2. Rocky Mountain Bighorn Sheep - Current hydroelectric operations and fluctuating river flows mostly affect riparian habitats…". IPC should provide an in-depth comprehensive review of continued project affects downstream of HC dam.

E.3.2.1.3. Wildlife Resource of the Hells Canyon Complex and Vicinity

E.3.2.1.4. Wildlife Resources Downstream of the Hells Canyon Complex

Response: Both sections provide an overview of current population and distribution status in the HCC. However, IPC needs to provide a discussion relating species to habitats to potential impacts from HCC.

E.3.2.1.5. FERC-Permitted Transmission Lines and Associated Service Roads

E.3.2.1.5.1. Current Habitat Conditions

E.3.3.1.2. Botanical Resources along Transmission Lines and Associated Service Roads

E.3.3.1.2.1. General Vegetation Resources

Response: Duplicative sections, although each section cites different Technical Reports E.3.2-37 and E.3.3-4, respectively.

E.3.3.1.1.4.4. Reach Below Hells Canyon Dam

E.3-563 & 564

Response: In this section there is a brief discussion of upland species, native species, special status plants, and riparian weed species. However it lacks a discussion of riparian species/habitats below Hells Canyon Dam. Riparian species were explicitly discussed in the previous sections of E.3.3 Botanical Resources. IPC needs to integrate Botanical technical appendices E.3.3-3 and E.3.3-1 with this section and describe the lack of riparian vegetation below Hells Canyon Dam and below the mouth of the Salmon River.

E.3.3.4.2.2. Downstream Operations and Noxious Weeds
(E.3-603 & 4)
Few occurrences of riparian noxious weeds occur downstream of the project. Little negative influence on the spread of these occurrences would be expected, both under the Applicant proposed scenario or with full pool run-of-river operations. However, as stated in section E.3.3.4.2.1.2., if the project were operated under full pool run-of-river operations, new sources of noxious weeds would be expected to quickly invade this reach from upstream sources and become detrimental to existing riparian communities, which consist almost entirely of native species (Technical Reports E.3.3-1, E.3.3-2, E.3.3-3).
Response: The first and second sentences of this paragraph contradict each other. The BLM wonders what and how much habitat below the HCC is actually available for colonization? Why would active integrated weed management practices not be sufficient to control noxious weeds on such a limited number of acres, especially for Tamarisk?

The BLM agrees that occurrences of *Phalaris arundinace*a, *Equisetum arvense* (Common horsetail), and *Cyperus esculentus* (yellow nut sedge) could be spread by water level fluctuations in the downstream reach.

The BLM's Cottonwood Resource Area indicates there are numerous noxious weed species below the mouth of the Salmon River including; star thistle, purple loosestrife, knapweed, leafy spurge and others. IPC should analyze the impacts from the project including spread from recreation users in this area.

Both natural runoff events and project operations probably influence the distribution of some riparian noxious weeds below Hells Canyon Dam. Quantifying those influences would be difficult, if not impossible.
Response: This statement contradicts the first paragraph of this section. The BLM questions the "impossibility" of quantifying the impacts these plants would have under IPC operational scenarios, given the extensive discussions IPC has produced for native riparian plants growing in roughly the same environment. IPC should go back and try to integrated their reports into an analysis of impacts from all operational scenarios and compare that to the historic regime prior to construction of the HCC.

Terrestrial PM&E's

E.3.2.3.2.1.1. Acquisition of Upland and Riparian Habitat

Justification

E.3-412
Continued operation of the Hells Canyon Complex would affect wildlife habitat and wildlife species, including threatened, endangered, and special status species, associated with the three reservoirs (Technical Report E.3.2-45). Impacts occur in the fluctuation, shoreline, and mule deer winter range (or crucial winter range) zones.

Response: Upland habitats inundated by the reservoirs will not be available for the next license term. IPC identified upland habitats immediately adjacent to all reservoirs as crucial winter range for mule deer. Therefore, the upland habitats inundated by all reservoirs was crucial winter range for mule deer and most likely other big game species. As mitigation, the BLM will recommend that IPC use a 1:1 habitat replacement ratio where upland habitats are of equal (crucial winter range) value and at least a 2:1 replacement ratio where the upland habitat is of lesser quality (winter range zone).

Likewise, riverine riparian habitats that have been inundated by all reservoirs will not be available as habitat for the next license term. Those riparian zones had the ability to provide high quality habitat for riparian dependent and associated species, including flora and fauna and T&E species. With the continued operations of the HCC, acquisition of high quality riverine riparian habitats is questionable. Therefore, as compensation, the BLM will recommend that IPC at least a 2:1 replacement ratio where the riparian habitat is of lesser quality.

E.3.2.3.2.1.1. Acquisition of Upland and Riparian Habitat

E.3-413

The Applicant also concluded that it is not possible to eliminate the influence on shoreline erosion from water-level fluctuations of the Hells Canyon Complex that are necessary for flood control, anadromous fish spawning and protection, downstream navigation, and hydroelectric generation (Technical Report E.3.2-42). Therefore, the Applicant proposes to mitigate for 90 acres of reservoir and river shoreline that has eroded, possibly because of Hells Canyon Complex operations.

Response: IPC did not fully disclose the impacts of erosion to upland and riparian habitats by limiting their impact analysis to the shoreline and fluctuation zones. The PM&E measure proposed is not wholly adequate to mitigate project affects to BLM lands and resources. IPC must disclose their analysis method and provide specific locations for shoreline erosion. If these are outside of the proposed new project boundary, compensation or mitigation must be provided prior to a change in the boundary.

E.3-572. *With water fluctuations necessary for flood control, anadromous fish spawning and protection, downstream navigation, and hydroelectric generation, the Applicant concluded that eliminating negative impacts to shoreline erosion from human activity is impossible at the HCC (Technical Report E.3.2-42). Because many of the factors that influence shoreline erosion are interrelated, it is impossible to attribute the cause of erosion at any specific site to any single influence. With regard to HCC operations, erosion cannot be attributed only to one operational influence.*

Response: The absolute nature of this statement is inaccurate. This discussion appears to be an attempt to distract the reader away from the elements of human use and erosion sources that IPC does have the ability to control, entirely or to some degree. In their PM&Es, IPC needs to address actions that relate to their contribution to shoreline erosion, not just say that everything is causing shoreline erosion, so they don't know how to reduce it.

E.3.3.3.2.1.1. Acquisition of Upland and Riparian Habitat
Taking a liberal approach, the Applicant concluded that HCC operations have potentially contributed to the total ***shoreline erosion*** *occurring throughout the canyon; about 84 acres of terrestrial habitat along reservoir reaches and an additional 6 acres of such habitat downstream of Hells Canyon Dam. Habitat management actions designed to protect (for example, through acquisition) and enhance 90 acres of terrestrial habitat would mitigate for potential HCC operational influences on shoreline erosion along reservoirs and downstream reaches (Table 2 in Technical Report E.3.2-45).*

E.3-572
Response: BLM needs documentation as to how this analysis was done and how many of these acres are on BLM. IPC must also show where these impacts lie in relation to the project boundary proposed changes.

E.3-574*, under duties of the proposed Noxious Weed Advisory Board.*
Identify common inventory and mapping protocols
Response: The BLM notes that there are already national standards for noxious weed inventory and mapping protocols that would need to be employed on BLM lands.

E.3-575*, suggested management objectives –*
Early Detection/Prevention—Identify potential invaders and prevent their establishment through regular monitoring and control treatments.
Response: The BLM suggests that noxious weed spread prevention would include best management practices, (BMPs) for all equipment operating in the permit area, such as cleaning them prior to entering BLM lands, if they have been operating in an area of known noxious weeds.

E.3-576*, Tolerat**e**—Accept the presence of the weed when 1) the species is not inherently invasive, 2) environmental or biological elements keep the populations within acceptable limits, or 3) control is not economically feasible under current technologies*.
Response: Economically feasible is not defined, nor is a method of establishing a threshold of economic infeasibility suggested.

The BLM suggests an additional management priority: Revegetate treated noxious weed sites with species appropriate to the governing agency.

E.3-577*, Cost Estimate table –*
Response: From recent BLM contracting experience (of $25.00 to $200.00 / acre in that kind of habitat), the proposed +/- $50,000 to treat, even the existing high priority weed patches, is likely too low. Granted, treatments along existing roads are generally less expensive. This same comment is applied to the cost estimates on pg. E.3-588.

E.3-579*, on rare plan management goals –*
Response: The BLM suggests that IPC add a fifth goal, of working cooperatively to introduce or reintroduce rare plant species were habitat is appropriate, in order to address conservation plans or recovery plans.

***E.3-580**, rare plant management action costs –*
Response: Even working cooperatively, the proposed $6,000 might be too low, as it alone would likely only fund less than 30 person days of rare plant work?

E.3-583
The Applicant recognized that O&M activities contribute to the spread of noxious weeds along transmission-line service roads and at tower locations. However, because most disturbance factors are interrelated, attributing the cause of noxious weed occurrence and spread to any single factor is difficult, if not impossible. Other factors potentially contributing to the spread of noxious weeds along transmission lines include livestock grazing, wildlife use, use of roadways by recreationists, ranchers, landowners, and land resource agency personnel.
Response: The BLM agrees that weed spread has many causes and applauds IPC's recognition that O&M activities are one of the contributors. However, discussion appears to be an attempt to distract the reader away from the elements of IPC actions that do contribute to the spread of weeds and to which IPC does have the ability to control, entirely or to some degree. In their PM&Es, IPC needs to address actions that relate to their contribution to noxious weed spread.

***Noxious Weeds**. The Applicant proposes to work cooperatively with state and federal agencies, counties, and other private landowners to control the establishment and spread of noxious weeds. Specifically, the Applicant recommends participating with local WMAs where transmission-line ROW exist. These groups build cooperative relationships between agencies, landowners, land managers, and other interested individuals and organizations needed for effective management of noxious weeds. Specific actions to minimize impacts from Applicant-related O&M activities would include the following:*

- *Clean vehicles that travel off-road or disturb soil and that are likely to spread noxious weed seeds*
- *Promptly reseed areas following disturbance to reduce the potential for weed invasion*
- *Educate and communicate with the Applicant's personnel and contractors regarding noxious weed control*
- *-Implement best management practices for road maintenance*

Response: The vehicle cleaning statement needs to be expanded to include all vehicles and equipment that work in known noxious weed sites, not just those that are designed to go off road. If equipment is traveling along a road that has known noxious weeds on it, it should be cleaned (washed or by other means), as soon as possible before traveling to uninfested lands whether it goes off road or not. A public education element should be added to the statement regarding education of IPC employees and contractors.

E.3.2.3.2.1.1.
E.3-412-414

*"…the Applicant concludes that proposed operations of the HCC would impact **6,148 acres** (388 acres riparian and 5,761 acres upland habitat) of wildlife habitat in the reservoir fluctuation zone…"*

*"…the Applicant concludes that the proposed operations would preclude **343 acre** of riparian habitat in the shoreline zones of Brownlee Reservoir currently occupied by upland habitat."*

*"…the Applicant proposes to mitigate for **90 acres** of reservoir and river shoreline that has eroded, possibly because of HCC operations." "ID for shoreline zones downstream of HC dam: provides 6 acres of riparian habitat and 84 acres along all reservoir reaches." (E.3-413 and E.3-572).*

*"An estimated **582 acres** of habitat…prevented from establishing in the fluctuation zone of Brownlee Reservoir…"*

*"…**16,418 acres** of habitat would be required to mitigate for impacts to winter range of mule deer."*

*"The goal of this measure is to acquire, enhance, and manage **23,581 acres**…"*

*"The **wildlife management plan** would be developed cooperatively with natural resource agencies…"*

***E.3.2.3.2.1.4. (E.3-424)** Mgmt of wildlife resource on applicant owned lands (3,450 acres of fee title lands) (1,850 acres would not be part of pkg., known as non-project lands). $145K annually, totaling $4.37MM for 30 yrs.*

"…enhance riparian and upland habitat on the 4 islands purchased per Article 37-current license, for waterfowl and T&E, candidate, and special status species."
Response: The BLM, as previously detailed, argues that IPC did not fully disclose the on-going continued impacts to BLM lands and terrestrial resources from project operations. Because analysis did not fully disclose all project impacts, IPC's presentation of mitigation measures are insufficient to mitigate all on-going continuing projects impacts. However, the BLM applauds IPC's efforts to provide some mitigation for the area of analysis they conducted.

The BLM will expect IPC to mitigate on-going continued impacts to BLM lands and terrestrial resources adjacent to HCC reservoirs for the inundation zone as well as for the shoreline and fluctuation zones, the river reach downstream of the mouth of the Salmon River, and to BLM land adjacent to and within IPC's right-of-way for project transmission lines.

Upland habitats inundated by continued occupancy of the reservoirs will not be available as habitat for the next license term. IPC identified the upland habitats immediately adjacent to the HCC reservoirs as crucial winter range for mule deer. Therefore, the upland habitats inundated by HCC reservoirs were crucial winter range for mule deer and other big game species. As mitigation, the BLM will require that IPC use a 2:1 replacement ratio for upland habitat is of lesser quality (crucial winter range zone).

Likewise, riverine riparian habitats that have been inundated by the reservoirs will not be available as habitat for the next license term. Those riparian zones had the ability to provide high quality habitat for riparian dependent and associated species, including T&E flora and fauna

species. With the continued operations of the HCC, acquisition of high quality riverine riparian habitats is questionable. Therefore, as mitigation, the BLM will expect IPC to use at least a 2:1 replacement ratio for riparian habitat.

To meet BLM land and resource management direction, acquisition of upland and riparian habitats will be on-site or immediately adjacent to the reservoirs where possible. Acquisition acreage will be commensurate with the level of impact to BLM lands, at a ratio of at least 2:1 for critical habitats.

The BLM argues that the Snake River downstream from HC dam is "sediment hungry" (Kendall, 2002) because the supply of material from upstream sources has been interrupted and trapped by the HCC reservoirs. As stated previously, that sediment provides the necessary substrate for riparian vegetation to establish and propagate. The BLM concludes that riparian vegetation has been limited in the river reach downstream of HC dam by the lack of sediment recruitment and IPC's daily flow fluctuation. IPC has not analyzed this impact below the mouth of the Salmon River. Therefore this analysis of project impacts must be done and subsequently mitigated for BLM lands.

The BLM will also expect IPC to provide funds to manage, enhance, and provide O&M for all acquired habitats, the shoreline habitats and rehabilitate habitats in areas degraded by recreational activities for the term of the new license. BLM will manage lands acquired for BLM mitigation.

E.3.3.3.2.1.2. Cooperative Noxious Weed Control, Site Monitoring, and Reseeding E.3-573

Response: The BLM concurs with the conclusion that ongoing continued operations can still contribute to the spread of noxious weeds along the reservoir and downriver reaches. As such, the BLM will require IPC to participate in the prevention, suppression and containment of noxious weed plants. IPC shall at a minimum identify and implement the following activities on BLM lands associated with project-related roads, campgrounds and trails:

- Inventory and map noxious weed presence, distribution, and density. The initial inventory will be completed within one year of issuance of the new license, and annually throughout the length of the license or as defined by the agencies.
- Develop and implement a monitoring program for noxious weeds that includes evaluating the effectiveness of prevention, control, and eradication measures.
- Annually detect and eradicate small existing populations and new introductions of noxious weeds.
- Control, suppress, and contain large-scale infestations of noxious weeds, especially those that overlap different ownerships or responsibilities.
- Maintain native plant composition and re-vegetate weed infested and disturbed sites with native species.
- Prevent invasion of new weeds by limiting their dispersal, minimizing soil disturbances, and properly managing desirable vegetation.
- Complete all necessary NEPA environmental analyses and comply with existing NEPA. Prior to any noxious weed control activities on BLM lands, the licensee shall obtain approval from the BLM.

Coordinate with the BLM to ensure that exotic and invasive vegetation objectives are met across administrative boundaries.

E.3.2.3.2.1.1. (E.3-413) *"…the 343 acres of riparian habitat would constitute mitigation for habitats of T&E, candidate, and special status species that would be affected by proposed operations of HCC (Tech Report E.3.2-45).*
Response: IPC's analysis of T&E, candidate and special status species is limited to IPC's two operational scenarios that only address the reservoir shoreline and the downstream river shoreline from HC dam. The analysis does not address loss of these species habitats by project reservoir inundation nor does it adequately address the cause and effect of the on-going continued project operations on these species.

IPC's proposed acquisition of riparian habitat as mitigation for T&E, candidate, and special status species is incomplete until an adequate analysis is supplied for actual impacts to these species the BLM will require measures mitigating loss of habitats based conservative estimates.

Cultural Resources Key Issues

Cultural Resource Management Program, Adaptive Management and Monitoring

A Cultural Resource Management Plan is attached to the Draft License Application as Technical Report E.4-15. Elements of the draft CRMP are summarized in Exhibit E.4: Report on Historical and Archaeological Resources. This is the first time the BLM has seen this CRMP. Additional specific comments are discussed in the attached technical report and exhibit review documents.

The CRMP describes legal authorities, the Area of Potential Effect (APE), inventories conducted and eligibility of sites identified, summary of site impacts, traditional cultural property and resource studies, proposed PM&Es, a monitoring program, and the process for Applicant's coordination of plan implementation with agencies, Tribes, and SHPOs.

p. E.4-1: *"....three separate APEs were established. The first of these APEs includes the three reservoirs, the second includes the unimpounded reach of the Snake River...., and the third includes the transmission lines. These three APEs are described in the following paragraphs...." . Descriptions follow for these three APEs. The APE for reservoirs was defined as 0.1 miles along the reservoir margins; and as the operating corridor width for the transmission lines.*

Response: BLM does not agree with the geographic area of the "three APEs" established by the Applicant. The area of potential effect (36 CFR 800.16) is "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties". The APE for the three reservoirs does not fully take into account the actual area directly or indirectly affected by dispersed recreation which originates with use of the reservoirs. Dispersed recreation areas include informal camping and day use locations, off-road vehicle use areas, and hiking trails that extend up to 1/4 mile up lateral side drainages along the Brownlee and Hells Canyon Reservoirs. In some places, the transmission line APE excludes segments of service and access roads used to reach the transmission lines. Exhibit E.4 provides no clear geographic description of the APE for traditional cultural properties.

BLM disagrees with the APE boundary terminating at the confluence of the Salmon and Snake Rivers. River fluctuations caused by dam releases effect archaeological sites in the Snake River and Nez Perce National Register Archaeological Districts downstream of the Salmon River, as far as the upper limits of the next reservoir on the Snake River. Sites in Idaho and Washington along this reach of the free-flowing Snake need to be included in monitoring and stabilization efforts.

Appendix E.4-15, page 36: *"A separate survey of the drawdown zone consisted of a survey of opportunistically selected locations below the high water mark of Brownlee Reservoir....Areas surveyed were selected based on a number of factors: steep slopes were not examined; sand and gravel bars were examined where accessible either by helicopter or by foot from the road."*

Response: Based on a review of drawdown zone survey maps, BLM questions whether or not all draw down areas with potential for cultural resources were inventoried along Brownlee Reservoir and the Powder River arm of Brownlee Reservoir. Since draw down inventories were conducted opportunistically, there may be areas exposed that have not been previously surveyed. As part of the cultural resource management program, Applicant should plan for and conduct systematic, ongoing inventories of draw down areas, using a design adaptive to changing conditions, until all areas exposed during such events have been examined. In addition, there are daily fluctuations along Hells Canyon Reservoir, which expose additional shoreline near known archaeological sites.

Appendix E.4-15, page 36: *"These three reservoirs were examined from the high water mark to 0.1 mile inland. Survey was intensive at 15 meter transect intervals, with the exception of steep (greater than 30 percent) slopes, which received a reconnaissance level examination, with particular attention paid to features such as outcrops and benches that could include archaeological resources."*
Response: BLM agrees that the areas inventoried on the ground at 15 meter transect intervals constitutes thorough inventory of those specific locations. At some locations, the surveyors remarked upon limited visibility conditions. Since such conditions can change over a short period of time (for example after a wildfire) and certainly can change during the term of the license, as part of the cultural resource management plan the Applicant should plan to conduct periodic re-inventory of areas that had poor to zero visibility .

The discussion should acknowledge that "reconnaissance" as described in the technical reports was a remote method using field glasses for much of the Brownlee and Hells Canyon Reservoirs; therefore not all side drainages or project impact areas were examined on the ground. For example, it appears that the hiking trail from Copper Creek to McGraw Creek along Hells Canyon Reservoir was not inventoried on the ground, but rather by reconnaissance. Also please clarify if the draw down zone was inventoried at 30 or 15 meter transect intervals.

p. E.4-5 through E. 4-6: *"Because the Applicant proposes to treat sites that are potentially eligible as though they were eligible, all protection, mitigation, and enhancement (PM&E) projects associated with eligible sites, including monitoring, would cover these sites as well."*
Response: Applicant should plan to complete the investigations needed (eg., historical research) to firmly establish eligibility of potentially eligible sites. For most "potentially eligible" sites, the only immediate action proposed is monitoring. If the characteristics that make a site eligible have not been sufficiently identified, it is not clear how Applicant can be sufficiently informed to monitor for changes that would affect eligibility. If either integrity or significance is in question, these questions should be resolved through a systematic program of eligibility determinations - particularly for sites where project related impacts have been observed. These determinations have a bearing on the assessment of project effects, but also on the long term allocation of fiscal resources. For example, a records search and comparative architectural assessment for historic site BD00-74 would inform upon its significance, which in turn would aid in determining the advisability of more comprehensive documentation, structural stabilization or interpretation. This site is highly vulnerable to vandalism by fire (or natural wildfire).

E.4.2.5.1.3 Monitoring of Known Eligible Sites on Oxbow and Hells Canyon Reservoirs
E.4.2.5.1.4 Monitoring of Known Eligible Sites on Brownlee Reservoir
Response: BLM agrees in general that monitoring of eligible and potentially eligible sites is a necessary and useful measure that serves as one aspect of a program for adaptive management. However, Applicant has not provided criteria for prioritizing sites or quantifying impacts. The specifics of the plan and schedule need to be more fully developed, including specifying limits for acceptable change and evidence for adverse effects that would trigger data recovery, stabilization or other protective measures. BLM does not agree that a six year monitoring schedule is adequate for archaeological sites on the three reservoirs - Oxbow, Hells Canyon, and Brownlee. Applicant should sponsor a program of annual monitoring on the three reservoirs for the first three years, and then re-prioritize; or continue annual monitoring until other protection and mitigation measures have been designed and scheduled for implementation.

pp. E.4-35, E. 4-38-39: *"At the end of the first six-year cycle and before the second cycle, all parties involved....would evaluate the procedures, list of sites, and monitoring plan for the next six year cycle."*
Response: BLM recommends Applicant should not postpone the first review of the monitoring plan until after the first six year cycle. A more detailed monitoring plan (schedule, priorities, permit requirements, professional qualifications of supervisory personnel, methods/procedures, data to be recorded, quantifiable limits of acceptable change, provisions for revision to the plan, and report requirements) needs to be mutually developed and agreed upon between the Applicant and BLM before the monitoring program is implemented, not after the first six years have passed. Then, the procedures and monitoring plan can be reviewed and evaluated by all parties for the next cycle.

Monitoring should be conducted and reported under the supervision of a professional archaeologist. Applicant and BLM should cooperate to involve BLM federal and Oregon-Idaho state law enforcement personnel in the monitoring plan and its implementation. BLM recommends that support for additional law enforcement patrols during peak use weekends would facilitate protection of cultural resources.

p. E4-35, E.4-39: *"Monitors would be looking for the causes of site impacts, especially those related to erosion. For example, the Applicant would try to distinguish between erosion that is related to project operations, and erosion that is related to boat wakes or wind action."*
Response: BLM agrees that monitoring should examine sites for causes of impacts related to erosion and other sources of condition deterioration. However, BLM questons the necessity to distinguish between erosion related to "project operations", "boat wakes" or "wind action" on the reservoirs, since all these sources of erosion (or siltation, and deflation) are ongoing effects resulting from an unnatural large reservoir body of water which would not be present at this location if there was no hydroelectric project. On the other hand, for example, it is important to distinguish project related impacts from natural event erosion or deposition on a site (eg., side drainage flood blowouts), or from trailing associated with recreation use.

p. E.4-35: *"Monitoring techniques and intervals will be designed to serve as data collection for study 8.4.7.....In consultation with the Cultural Resources Work Group, the study was deferred until the implementation of archaeological site monitoring efforts."*

Response: Inventory and recent monitoring results already provide evidence that reservoir level fluctuations are adversely affecting archeological sites on the Oxbow and Hells Canyon Reservoirs.

Appendix E4-15: 4.3.2 Consultation; pages 53-54: *"If the proposed action is on federal land, the cultural resources manager will consult with the Idaho and/or Oregon SHPO, who will have 30 days to express concerns, and also with the federal agency affected (eg., the BLM or USFS), who will have the same 30 days (cf. 36 CFR 800.3(c)(4). The federal agency will conduct consultation with the appropriate Native American tribes (s), as this would enter the realm of government-to-government consultation. The federal agency will have 45 days to express concerns, including soliciting and receiving input from Native Americans."*
Response: BLM disagrees. Applicant has ignored the fact that BLM and SHPO have a National Programmatic Agreement for Section 106 consultation. In addition, the 36 CFR 800 regulation cited by Applicant for the 30 day time frame for BLM to respond to Applicant is not relevant, since that part pertains to consultation between an agency official and SHPO/THPO - Applicant is neither of those. Most importantly, Applicant proposes to impose upon a federal agency a 45 day time frame for government-to-government consultation with Tribal governments. In the absence of a mutually negotiated agreement between BLM and a Tribe on this particular matter, the BLM cannot unilaterally accept an iron clad 45 day tribal consultation time frame for actions under this CRMP.

While Applicant is entitled to a timely and reasonable response to proposed actions, it would be more in the spirit of consultation for Applicant to recognize that consultation time frames should be mutually negotiated and agreed upon. BLM recommends that Applicant modify this portion of the consultation protocol, and simply state that consultation time frames shall be mutually developed by all interested parties under the terms of the Programmatic Agreement. In all cases, it is important for the Applicant to provide information about proposed actions very much in advance. For this reason, it would be useful for Applicant to distribute an annual project scoping list; or coordinate an annual face to face meeting for all interested parties, to discuss and scope upcoming year projects well in advance.

Adequacy of Analysis:

- The Area of Potential Effects which guided the geographic scope of studies did not include areas of associated dispersed recreation, transmission line access roads, all draw down areas, or the area potentially effected by flow regulation on the free-flowing Snake downstream of the Salmon River.
- Although the Applicant will treat all potentially eligible sites as if they were eligible, final determinations are needed.
- There is no discussion of cumulative impacts to archaeological sites. There is no discussion of whether or not there were prior monitoring studies that would contribute information about cumulative impacts.
- The assessment of effects to sites on the three reservoirs needs to be further described.

Adequacy of Plan - Data Needs and Adaptive Management
For the reasons stated above and in the discussion following for other key issues, the plan does not contain all the pertinent information needed to protect and manage the cultural resources over

the long term in the project area. BLM does not agree with APE as defined, and therefore this portion of the study is incomplete.

The draft CRMP provides a beginning framework for further development of an agreed upon CRMP with BLM participation, and the Programmatic Agreement should make provision for CRMP revision with BLM concurrence. The plan provides some general management direction and guidance. There are gaps in adaptive management aspects of the plan. Although Appendix 4.3-A provides some discussion of roles and responsibilities, in several cases these are unclear.

Elements that need revision in the plan include, but are not limited to:

- schedule for survey of uninventoried BLM lands in the APE;
- as conditions may change during the term of the license, plan for re-inventory of BLM lands where conditions precluded thorough examination (eg., vegetative carpet or siltation obscured surface)
- schedule for final determinations for "potentially" eligible sites
- results of completed oral history studies with Nez Perce and other tribes, and eligibility determinations for traditional cultural properties
- priorities and schedule for site monitoring with agency concurrence
- a revised monitoring protocol with limits of acceptable change, quantifiable impact measures, and annual monitoring of BLM sites for first three years or until protection plans are implemented;
- plan to involve law enforcement in both monitoring and protection patrol
- identify routine actions exempt from further Section 106 review
- identify types of actions proposed by other resource PM&Es that would require further Section 106 review
- coordination and consultation process with BLM for emergency undertakings (including defining "emergency")
- data sharing and annual reporting of monitoring and mitigation results
- permit requirements and qualification requirements for contractors
- professional qualification requirements of Applicant's key coordinating staff
- long term curation of materials and records in a designated Oregon curation facility that meets federal standards
- establish process and time frames for agency and tribe review, with their concurrence;
- emergency compliance procedures;
- procedures for consultation with agencies, Tribes, and SHPO on plan revisions and updates.

The plan should clarify responsibilities of various parties for:

- FLPMA permits for monitoring and inventory; ARPA permits;
- NAGPRA actions and consultation, and should identify the "responsible official' for federal lands;
- government-to-government consultation and time frames;
- responsibility for Section 110 and ongoing Section 106 NHPA implementation.

Native American and Euro-American Sites

p. E.4-9 through 4-10**:** *"Definition of Adverse Effects: Project-related impacts to sites eligible for inclusion on the National Register constitute adverse effects. In this section, the Applicant describes impacts and assesses adverse effects. The Applicant will consult with the Idaho and Oregon SHPOs and with Native American tribes regarding its assessment of adverse effects, pursuant to implementing the regulations of the National Historic Preservation Act.....These adverse effects are only defined for sites that are listed or eligible for listing on the National Register. Under 36 CFR 800.5(a)(2)(i), physical destruction of or damage to all or part of a property is an adverse effect. Therefore, the listed impacts constitute adverse effects because they have resulted in or could result in partial or total destruction of the sites.... Impacts from project operations could be related to recreation and access, as well as to pool fluctuations and cutbank erosion." Following this narrative is a list of impacts to sites in Brownlee, Oxbow,.and Hells Canyon Reservoir (p. 4-10).*
Response: Although the kind of impacts are described, BLM could not find on page 4-10 where the Applicant assessed adverse effects on the eligible and potentially eligible archaeological sites on Brownlee, Oxbow, and Hells Canyon reservoirs. In contrast, Applicant provides an extensive discussion of effects characterized as adverse below Hells Canyon Dam. Applicant has summarized collected data without drawing conclusions based on effects of project operations. To clarify, applicant should provide the assessment of adverse effects based on impacts observed by consulting archaeologists.

Reservoir pool fluctuations and reservoir erosion are having adverse effects on archaeological sites. Other project related impacts that can have adverse effects include various recreation activities (eg., camp site preparation, poor sanitation behavior, driving off road, pedestrian trails, building fires, removing vegetation, digging), proliferation of non-native annual vegetation, and new development. Fully comprehending the array of impacts is important to develop effective monitoring protocols and physical and administrative measures for cultural resource protection.

p. E4-35: *"Based on the current state of knowledge about resources and their conditions, three sites on Oxbow Reservoir.....and nine sites on Hells Canyon Reservoir....would each be visited five times over the license period....."*

P. E.4-38: *"Based on the current state of knowledge about resources and their conditions, 22 sites on Brownlee Reservoir would each be visited five times over the license period, using a six year cycle....."*
Response: BLM recommends that Applicant should sponsor annual monitoring for the first three years. Then a systematic evaluation program could prioritize sites for further monitoring, evaluations, stabilization or protection measures, data recovery or historic research. In the fifth year, physical or administrative protection measures should be implemented, stabilization plans should be developed, data recovery should be implemented where it is essential.

E.4-5 "In addition, the Applicant agrees with the evaluation that site HC-17/35 BA 894 is ineligible because it lacks integrity."

Response: BLM does not believe that enough information has been provided about integrity to establish that the site is ineligible. When the site was originally recorded, road construction and dispersed recreation impacts were among the observed impacts. Since that time no additional road construction has occurred. Dispersed recreation and off-road vehicle travel and parking has continued, possibly affecting site visibility and/or integrity, as suspected. The site may be shallow, but the site record indicates this is "undetermined". Whether or not these impacts are superficial, or if there is any potential for cultural deposits, should be more firmly established. Until then, BLM will consider the site to be potentially eligible.

p. E.4-8: *Historical and Archaeological Sites Affected by Transmission Lines and Associated Service Roads*
Response: BLM does not agree with all eligibility evaluations made by the Applicant. Please see comments on the Transmission Line 903 study.

E.4.2.5.2.2 *Data Recovery at Four Archaeological Sites on Brownlee Reservoir*
Response: BLM agrees that IPCBD-97-03 is an eligible archaeological site being adversely impacted by project operations. Protection in place does not appear feasible, because the site is routinely inundated and within the draw down zone. Data recovery is probably the only feasible method of preserving its information value.

BLM agrees that IPCBD-075 is a potentially eligible site. However, additional historic research is needed because it is not clear from the site record whether or not this is a remnant of the Goodell wagon road, or if the road has sufficient integrity and visibility. If this is an emigrant road, the property would be eligible at the regional level of significance. In that case, BLM would recommend specific data collection measures to be followed by long term preservation measures and monitoring for condition changes.

BLM agrees that site IPCBD 0080, the Connor Ditch, is an eligible historic site as a component of the historic landscape of the Snake River canyon. It is significant at the local level. BLM would recommend specific data collection measures to be followed by monitoring for condition changes.

Adequacy of Analysis (Evaluations and Treatment)

With a few exceptions, BLM agrees with most of the Applicant's eligibility evaluations for Native American and Euro-American sites on BLM lands in the Hells Canyon Complex. In general, the program for monitoring, stabilization and protective measures, and data gathering are consistent with the intent and requirements of Section 106 of the of the National Historic Preservation Act and would mitigate observed and potential adverse effects of project-related operations.

Native American Graves Protection and Repatriation Act
A process for implementing the Native American Graves Protection and Repatriation Act is outlined in the draft CRMP (Appendix E.4-15, pages 59 and page 342).
Response: : According to the report, a protocol for discovery of human remains on state lands in Idaho has been developed and would be applied on state or private lands in Oregon as well (CRMP, page 59). Otherwise, on federal lands, the regulatory procedures of NAGPRA would apply. In places the CRMP appears to recognize this, but there is no clear statement in the CRMP that says the federal land manager is the responsible official for NAGPRA regulations. This is the type of ambiguity that could be cleared up in a revised CRMP, developed with agency participation and concurrence.

Appendix E4-15, page 342: Standard procedures for treatment and disposition of any human remains should include an action alternative for stabilization and preservation in place. More explicit guidance on securing the site, and not removing remains should be included. BLM recommends that Applicant should consider an interagency/Tribe in-house training program on this subject for Company employees.

Adequacy of CRMP Protocol
The proposed plan for protection of graves on private and state lands is appropriate. The Applicant's position is that reburial in the area of discovery is preferred. However, current BLM policy does not allow reburial on public lands, unless the lands are set aside for this purpose under other legal authorities. The BLM policy is at odds with Native American interests concerning reburial on or near the place of discovery. Given the mixed private/public ownership along the three reservoirs, it may be necessary for the Applicant to use its own lands to comply with these Tribe requests; or to facilitate tribe acquisition of property to meet this need. How the Applicant would operationalize reburial in the area of discovery is not discussed.

Whether or not the applicant intends to support costs of stabilization of burials on federal lands, or the cost of repatriation and reburial regardless of land jurisdiction is not addressed in the PM&Es.

Traditional Cultural Properties and Sacred Sites

E.4.2.2.4 *"Traditional Cultural Properties and Archival and Oral History Studies": One archival review and three oral history projects were conducted. Technical reports on the oral history projects are included from the Burns Paiute, Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation.*
Response: BLM considers the evaluation of potential effects to traditional cultural properties to be incomplete. One study underway with the Nez Perce Tribe has not been completed. Applicant has not stated whether or not traditional cultural properties as described in the Confederated Tribes of the Umatilla Indian Reservation technical report are eligible or potentially eligible for the National Register.

p. E.4-27: *"That being the case, the extensive archival study sponsored by the Applicant identified no traditional cultural properties in the project area that were eligible for inclusion on the National Register."*

Response: Applicant has correctly cited one conclusion drawn in Myers' archival study technical report, which did not identify any potential traditional cultural property and therefore did not assess eligibility. However, the author of the archival study recommended further investigations; and it appears that the technical reports contain information which may indicate potential traditional cultural properties (BLM comments on the Technical Report E.4-12). In Appendix E.4-G (p. E.4-143) Applicant suggests two sites may be eligible TCPs.

Adequacy of Analysis

The identification and evaluation studies are incomplete. Eligibility determinations have not been made for properties identified as traditional cultural properties in the respective tribe reports. The importance of protecting and enhance natural resources important to tribe heritage and subsistence are mentioned by Applicant, with specific reference to plants, but no specific PM&E enhancement measures or protection opportunities are identified. If this is due in part to confidentiality concerns, then BLM does not have sufficient information to determine if the issue of Traditional Cultural Properties and Sacred Sites has been adequately analyzed.

- Applicants' conclusions on the eligibility of traditional cultural properties is ambiguous, and leaves BLM wondering if any TCPs (as defined by National Register Bulletin 38) are present or eligible.
- Applicant should conduct additional studies, or consult with Tribes, to establish whether or not these are National Register-eligible traditional cultural properties.

Paleontological Resources

No studies or preliminary assessments were conducted.

Adequacy of Analysis:

Potential for paleontological resources in the project area is not assessed in the applicant's studies or submittal. A review of existing literature and geologic maps should provide enough information to characterize potential. Even if the potential is low; the Applicant should make a provision in its general management plan for paleontological discoveries or mitigation in the event that a locality may be impacted by project operations.

- BLM Manual 8270 provides guidance for managing and protecting paleontological resources on federally administered lands. Applicant management plan provisions should be consistent with the guidance in the BLM manual.

Heritage/Education

E.4.2.5.3 Enhancement Measures: *"The goal of each of the following Applicant-proposed measures is to enhance the current state of knowledge about Native Americans, as well as Euro-and-Asian-American settlers, in the Hells Canyon area."*
Response: BLM agrees that the development of interpretive sites on Oxbow, Hells Canyon, and Brownlee reservoirs would enhance public understanding of the history and current use of the Hells Canyon area and should facilitate heritage stewardship. If BLM lands or resources are involved or adjacent to the locations selected for interpretive site development, BLM would need to either participate and concur or be consulted regarding the development, the interpretive message, and the indirect effects of siting this type of development.

Adequacy of Analysis:

Applicant has proposed interpretive and educational efforts that are adequate and would be a significant improvement for heritage education in the three reservoirs area and in local communities. Applicant is sponsoring a small grants program for interpretation at local community museums.

- Although no specific locations for this interpretation are identified in the CRMP, interpretation of Euro-American history and a heritage protection message are needed at the Spring Recreation Site on BLM (a site which receives high levels of use. Applicant should fund development, and maintenance of interpretation at the Spring Recreation site, and this interpretation should be developed with BLM participation in order to be consistent with other BLM interpretive sites. .

Enforcement of Cultural Resource Laws and Regulations

E.4.2.5.1.3 Monitoring of Known Eligible Sites on Oxbow and Hells Canyon Reservoirs
E.4.2.5.1.4 Monitoring of Known Eligible Sites on Brownlee Reservoir

Appendix E4-15, page 56-57: *Protection Against Vandalism: "Vandalism of archaeological sites has been occurring for many years, and is an established practice among some groups in the region....On Company land in any state, the Company will consider disturbance of archaeological sites with or without human remains, by unauthorized persons, an act of trespass that could lead to prosecution.... On federal land, this individual must have a permit under ARPA."*

Appendix 4.3-a, page 345-346: *Actions include: "Prosecute trespass violations on Company land, and support prosecution of ARPA and/or NAGPRA violations on federal land."*
Response: Applicant appropriately describes the federal and state laws and regulations protecting archaeological properties and Native American burials from unauthorized actions; and CRMP appendices include full text copies of key laws and regulations. Applicant's company policy is highly commendable. BLM recommends that Applicant should involve BLM federal and Oregon state law enforcement personnel in the monitoring plan and its implementation. BLM recommends that support for additional law enforcement patrols during *peak use weekends would facilitate protection of cultural resources and discourage casual vandalism.*

Adequacy of Analysis
Although cooperation with law enforcement is mentioned, there is no specific PM&E identified for cost sharing the BLM and local law enforcement patrol and public contact needed to protect heritage resources - especially during high use periods.

In the CRMP list of legislated authorities for management of cultural resources, Applicant has omitted the Federal Land Policy and Management Act.

Heritage Enhancement and Land Acquisition

E.4.2.5.3.6 through E.4.5.3.10.1 *Native American Programs*
Response: In this Exhibit E.4, funding for Native American Programs is provided at a level of $1,000,000 for the 30 year term of the license, for each of the six tribal governments listed. However, in the Cultural Resource Management plan (Technical Report E.4-15), the same enhancement measure is depicted with very different funding levels - most notably, four tribal governments are funded for $1,000,000; while the Shoshone-Paiute and Shoshone-Bannock are funded for less at $502,500. This discrepancy between the Exhibit E.4 and Technical Report E.4-15 needs to be resolved.

Adequacy of Analysis:
In tandem with interpretive and educational efforts, Applicant is providing funds to facilitate Tribal heritage programs. There is a major discrepancy between the funds identified in the Exhibit E.4 report and the CRMP Technical Report E-4-15. It is not clear whether or not Applicant's expectation is that these funds would also support on- going consultation with Tribes on project initiated actions.

Acquisition of lands with important cultural resources (sites or habitats) are not identified as an enhancement measure. Potential opportunities to acquire upland cultural plant habitat and provide for its restoration, protection and enhancement are not considered among the PM&Es. No off-site measures to mitigate impacts are considered.

Tribal Treaties

No mention of treaties, treaty history or treaty rights is made in the cultural resources sections of the Draft License Application.

Recreation Key Issues

Past Use

(E.5-1, page 3) *"This reach extends from approximately 8 mi. downstream of the U.S. 30N bridge and west of the town of Weiser, Idaho, at the project boundary, designated by the Federal energy Regulatory Commission (FERC), downstream to the northern boundary of the Hells Canyon National Recreation Area (HCNRA)…."*
Response: This sentence defines the study area. BLM has consistently stated that the study area should extend beyond the HCNRA boundary to Captain John Creek. There are BLM lands within this reach that are affected by project operations. Impacts to these lands need to be addressed as well.

(E.5-1, page 8) *"Several special management areas also exist in the Hells Canyon area and are directly administered by the USFS."*
Response: The study did not list any BLM special management areas such as ACECs and WSAs. Both the Lower Salmon and Grande Ronde Rivers are designated ACECs at their mouths with the Snake River. There are BLM lands, which are designated wilderness within the Hells Canyon Wilderness. Designated WSAs include McGraw, Homestead, and Sheep Mountain along the reservoirs in Oregon.

(E.5-1, page 21) *"The lower portion of railroad track was removed in 1936. In 1959, Brownlee Reservoir inundated Robinette. Later, a road replaced portions of the railroad track."*
Response: This statement provides evidence that portions of the existing Snake River Road may have been constructed by IPC in order to mitigate affects of project development. The question now is, do on-going project operations continue to affect the Snake River Road? Do reservoir fluctuations increase maintenance? Does recreation traffic using the road to access the reservoirs increase maintenance? If so, does IPC have a percentage of responsibility for that project impact?

(E.5-1, page 40) *"The 1995 Vessel Waste Disposal Plan prepared by Oregon State Marine Board identified the need for…. floating restrooms at Powder River and South Reservoir."*
Response: BLM agrees. These floating restrooms may still be needed, especially on the Powder River arm of Brownlee Reservoir. No study addressed this issue.

(E.5-1, page 45) *"While anglers expended 15,955 angler days in the study area, other recreational use was estimated to be 25,927 recreational-user days. Activities included swimming, boating, water-skiing, camping, hunting, picnicking, and sightseeing."*
Response: This is from a 1971, IDFG study. It is interesting that IDFG recognized almost twice the amount of non-angler use than angler. The IPC studies indicate that almost 100% of the use is angling with negligible other activities. How could these two studies be so different?

Adequacy of Analysis of Past Recreation Use

BLM's identified issues did not include anything regarding past use. However, this collection of available information is useful as background information.

Critique of the Applicant's Conclusions for Past Recreation Use
"Recreational use of the HCRA has been documented by state and federal agencies and IPC over the last 50 years. The majority of the information reported has been limited to qualitative review. Information collected in this literature review will help IPC and appropriate agencies avoid duplication of study efforts; provide background information to entities involved in the relicensing process for the development of protection, mitigation, and enhancement measures; and provide background information for all other recreation studies in the HCRA."

Response: This quote is the entire conclusion to this study. It met its intended purpose. It does not address affects of project operations and therefore does not drive development of mitigation measures.

Current Recreation Use – Reservoirs

(E.5-2, page 32) *"…For 2000 we added 22 recreational-use areas to sampling maps as distinct areas…"*

Response: The data collections were changed each of the six years that were sampled. Granted, they were refined and improved but the result is that only during 2000 was a complete sample collected. It begs the question, "Would the data be different if all six years had been treated the same?"

(E.5-2, page 33) *"To arrive at estimated hours of recreation use, we used methodologies suggested by Malvestuto et al. (1978), Malvestuto (1983), and Hoenig it al. (1993)."*

Response: It is unfortunate that IPC used the quantifier "hours of use." All government agencies report use in visits and visitor days. There is no direct conversion from hours of use to visits. In general, it appears the use numbers are low because the sampling occurred during a cycle of low use years.

(E.5-2, page 34) *"An understanding of two major issues related to recent changes in recreational use in the HCC is necessary to fully comprehend the results of this report. First, fluctuation patterns at Brownlee Reservoir changed dramatically in the years immediately preceding the study period… Second, the crappie fishery experienced a substantial reduction in quality immediately prior to and during the early years of the study period. After 1992, additional releases from Brownlee Reservoir and their subsequent drawdowns were instituted in cooperation with federal authorities attempting to improve downstream conditions for migrating*

endangered salmon. These measures include a drawdown normally instituted immediately after July 4 and lasting until the end of August… Usually, the reservoir does not refill before the process of creating reservoir capacity begins to provide a constant flow of water for salmon spawning downstream."

Response: "Biological Opinion, Reinitiation of Consultation on1994-1998 Operation of the Federal Columbia River Power System and Juvenile Transportation Program in 1995 and Future Years", National Marine Fisheries Service, Northwest Region, March 2, 1995 requires specific water management scenarios for flow augmentation. David Diamond, DOI - Office of Policy Analysis, stated, "NOAA Fisheries requests a drawdown to 2059' elevation in August. The fall drawdown has exceeded that requirement every year since 1997. That is fully the choice of IPC." Since the flow augmentation drawdown has such a significant impact on recreation, the study should clearly delineate between NOAA Fisheries requests and other reservoir management needs. BLM expects IPC to meet the needs of NOAA Fisheries and ACOE but not exceed them.

(E.5-2, page 35) *"This period of phenomenal crappie angling was probably caused by the series of drought years that allowed juvenile crappie to accumulate in the system, rather than being flushed out by high flows…. The study efforts described in this report begin with 1994, when the "crappiethon" was already over."*

Response: Is this is a statement of a fact or theory? The words "probably caused" leave room for doubt. How does it correlate with the data that indicates 1981-1983 where high-flow years and the crappie population was also at a peak? To substantiate this statement, the study needs to review a wider time frame. Many people find a correlation with the drop in crappie population in 1994 with reservoir fluctuations. Is it only coincidental that the late season drawdowns occurred from 1994 to 2001 and the crappie population was very good pre and post those drawdowns irrespective of flow year? IPC needs to study this phenomenon and reveal the results.

(E.5-2, page 38) *"Warm-season park use by activity generally decreased during the study period. The one notable exception was picnicking, which increased… 159% of the 1994 totals."*

Response: The unwritten statement here is that the study focused almost exclusively on angling and how crappie populations drive use figures. The study bias did not adequately consider non-angling uses. This is the only statement that even mentions picnicking. What is the reason for the 159% phenomenon? Would there be more use in non-angling activities, such as water skiing and swimming if water quality was improved and facilities were provided that were designed for their use? The study results do not provide meaningful data to drive PM&Es outside of angling needs.

(E.5-2, page 43) *"This subzone [Hells Canyon Reservoir] is the only area in the HCC where personal watercraft and water skis are consistently used, although neither activity contributed more than 5% of the total during any year."*

Response: This data may reflect the built in bias of the study that targets activities that are long term and stationary. Water sports may also prove to be an under utilized opportunity at this time. Water sport use may increase dramatically as reservoirs closer to population centers become more crowded. Hells Canyon and Oxbow Reservoirs may become "discovered" within the life of the new license.

(E5-2, page 45) *"The Oxbow Bypass is not very conducive to boat angling. Although it lacks attractive areas for camping, the subzone regularly hosts some camping activity. It does offer high-quality and easily accessible bank angling."*

Response: This used to be very true. However, due to security policies post Sept. 11th, this area has been blocked off at the powerhouse. Vehicle access is not possible. Anglers can walk into the site, but it requires a hike of almost one mile. All use figures displayed in this study are no longer valid. IPC should provide updated data in their FLA.

(E5-2, page 61) *"Brownlee Reservoir, however, experienced dramatic changes in use that appear to have been caused by both the reduction in crappie angling success and the implementation of severe drawdowns during the peak use season…. Overall warm-season recreational use in the HCC was down 48% between 1994 and 1998."*

Response: BLM agrees with the finding, but it does not identify the project operation effects that have caused the reduction in use. Were the severe drawdowns in response to ACOE and NOAA Fisheries requirements only? The drawdowns of Brownlee Reservoir to depths and times beyond what ACOE and NOAA Fisheries required would constitute project impacts. If IPC drafted the reservoirs beyond requirements and therefore caused these impacts, what are their license responsibilities to mitigate the impacts to the public for the detrimental consequences caused to the recreation resource? It would also be interesting to have the percentage drop in use from 1989 to 1998 displayed. Changes in use within the study period are minimal when compared to the changes from the "crappiethon" period to the low of 1998.

(E.5-1, pages 29 & 30) *"Idaho is predicted to grow at a rate twice that of the rest of the country. The state's expected rate of population growth through 2025 could be the sixth largest in the nation. Oregon and Washington show similar growth trends." "During the 1980s, recreation visitation in the HCNRA dramatically increased, rising from 1979 through 1991 by more than 147%."*

Response: With this kind of growth, IPC's commitment to public recreation and "no growth" approach may not be realistic. The proposed "Adaptive Management Plan" is essential to implement and monitor the changes over time.

(E.5-2, page 58) *"Although hunting contributes only a small proportion of the total, this zone is the only one of the six that receives consistent hunting use, mostly for waterfowl."*

Response: This seems to be an inaccurate statement. The Snake River area is nationally recognized as an upland game bird hunting area. Chukar hunting attracts thousands of visitors

annually to all three reservoirs. Other upland game birds, deer, and to a lesser degree elk, antelope, and bighorn sheep hunting also contribute to visitation on both sides of the river. There appears to be an inconsistency between this finding and ODFW and IDFG data.

(E.5-4, page 17) *"The sampling strategy involved "roving" interviews, so the final sample probably has both "length-of-stay" and "group size" biases."*
Response: BLM agrees. This bias appears to create numbers that do not always coincide with personal and professional observations.

(E.5-4, page 22) *"Brownlee Reservoir had the most diverse visitors. Over the years, about 4% were Black, 4% were Latino, and 2% were Asian."*
Response: If the study had extended into 2001 and 2002, it may have found a much higher percentage of Black and Asian peoples. When crappie fishing is good, Brownlee receives much more fishing pressure from ethnic populations.

(E.5-4, page 26) *"Sampling may suggest high percentages for some sites because they are primary sites in areas with only a few dispersed sites (allowing interviewers to reach more users), while other sites are more dispersed and interviewers have to cover more ground to reach them in a set sample period."*
Response: BLM agrees. This is one of the sampling techniques that may cause less than accurate data.

(E.5-4, page 27) *"Several facilities were reportedly visited by ¼ to 1/3 of Hells Canyon users… The most-visited facilities were Hells Canyon Park, the visitor station below the dam, and Copperfield Boat Launch…. About 4 in 10 reported visiting dispersed areas along the reservoir."*

Response: Virtually all visitors to Hells Canyon Reservoir stop at at least one dispersed site during their visit to the area. Almost all visitors are in the area to specifically visit one site or another, or at least stop and look around while they are driving for pleasure. Both the Oregon and Idaho access roads dead end. Therefore, it seems inaccurate to estimate that only 40% of all visitors to HC Reservoir visit a dispersed site. It is possible respondents to the survey did not interpret the question to mean a visit of short duration. Maybe they interpreted it to mean only where they spent the night.

(E5-4, page 28) *"Readers are cautioned from over generalizing from these results, which are probably influenced by a "length-of-stay" bias due to sampling. With any "roving-based" sample, people who stay longer at a resource are more likely to be interviewed. Accordingly, our sample probably overestimates overnight and long-term users and underestimates day and short-term users…. Most visitors to the HCC reservoirs stayed overnight (over 75% in this sample)."*

Response: BLM agrees that caution is warranted. This bias seriously underestimates the visitors that are "on the move," such as pleasure drivers, hunters, picnickers, and sightseers. In our fast paced society, many of the visitors to the HCC are making a quick visit on their way to another

destination. They have a time schedule that does not allow staying in any one place for an extended period of time. BLM questions the finding that 75% of all visitors to the area stayed overnight.

(E.5-4, page 29) *"There are fewer primitive site campers who used to be campground users than campground users who used to use primitive areas. In general, this finding suggests that in the future there may be a moderate increase in demand for more developed facilities in comparison to dispersed camping."*

Response: This makes sense when considering our aging society. As the median age of recreators goes up, there is more demand for amenities. The study did not use this type of finding to drive an appropriate mitigation measure.

(E.5-4, page 32) *"Very small percentages (usually less than 5%) report any other single activity among their primary activities. This includes swimming, boating for pleasure, picnicking, hiking, hunting, playing sports, or riding ATVs."*

Response: As stated above, there is a sampling bias that would miss these types of users. The study was not designed to pick up anyone driving for pleasure, hunting, or any other land based activity. Plus, how would a person answer the question if they were there for one person to fish while the second person was riding their ATV? What is their primary activity, and which one is more likely to be interviewed?

(E.5-4, page 34) *"In more recent years, with fishing success apparently lower than historical highs of the early 1990s, the proportion of visitors focused on non-fishing activities may be growing slightly (and the proportion engaged in fishing may be declining)."*

Response: BLM agrees. This is an important finding. It may suggest current management practices are no longer appropriate. The proposed "Adaptive Management Plan" is essential to monitor changes over time and identify funding responsibilities for implementation.

(E.5-4, page 35) *"…about 7 of 10 angling comments were negative (e.g., "fishing was poor")."*

Response: Of course. This statistic would be different if survey was conducted during a different set of years.

(E.5-4, page 36) *"The vast majority of general comments were positive…. Results suggest that many users had a satisfactory experience, a consistent finding from surveys of recreation users (who chose to go to locations and do activities that they enjoy)."*

Response: This means that people who choose to recreate at these reservoirs are satisfied. What it does not explore is – why do others choose NOT to recreate here? How many people have recreated on the reservoirs once or in the past but have chosen to not return? What was there about their experience that was not satisfactory?

(E.5-4, page 58) *"Several potential conflict interactions were reported by 1/3 to nearly ½ of all users, including people camping too close, large groups, jet skiers, repeated encounters with the same group, and loud or rowdy people…. Relatively fewer visitors encountered swimmers at boat launches, people with or who use firearms, or people taking items from campsites. However, in the case of the latter two encounter types, one could argue that percentages should be near zero, so these percentages seem quite high."*

Response: BLM agrees with these findings. However, the proposed PM&E in the draft application falls short of the expressed need. IPC has offered to provide a "forum" for law enforcement coordination and continuance of the current support of Adams County officers. When nearly one-half of all users experience conflict, there is an expressed need for an increase in law enforcement presence. The study does not address project operation impacts that establish IPC's level of responsibility for funding law enforcement needs.

(E.5-4, page 65) *"… reservoir users are primarily focused on fishing and camping/relaxing in a natural place, although small but significant proportions also pursue other activities such as wildlife viewing, water-skiing, hiking, hunting, or swimming."*

Response: BLM does not agree with this finding. Fishing and camping are the primary focus but it appears the study reflects a sampling bias that under represents the number of visitors that are focused on other pursuits. Wildlife viewing and hunting are especially subject to this bias.

(E.5-4, page 66) *"Future survey work should present visitors with a list of potential key issues and have them rate their importance. Standardized responses would allow more focused analysis that could better assess the relative importance of an issue to all users and help establish when conditions have become unacceptable."*

Response: BLM agrees with this conclusion. The proposed PM&E for Adaptive Management should incorporate this need.

(E.5-6, page 30) *"Based on these results, reservoir level has a consistent but small effect on use level. However, the models are based on data from 1994 or later and thus do not consider the much higher use levels that apparently existed on the reservoir during the exceptional crappie years in the late 1980s and early 1990s. The data used in this analysis also do not compare use levels prior to the warm-season reservoir drawdowns that started in 1993. People who have been displaced (those who stopped coming and have not been back) by reservoir level impacts prior to 1993 simply are not considered in these models."*

Response: BLM strongly disagrees with the finding that reservoir levels have a "small effect" on use level. For the reasons given within this paragraph, it seems the model information is not accurate. This paragraph does accurately reflect the inappropriateness expressed by not having pre-1993 data nor displaced user input.

(E.5-6, page 32) *"However, 2000 was a year that reservoir levels did not have to be lowered significantly for flood control in late spring…. The 2000 sample did not see or rate levels lower than about 44 feet below full pool."*

Response: BLM agrees. The sample period was small, and not reflective of the problems faced by visitors from 1992 to 1999.

(E.5-6, page 33) *"There were differences in evaluations for the on-site and mail surveys, with mail responses consistently showing more acceptable ratings and no substantial declining trend after the 0 to 10 feet category. Most significantly, users that saw reservoir levels 40 feet or more below full pool rated them as unacceptable on the on-site survey but marginally acceptable on the mail survey."*

Response: This is an interesting finding. It is difficult to believe that there was "no substantial declining trend" beyond a 10-foot draw or that anyone could feel that a draw over 40 feet was acceptable. The mail survey respondents appear to be an anomaly.

(E.5-6, page 34) *"… Reservoir levels are best within 5 to 10 feet of full pool, particularly on the upper reservoir, but levels from 0 to 30 feet below full pool are acceptable to most users. Levels are marginal around 30 to 40 feet below full pool, and levels below 40 feet are clearly unacceptable."*

Response: BLM agrees with this finding. It would be in line with our anecdotal evidence. It appears to contradict the previous statement, especially when compared to mail survey respondents. The bottom line of this study is that there is a stratification of user satisfaction directly associated with reservoir level.

(E.5-6, page 52) *"Based on an analysis of use and reservoir levels, reservoir levels do not "drive" use levels at the HCC reservoirs…. Many people still visit when time is available and weather and or fishing are generally better."*

Response: BLM disagrees. All campground receipts, professional knowledge and personal observations would refute this finding. Prior to the warm-season drawdowns begun in 1992, use levels were much higher than current. The question is: Are visitors staying away because of the low reservoir levels or because the fishing quality has gone done? Are these two directly related or just coincidental? The fact is that use has gone down dramatically and the above finding would indicate that visitors do not come when the reservoir is below 40 feet.

(E.5-6, page 54) *"When faced with less than acceptable reservoir levels or fluctuations, current HCC visitors generally respond passively: they tolerate or ignore the situation rather than becoming frustrated or dissatisfied or leaving the area."*

Response: BLM disagrees. As stated above, this just does not make sense. The drop in visitation, formation of Friends of Brownlee, and the active role Baker County has taken regarding Brownlee Reservoir levels, does not suggest a passive response.

(E.5-6, page 36) *"…about two-thirds of the mail sample did not specify minimum or ideal levels on the vertical scale, and these users might be more tolerant of lower levels. On the other hand, the sample does not provide information from users who did not visit the reservoir in 2000, including those who might have been displaced by unacceptable levels. These users are probably less tolerant of lower draw downs."*

Response: BLM does not agree with the assumption that two-thirds of the respondents did not answer the question because they are tolerant. There are many other possible reasons. The fact that the survey did not include data from displaced users indicates a study bias.

(E.5-6, page 33) *"Upper Brownlee users always rate reservoir levels less acceptable than Lower Brownlee users. As noted above, level changes have more dramatic effects in Upper Brownlee (… or at Hewitt/Holcomb Parks, Steck Park, Spring Recreation Site, Farewell Bend, or the Oasis area)."*

Response: Every one of the above mentioned sites are non-IPC developed sites. The proposed mitigation measures do not address this project impact.

(E.5-10, page 57) *"Both estimates of hours of effort are probably fairly accurate; the main difference in results between the two years is that the 1989 effort resulted in an estimated warm-season crappie catch of 1,937,513; our 1994 effort resulted in an estimated warm-season crappie catch of 684,481."*

Response: In other words, '89 and '94 received about the same amount of fishing pressure but more than twice the crappie were caught in '89. I am surprised that the two years received nearly the same amount of fishing. Observations and campground receipts would indicate many more people were in the area in '89. This inconsistency may indicate a study bias and/or inaccuracy.

(E.5-10, page 58) *"While the percentage of anglers targeting catfish increased considerably from the 1989 survey, this increase is probably the result of large decreases in the number of anglers targeting crappie and the number of anglers changing target species."*

Response: BLM agrees. Prior to the study period, crappie were the primary target fish. When the crappie population disappeared, the relatively few remaining anglers turned their attention to other species, primarily catfish. Again, this may not be a representative time period from which to draw conclusions. Through the life of the license fish populations are due to vary. Therefore, do the changes in target species drive a need for varying facilities? Do different user groups have different needs and wants? IPC should answer these questions.

(E.5-10, page 54) *"Although many types of recreation occur in the HCC reservoir areas, all of them important to those who participate, angling attracts more recreationists than any other activity…. Many changes in angling success occurred in the HCC during the study period. These changes influenced how many and what type of anglers came to the area"*

Response: BLM agrees. The tie to this conclusion is that land managers need to provide facilities that meet the needs of anglers that change over time. How many anglers, and what type of anglers, drive what facilities are required. The proposed Adaptive Management Plan is essential to implement and monitor the changes over time.

Adequacy of Analysis of Current Recreation Use

Identified BLM Issues –

- What are the effects of water fluctuations on fishing?
- What recreation conflicts exist between users and what fixes are needed?

The Applicant partially addressed the issue of the effects of fluctuations on the crappie population and the correlated drop in overall use figures. The assertion is that 1) crappie populations can be protected if they are not de-watered during the spawning period, and 2) survival of the fry is dependent on the flow year not being so high as to wash the fry downstream (entrainment). This may be true, but there are lingering questions that require further investigation. No studies were conducted to determine the rate of entrainment. Other factors could be limiting crappie production in Brownlee Reservoir.

The second issue regarding conflicts between users found that one-third to one-half of all users reported conflict. However, this finding did not drive an appropriate mitigation measure. Law enforcement needs have not been mitigated.

Critique of the Applicant's Conclusions for Current Recreation Use

- Use and demand information on an annual basis.
  Applicant's Response: The Applicant proposes an "Adaptive Management Plan" that will include a schedule of continuing data and survey collections.

- Trends and user attitudes on a ten-year basis.
  Applicant's Response: See comments above.

Reservoir Level Issues

(E.5-6, page 24) *"…20% of Brownlee visitors considered levels to be a major factor, and an additional 21% reported that levels were one factor. For this reservoir, about 4 in 10 visitors appear "level sensitive."*

Response: Since the survey data did not begin until 1994, it is possible that a large percentage of the visitors that were sensitive to levels no longer return to the area. 4 in 10 is a very conservative estimate of those that are "level sensitive." It is important to note that those who no longer come because levels are judged unacceptable were not in this sample.

(E.5-6, page 31) *"Based on level data from 1994 through September 2001, reservoir levels were within 30 feet of full pool about 74% of the days and within 40 feet about 86% of the days.*

Therefore, several ramps were unusable only about 15 to 25% of the days. However, the timing of those lower reservoir levels exacerbates this problem. In general, flood control and salmon flushes require Brownlee to be drawn down in April and May and then again in mid-July through October. These are prime parts of the reservoir recreation season, so these levels displace users from some ramps."

Response: It appears the percentages calculated above were based on a full 365 day year. The percentage of days during the primary use season (April 1- October 31, 214 days) would give a more accurate reflection of user impact. In other words, the ramps would be unusable for a higher percentage of the peak use season.

(E.5-6, page 45) *"1994 was a dry year and did not require a significant spring draw down until mid-May (which never went lower than 20 feet below full pool)."*

Response: ACOE requirements for 1994 were a draw of 7.1' by March 1st.

(E.5-6, page 45) *"2000 was an average year and did not require a large draw down from March through May (reaching a low of about 30 feet below full pool in late April)."*

Response: ACOE requirements for 2000 were a draw of: 20,3' by Feb. 29th, 18.9' by Mar 31st, and 15.7' by April 30th.

(E.5-6, page 45) *"1999 was a medium-wet year, so there was a significant draw down to accommodate the spring runoff (with a floor at about 87 feet below full pool for nearly a month from mid-April to mid-May).*

Response: ACOE requirements for 1999 were a draw of: 32.5' by Feb. 28th, 42.4' by Mar. 31st, and 52.8' by April 30th. It appears that in several of the study years, the actual drawdown was greater than that required for flood control by the ACOE. ACOE requirements do not extend beyond April 30th at which time the reservoir should begin refilling. The Technical Reports should explain the discrepancy between the actual reservoir elevations and requirements of the ACOE and NOAA Fisheries.

(E5-6, page 45) *1994 - "The salmon flush beginning in midsummer was also small relative to inflows, with reservoir levels never reaching more than about 20 feet below full pool." 1997 – "… it stayed full until early August, when salmon flush releases began exceeding inflows. These releases dropped reservoir levels to about 20 feet below full pool by mid-September, when spawning releases were set. This level led to additional draw downs through mid-October, eventually reaching a floor of about 90 feet below full pool." 1999 – "Salmon flush flows dropped the reservoir substantially in July to about 25 feet below full pool, when power demand, salmon spawning needs, and lower inflows led to an additional steady drawdown through October, reaching a low of about 50 feet below full pool." 2000 – "At this point, salmon flush releases caused the reservoir to drop steadily to about 30 feet below full pool in early August. From August through October, reservoir levels varied from about 25 to 40 feet below full pool…"*

Response: BLM disagrees that salmon flushes are the sole cause of these later drawdowns. The 1995 NOAA Fisheries Biological Opinion requests a draw down to 2059' elevation (18' below full pool) in August. The fall drawdown has exceeded that requirement every year since 1997. The recreating public would be quite satisfied with an 18' drawdown. It appears actual elevations in 1997-1999 were much lower than required for flood control and/or salmon recovery. These drawdowns were at the discretion of IPC.

(E5-6, page 47) *"Brownlee Reservoir is also drafted in July and August to provide salmon flush flows in the lower Snake River. The amount of draw down depends upon the water year and inflow levels (see Parkinson, 2002 for details)."*

Response: Parkinson's model does not appear to take the salmon flush into consideration. It seems to simulate operations in 2001 and 2002 when IPC did not participate in the flow augmentation program.

(E.5-6, page 48)*Proposed Operations Regime – "The drawdown for flood control in the spring will be* ***larger*** *than the draw down for salmon restoration in the summer and early fall in all years."*

Response: How can this be stated? The ACOE has the authority to set the flood control needs. This could change annually, as it currently does. NOAA Fisheries' biological opinion request is already much lower than the ACOE requirement in most years. In Parkinson's "Hells Canyon Complex Operations Modeling" it states on pg. 12; "After the Fourth of July holiday, the model again drafts the reservoir beginning July 5 each year to simulate IPC customers' power needs during the summer months… actual reservoir elevations by August 31 are a function of IPC's system or load needs and water conditions." If so, it should be stated clearly and not "blamed" on flood control and salmon.

(E.5-6, page 52) *"Increased information about current or planned Brownlee levels, however, is still likely to be supported by considerable numbers of Brownlee users."*

Response: BLM agrees that Brownlee visitors would like improved information regarding reservoir levels. However, this study did not address the fact that many users do not have access to a computer and many do not speak English as their first language. Creativity is needed to respond to this need. No proposed mitigation measure addresses this issue yet. IPC should do so.

(E.5-6, page 53) *"On-site evaluations of Brownlee reservoir levels suggest that the highest quality conditions are from 5 to 10 feet of full pool. Drawdowns from 10 to 20 feet still provide good quality, but conditions decline below that. At about 25 feet below full pool, about half of Brownlee users report that levels are too low, and by 35 feet below, most report that levels are too low to visit."*

Response: This is a direct contradiction with the previous finding, but BLM agrees that users would find the higher levels more acceptable.

(E.5-1, page 14) *"From 1995 through the summer of 2000, IPC participated in the program and drafted specified amounts of reservoir water between July 4 and early fall. The amount and timing of these drafts were planned to balance environmental, recreation, and power generation needs."*

Response: Why did the post-July 4 drawdowns begin in 1992 when NOAA Fisheries did not initiate their Biological Opinion until 1995? Why were the drawdowns much more than the 18-feet that NOAA Fisheries requested? In 1997 the spring drawdown was 101-feet as required by ACOE for flood control but why was there an additional 70-foot drawdown after July 4th?

(E5-2, page 26) *"…and between 1995 and 2001, the cooperative arrangement that IPC had with federal interests in implementing portions of the Federal Columbia River Power System (FCRPS) biological opinion flow augmentation, which is intended to avoid jeopardy of the FCRPS operation below the HCC." Pg. 27 - "…IPC cooperated with the BOR and other federal interests in these flow augmentation efforts by shaping (or pre-releasing) water from Brownlee Reservoir (and later refilling the drafted reservoir space with water released by the BOR from the upper Snake River reservoirs) and by occasionally contributing water to flow augmentation efforts…. The agreement reimbursed IPC for any energy losses…. The agreement expired in April 2001 and has not been renewed by BPA."*

Response: Since the agreement expired in April, there was no midsummer drawdown in 2001 or 2002. Recreation use and crappie populations immediately responded with higher numbers in 2001, and another significant increase in 2002. Neither of these years, or similar years (1988-1992) where used in the study.

(E.5-2, page 26) *"After flood-control requirements have been met in early summer, the reservoir is refilled to meet peak summer electricity demands and provide suitable habitat for spawning bass and crappie. The full reservoir also offers optimal recreational opportunities through the Fourth of July holiday."*

Response: Early summer to July 4 is a very short "optimal opportunity" time period.

(E.5-2, page 35) *"…while during 1995 [medium flow year], the reservoir was full for four to five weeks and dropped 40 feet during the rest of the warm season."*

Response: The ACOE required a 42.5-foot drop until May 1st. NOAA Fisheries requested an 18-foot drop in August. Most of May, June, and July should have been filling or near full pool, and at a recreationally acceptable level of less than 20-foot drop the remainder of the warm season.

(E.5-2, page 35) *1986 and 1997 were high flow years. "During 1986, the spring drawdown was about 40 feet, while the drawdown during the same period in 1997 was **100 feet**. In 1986, the reservoir stayed within 10 feet of full pool during the remainder of the warm season, but during 1997, the reservoir **stayed full for about three weeks** of the warm season and then dropped about 70 feet."*

Response: 1986 and 1997 were both high flow years, however the management of Brownlee was vastly different. The ACOE did require a 101' draw in spring '97 and NOAA Fisheries requested an 18-foot drop in August. But why was the reservoir full for only three weeks and then dropped seventy feet? Why was the reservoir level so very different between the two years? From 1995 to 2000 the average draw down in August was 28 feet, not 18.

IPC has cited the ACOE and NOAA Fisheries as being the sole reason the reservoir is drawn down. In The Oregonian, dated 10/22/99, it states, "Craig Jones, spokesman for Idaho Power Co., said the primary reason for the drawdowns has been to provide flows for spring, fall and summer Chinook salmon and for steelhead trout." There are approximately 20 newspaper articles that quote or imply that the post flood control drawdowns are all due to NOAA Fisheries requirements. In fact the Baker City Herald, dated 10/21/99 states, "James explained that the five turbines in the dam produce peak power when the reservoir is full. "I'm a power guy," he said. "What I'd like to see is a full reservoir."

This study does not make a clear distinction between drawdown levels that are outside the control of IPC, and what levels are at the discretion of IPC. This should be done in the FLA.

(E.5-4, page 35) *"On Brownlee Reservoir, where 21% of all comments were about water levels, the ratio of negative to positive comments was 20 to 1."*

Response: This should not surprise anyone. Fluctuations on Brownlee are the single most impact from project operations on the recreating public. In fact, the only reason Friends of Brownlee was formed was to create a unified voice that might influence the fluctuations.

(E.5-4, page 64) *"Results suggest two primary reasons why visitors might not return: reservoir level fluctuations and long travel distances. Of these two, only the water level issue is directly affected by management or operations."*

Response: BLM agrees with this finding. However, neither this study nor the "Reservoir Level Issues" Study addressed the question of what opportunities are there to reduce the water level fluctuations on the recreation resource.

(E.5-10, page 57) *"Results from the creel survey conducted by IDFG and ODFW in 1989 …indicate that the catch of crappie during that year was much higher than any catch we recorded during our study years…. This period of phenomenal crappie angling was* ***probably caused*** *by a series of drought years that allowed juvenile crappie to accumulate in the system instead of being flushed out by high flows (Richter 2001)."*

Response: BLM feels more information is needed to draw a conclusion. Was it purely coincidental that in 2001 and 2002 when IPC did not participate in the flow augmentation program, that the crappie population immediately skyrocketed again? The aquatics studies find that reservoir fluctuations affect spawning survival but flow year determine the survival of fry. High flow years result in poor crappie survival. The warmwater fish plan prescribes to maintain water levels in the reservoirs during the nesting period to ensure spawning success. Does the plan address the question: If the reservoir is down when the crappie spawn and the reservoir refills covering the eggs with many feet of cold water, are their impacts on crappie survival?

Why is it that the late season drawdowns occurred from 1994 to 2000 and the crappie population was very good pre and post those drawdown years exactly? IPC needs to explain this phenomenon.

(E.5-10, page 57) *"The study efforts described in this report began in 1994 when the "crappiethon" was over. A few large crappie were still being caught but not nearly the number seen in previous years."*

Response: BLM agrees, but this is the crux of the problem with all of the recreation studies. The data was not collected during a representative period over the life of the license. Conclusions are based on a low use cycle. Conclusions that would drive appropriate mitigation measures should be drawn from a cycle that would reflect an average to high use period.

Adequacy of Analysis of Reservoir Level Issues

Identified BLM Issue –

- What are the effects of water fluctuations on recreation site management?

The Technical Reports adequately analyzed the effects of water levels on the recreation resource. There are very few conclusions drawn in this report. It is a summarization of data.

Critique of the Applicant's Conclusions for Reservoir Level Issues

- Develop a reservoir management strategy to minimize reservoir water level impacts on recreation and boat launch sites.
  Applicant's Response*: The applicant contends that drawdowns of Brownlee Reservoir are subject to outside controls and that they prefer a full pool whenever possible. Data indicates that there are discrepancies regarding ACOE and NOAA Fisheries requirements over the last decade and actual drawdowns. The applicant has proposed mitigation measures that address some improvement of launch sites.*

- Determine a reservoir management strategy that compromises the needs of recreationists and other resource needs. Establish a drawdown limit and timing that satisfies a majority of recreation interests.
  Applicant's Response*: See comments above. The Applicant's warmwater fish plan may provide optimum spawning conditions for warmwater fish. The fall Chinook plan and the warmwater fish plan appear to be compatible*

- Manage reservoir water levels and drawdown to encourage crappie reproduction if this is compatible with ESA listed species recovery.
  Applicant's Response*: See comments above.*

- Pursue elimination of spring flood control drawdown.
  Applicant's Response*: The Applicant did not address the issue of modifying the spring flood control drawdown.*

- Reservoir habitat for warmwater game fish species should be optimized to provide a sport fishery of the magnitude that existed prior to 1995 if it is determined that this is not likely to adversely affect ESA listed species or other native species.
  Applicant's Response*: See comments above. The Applicant has implemented plans to improve bull trout and fall Chinook survival. The Applicant proposes to implement a warmwater fish plan to ensure small mouth bass and crappies spp. nesting success that will be compatible with plans for ESA listed species.*

- Manage reservoir water levels and drawdown to minimize navigation hazards. Improve boating safety information and awareness.
  Applicant's Response*: The Applicant did not address the issue of boating hazards. The proposed Information and Education (I&E) Plan may improve boating information and awareness.*

Developed Sites

Response: BLM agrees with this finding and the proposed mitigation measures substantially
(E.5-2, page 16) *"All four IPC parks have full-time, on-site maintenance personnel."*
Response: No BLM facility can boast this kind of public service. IPC may have a greater responsibility to fund operations and maintenance at non-IPC facilities. The study did not analyze project impacts and appropriate share of responsibility.

(E.5-4, page 38) *"Hewitt/Holcomb parks and Spring Recreation Site may have greater upkeep criticism than one might expect given their use levels."*

Response: BLM agrees with this finding. Spring Rec Site is not adequately maintained. Ongoing operations and maintenance costs are beyond the capacity of BLM budgets to keep up with needs and expectations. Many strategies are being implemented to change this situation. IPC may have a greater responsibility to fund operations and maintenance at non-IPC facilities. The study did not analyze project impacts and appropriate share of responsibility.

(E.5-4, page 46) *"The two facility types with the greatest development interest among respondents are a boat-in gas station and marina and fish cleaning stations…. Other facility types where substantial percentages report interest in increased development include places to buy food and supplies, docks, primitive camping areas, showers, day-use parking, restrooms, developed campgrounds, swimming areas, and biking/ORV trails."*

Response: BLM agrees with all of these findings. However, the study does not address project operation impacts that establish IPC's level of responsibility for funding for these facilities. Many of the proposed mitigation measures in the Draft Application address these findings, but there is not a clear link between the study conclusions and a responding mitigation measure, nor does it establish percentages of responsibility.

(E.5-4, page 47)*Developed Area Attribute Importance [i.e., Spring Rec and Steck]. "The four attributes that rated as most important were being close to fishing, having shade trees, having a boat launching facility available, and being close to the reservoir."*

respond to the need at Spring Recreation Site but nothing addresses needs at Steck Park.

(E.5-4, page 62) *"Most of the developed parks and facilities received relatively high ratings (typically 4.0 or higher), while dispersed areas generally received lower ratings (typically 3.5 to 3.6). …several Brownlee Reservoir developed areas (Spring Recreation Site, Hewitt/Holcomb parks, Steck Park, and the Oasis sites) received ratings around 3.5 to 3.6, ratings that were comparable to dispersed areas rather than other parks in the HCC."*

Response: BLM agrees with this finding. Each of these sites does not receive adequate maintenance. IPCs proposed mitigation measure addresses capital improvements only for Spring Recreation Site. It is silent regarding needs at Steck and Oasis. The study does not address project operation impacts that establish IPC's level of responsibility for funding on-going operation and maintenance of non-IPC recreation sites adjacent to the reservoirs.

(E.5-4, page 68) *"Among the more interesting development criticisms, "camping too close to others" may reflect poor campground design and screening and may be a focus for future improvements."*

Response: BLM agrees with this conclusion. The proposed mitigation measures respond to the finding.

(E.5-10, page 59) *"Some reduction in targeted effort for bass probably occurred because anglers had trouble launching boats during extreme drawdowns."*

Response: BLM agrees. This simple statement indicates a conclusion should be drawn that identifies that changes in drawdown require special facilities to accommodate user needs. Bass anglers are not as likely to launch their $20,000 boats from a rocky unimproved ramp that is only accessible over a rough gravel road. They need a quality concrete ramp that is designed to meet varying drawdown levels. An appropriate road must access this ramp. IPCs proposed mitigation measure for a low water launch at Swede's Landing addresses this project impact but a final site plan is required. IPC should assume full responsibility for funding development and implementation of the site plan.

Adequacy of Analysis of Developed Sites

Identified BLM Issues –

- What is the existing condition of developed recreation sites and what is needed?
- What is the diversity of developed recreation facilities and what is needed?

The IPC technical reports do a good job of identifying the existing condition. They are silent regarding diversity beyond the fact that many sites are described and some degree of diversity is obvious. The reports do not draw conclusions that definitively identify needs. However, proposed mitigation measures show recognition of a responsibility to meet immediate and future needs. The proposal to develop an "Adaptive Management Plan" for responding to societal changes and recreation demands in future years is appropriate.

Critique of the Applicant's Conclusions for Developed Sites

- If there is a need in the future to go to a reservation system, funding will be provided to implement and administer the system.
  Applicant's Response: The Applicant has proposed an "Adaptive Management Plan" that should address this issue in the future, however financial responsibility is not defined.

Dispersed Sites

(E.5-4, page 26) *Pg. 26 – "…visitors to report the names of dispersed areas where they were staying overnight."*
Response: Virtually no member of the public would know the name of a dispersed site because they don't exist. Even the sites with some development, such as Copper Creek and Bob Creek, didn't have names until recently. Site names are not identified as such on maps, posted on bulletin boards, nor by any other means.

(E5-4, page 38) *"However, patterns suggest at least two additional findings: 1) Shade and the lack of restrooms are key issues at several locations on Brownlee Reservoir, and 2) Hewitt/Holcomb and Hells Canyon parks may have restroom shortages."*

Response: BLM is very supportive of funding for shade and restrooms. This is an excellent example of a study result that drives the mitigation measure as written in the DLA. However, IPC needs to provide specific information on total cost for adequate funding levels and justification for IPC proposed contributions.

(E.5-4, page 41) *"Among criticisms, boat docks and launches generally received the greatest attention among specific comments… Hells Canyon Reservoir and Oxbow Reservoir users show interest in improved or additional docks or moorings; and Brownlee Reservoir users show interest in additional or improved roads and longer boat ramps… 1) Longer boat ramps are a particular issue at several upper Brownlee locations (e.g., Spring Recreation Site, Steck Park), and 3) road improvement comments are more plentiful for areas that currently have no or very poorly maintained roads (e.g., the upper and middle parts of Brownlee)."*

Response: BLM is very supportive of boat docks, launches, moorings, improved roads, and longer ramps. The draft application has proposed some appropriate mitigation measures.

However, IPC needs to provide specific information on total cost for adequate funding levels and justification for IPC proposed contributions.

(E.5-4, page 42) *"Litter was the most important issue for those users who commented on visitor impacts."*

Response: BLM agrees. Litter is an issue that we hear about frequently. The draft application has proposed an appropriate mitigation.

(E.5-4, page 45) *"…Brownlee Reservoir user comments about federal agencies were slightly more negative than other areas."*

Response: This is not a surprising finding. At current funding levels, BLM management is minimal at best. The study does not address project operation impacts that establish IPC's level of responsibility for funding operation and maintenance of non-IPC recreation sites adjacent to the reservoirs.

(E.5-4, page 49) *"Only one attribute was rated necessary by a majority of users (no litter). The six most important attributes are having no litter, being close to fishing access, being close to the reservoir, having trees/rocks for shade, having flat areas for sleeping, and having no problems from water levels…. Hells Canyon Reservoir users…were more interested in shade, a limit on campsites per area, scenic views, and being out of sight and sound of others."*

Response: BLM agrees with this finding and the proposed mitigation measure substantially respond to the need at the BLM dispersed sites on the Oregon shore of the reservoirs, especially along Hells Canyon Reservoir and Swede's Landing.

(E.5-10, page 56) *"Downstream of this area [Pine Creek], a series of dispersed sites are located on the Homestead Road on the Oregon side of Hells Canyon Reservoir. Because a large amount of bank angling occurs in this area, these sites provide day-use and camping areas for large numbers of anglers."*

Response: BLM agrees. Since the reservoirs attract the anglers, IPC should assume a greater share of the maintenance on the Homestead Rd. as well as the cost of operations and maintenance of the dispersed sites on BLM lands. IPC has already begun this effort by contributing to restroom construction in the past and by possibly contributing to a BLM construction project in the near future. BLM and IPC have had good working relationships regarding management of the recreation resource along the reservoirs.

Adequacy of Analysis of Dispersed Sites

Identified BLM Issues –

- What are the effects of recreation use on the physical environment?
- What is the existing condition of dispersed recreation opportunities and what is needed?

The technical reports for recreation did not directly answer the question of recreation impacts on other resources, but many of the other resource reports analyzed the impacts thoroughly (E.3.2-46 Influences of Human Activities on Terrestrial Resources). There are many areas in which recreation has negative impacts on the physical environment. There is a continuing need to find ways to accommodate the recreation resource while protecting and/or enhancing other resource values.

The technical reports did an excellent job of inventorying the existing condition of dispersed sites and has established a monitoring plan to further augment this information. Many of the proposed mitigation measures respond to existing needs. The proposed "Adaptive Management Plan" and dispersed site monitoring will be the avenue to address future needs.

Critique of the Applicant's Conclusions for Dispersed Sites

- IPC will continue to operate and manage Oxbow Boat Launch and Carter=s Landing on Oxbow Reservoir, under the authority of the original license.
  Applicant's Response: *The Applicant has proposed to continue this relationship in the Draft License.*

- Fund an appropriate share to contract development of an overall Recreation Area Management Plan with a holistic view of the watershed disregarding current landownership.
  Applicant's Response: *The Applicant has proposed an "Adaptive Management Plan" that will address changes over time but falls short of a plan that identifies overall recreation management.*

- Fund an appropriate share to construct and maintain a range fence paralleling Hells Canyon Reservoir from the tunnel to Copper Creek. The purpose of this fence is to keep range cattle out of recreation sites along the reservoir.
  Applicant's Response: *The Applicant does not address this issue.*

- Provide an appropriate share of funding to conduct environmental analysis and implement the needs identified in the BLM document, AAnalysis of Management Situation and Conceptual Recreation Plan for Hells Canyon Complex Oregon & Idaho BLM@ (AMS).
  Applicant's Response: *The Applicant has proposed several mitigation measures that respond to the needs outlined in the BLMs AMS. However, it is silent regarding the following sites: Snake River Boat Launch, Weiser Sand Dunes, Steck Rec Site, Kevin's Alluvial Fan, Jennifer's Alluvial Fan, and Oasis.*

Trails/Trailheads

(E.5-4, page 33) *"Hells Canyon Reservoir users were more likely to walk and hike than other users. Taken together, these results suggest greater visitor interest in short trails than in longer ones (although the lack of longer trails may also offer a partial explanation for these results.)"*

Response: BLM agrees. Hells Canyon Reservoir is the only reservoir with an associated trail system. BLM also agrees that there is a desire for short "after dinner" trails emanating from use areas, plus short trails that would improve fishing access. There is an opportunity to build a significant, well maintained trail system paralleling the three reservoirs. Maybe hiking use is low because hiking opportunities have not been provided.

Adequacy of Analysis of Trails/Trailheads

No technical report studied trails or trailheads in any depth. The Recreation Use findings indicate that hiking use is very low but it also recognized a survey bias that would not fully detect hiking use. Existing trails in the Hells Canyon Reservoir area where identified and some mitigation measures proposed in the DLA. However, there was no discussion or analysis regarding future needs or opportunities encompassing all three reservoirs even though survey results would suggest there is a need for such facilities.

Critique of the Applicant's Conclusions for Trails/Trailheads

- Provide funding for a feasibility study of a trail system paralleling the reservoirs. This potential trail system has been referred to as the ASnake River Breaks Trail@.
  Applicant's Response: *The Applicant did not address this issue. It was not identified in the BLM's document referred to as "Analysis of the Management Situation."*

Rivers

(E.5-2, page 24) *"Although Heller Bar is not within or adjacent to the HCNRA, it provides significant access for boaters accessing the HCNRA through the Cache Creek Portal."*

Response: This suggests that IPC has a project impact on Heller Bar. Therefore, this seems to indicate IPC's partial responsiblity for improvements and O&M at Heller Bar.

Adequacy of Analysis of Rivers

Identified BLM Issues –

- What are the effects of water fluctuations on recreation use, including erosion of beaches important to river based recreation (camp sites) below the mouth of the Salmon River?

BLM is concerned with this issue downstream from the mouth of the lower Salmon River to Heller Bar. The studies are found to be inadequate for the following reasons: 1) The IPC study boundaries end at the northern boundary of the Hells Canyon National Recreation Area, but

recreation use and the impacts for dam operations extend all the way to slack water at Asotin. In fact, the case can be made that there is more recreation use on the flowing section of the Snake below the HCNRA than there is between Hells Canyon dam and Cache Creek. Consequently, there is more impact on recreation users below the HCNRA than on recreation users in the study area. 2) Boaters entering the study area from the lower Salmon River are not accounted for in any of the studies, even though BLM information was shared with Idaho Power Company. The number of float boaters entering the Snake River from the Salmon River has exceeded the total number of float boaters entering the Snake from all other portals combined since 1997, yet this group of recreation users is not considered in any of the studies. 3) Since nearly all of the beach camping areas are found below the mouth of the Salmon, it is logical that the impacts from flow fluctuations, sediment loss, ramping rates, etc. would be greatest on recreation users below the mouth of the Salmon. This is not addressed in the study.

Project operations impact BLM lands, resources, and visitors beyond the HCNRA boundary. Extreme low and high water flows cause problems with launching and take out at Heller Bar. The rate of change in fluctuation are artificial. Snake River waters are significantly colder than Salmon River waters which affect the recreation experience. Beach camping areas below the mouth of the Salmon are affected by project operations.

Mitigation measures that could address these problems include:

- Development of Law Enforcement MOUs with Nez Perce County and Asotin County for assistance with search and rescue (low flows are the cause of many boating accidents);

- Development of a new ramp at Heller Bar Recreation Site to accommodate low water launches and take outs. The existing ramp becomes the only reasonable water access point during low water conditions forcing motorized and non-motorized boaters to use the same facility. They have differing needs that often create conflict during this scenario.

- Development of an agreement with Asotin County for road maintenance of the Heller Bar road (road is sometimes inundated during high flows, and receives additional use during low flows due to difficult navigation below Heller Bar.)

There are few discussions or conclusions regarding the impact of project operations on recreation use on the Snake River, Grande Ronde, or Lower Salmon. The studies that were conducted missed a large segment of Snake River recreation users, and did not cover the entire area that is impacted by the Hells Canyon Complex.

Critique of the Applicant's Conclusions for Rivers

- Fund a percentage of the recreation management for the Lower Salmon and Grande Ronde Rivers.
  Applicant's Response: *The Applicant did not address this issue.*

Safety and Law Enforcement

(E.5-4, page 43) *"The most common enforcement/regulation comments were about the need for more enforcement (34%), while only 1% advocated less enforcement."*

Response: BLM agrees with this finding. However, the proposed mitigation measure in the draft application falls somewhat short of the expressed need. IPC has offered to provide a "forum" for law enforcement coordination and continuance of the current support of Adams County officers. The study does not address project operation impacts that establish IPC's level of responsibility for funding law enforcement needs.

(E.5-4, page 59) *"The relative unimportance of 24-hour campground hosts at developed areas suggests that relatively few visitors are interested in additional enforcement at campgrounds; most of these problems are likely to be more common in dispersed areas."*

Response: BLM disagrees with this finding. All the developed sites, except Spring Recreation Site, currently have 24-hour campground hosts which is probably why there is a lack of interest in additional enforcement. However, study data would indicate that visitors are very much interested in additional enforcement outside the developed sites and at Spring Rec. IPC's proposed mitigation measure in the draft application falls somewhat short of the observed need. IPC has offered to provide a "forum" for law enforcement coordination and continuance of the current support of Adams County officers. The study does not address project operation impacts that establish IPC's level of responsibility for funding law enforcement needs.

Adequacy of Analysis of Safety and Law Enforcement

Identified BLM Issue –

- What is the current condition of recreation conflicts and law enforcement and what fixes are needed?

The technical reports find a need for increased law enforcement presence. The proposed mitigation measures are minimal toward improving the situation.

Critique of the Applicant's Conclusions for Safety and Law Enforcement

- Fund a communications consultant to analyze the feasibility of the project area to have complete communication coverage plus have communication between all stakeholders. Install the recommended system and maintain it.
  Applicant's Response: *The Applicant does not address this issue.*

- Fund law enforcement personnel and purchase equipment necessary to provide adequate presence.
  Applicant's Response: *The Applicant proposes to continue its existing agreement with*

local law enforcement. Plus, it proposes to provide a forum and limited funds to coordinate resources among law enforcement agencies. It does not address the need for increasing law enforcement needs.

- Provide funding for EMTs and ambulance to be located near the reservoirs.
  ***Applicant's Response**: The Applicant does not address this issue.*

- Provide and fund appropriate training for search and rescue personnel.
  ***Applicant's Response**: The Applicant does not address this issue.*

Interpretive/Education

Adequacy of Analysis of Interpretive/Education

IPC proposes to develop an I&E Plan in consultation with appropriate agencies. Included in the plan would be interpretive and directional information with the HCC and related recreation facilities in the area about cultural, natural, and historical resources and about public safety. IPC does not provide any specific details on the I&E Plan.

Critique of the Applicant's Conclusions for Interpretive/Education

- Provide funding for the development and implementation of an I&E plan. Provide funding for continuing operations and maintenance of the plan. Fund a percentage of the time and expenses for an interpretive specialist to coordinate programs, pamphlets, and displays.
  ***Applicant's Response**: The Applicant proposes to develop and implement an I&E plan by 1) providing interpretive and directional information within the HCC and related recreation facilities in the area about cultural, natural, and historical resources and about public safety and 2) further enhancing visitor information provided within the Oxbow vicinity. The Applicant would operate and maintain the I&E amenities and associated facilities resulting from this plan.*

Visual Quality

***(E.6-3, page 15)** "VRI class is only one of many factors used to determine the more complex and important VRM Class designation, which provides the standard for planning, designing, and evaluating future projects." " VRI Class represents a categorical assessment of existing visual resources while VRM Class includes not only a consideration of VRI Class, but also other resources to determine how an area will be managed."*

Response: The BLM requested this study reevaluate the existing VRM Classifications via completion of a comprehensive inventory. IPC agreed to the additional inventory. DEA has

provided their results in a separate Summary Memorandum in Appendix A and summary in Section 2.4.4.2.

(E.6-3, page 25) *"Project effects were determined first for the Current/Proposed Operations scenario, one of two scenarios that IPC has developed for its application for relicensing. The Current/Proposed Operations scenario is defined as the management regime under which the Project typically operates."*

Response: The study appears to be done with the understanding that the proposed operations are the same as the current operations, which is not the case. This makes the study unable to identify changes to the study area that would be caused by the proposed operations and compare those changes to existing and historic conditions.

(E.6-3, page 26) *"These sites are at the upstream end of the Project in a reach of the reservoir that is notably broader than the downstream reaches confined by the Canyon. The sites may not be as susceptible to water-level fluctuations as sites farther downstream."*

Response: This statement is referring to Oasis, Weiser Dunes and Farewell Bend. The assumption that they are less susceptible to visual impacts due to fluctuation is wrong.

(E.6-3, page 26) *"The Subgroup helped to develop classifications of effects and concurred with the classifications assigned in this report."*

Response: This statement is referring to the Direct Fact, Direct Hypothetical, etc. classifications. The Subgroup did not concur with all of the assigned classifications. Study results are not available to make these determinations in a conclusive manner.

(E.6-3, page 29) *"In this case, the contrast ratings were typically low because the vegetation, thought to be non-native and potentially noxious, had no or weak contrast in form, line, color, and texture when viewed from the KOPs."*

Response: BLM analysis would not agree with this being no or weak contrast. When the vegetation greens up, it creates a very non-typical stripe of bright green between the water and brown upland vegetation.

(E.6-3, page 31) *"In the Brownlee/Oxbow Unit, it was most common near the upstream end of Brownlee Reservoir where lands are classified as Class II on the Idaho side of the river and Classes III and IV on the Oregon side."*

Response: The 1989 Baker Resource Area RMP has classified the Oregon side as Class II along Brownlee Reservoir as far south as Spring Recreation Site. Malheur Resource Area has inventoried their public lands south of Farewell Bend as Class III. Even though the reevaluation inventoried the Baker lands at a lower class, no management decision has been made regarding changing the VRM management objectives.

(E6-3, pages 33 & 34) *"Provide education and interpretive signage and/or facilities where other measures are not reasonable." "It must be noted that the climate in the Study Area is exceptionally harsh and establishing vegetation may not be reasonable in some areas."*

Response: The decision of what is unreasonable may have been made too hastily and possibly inappropriately. Although common sense is expected to be used when making recommendations for mitigation measures, the determination of what is unreasonable can be debated. The process for making this determination is not made clear.

Adequacy of Analysis of Visual Quality

Identified BLM Issues –

- What are the effects of water fluctuations from dam operations on visual quality?
- What are the effects of heavy recreation use on visual quality?
- What are the effects of dam operations and related structures on visual quality?
- What are the effects of uncontrolled OHV use on visual quality?
- What are the effects of transmission lines and related roads on visual quality?
- What is the potential for off site mitigation of impacts to visual resources?

The visual analysis and proposed mitigations are adequate regarding project operation impacts on visual quality except for the effect of uncontrolled OHV use. The Applicant was silent regarding OHV use. The issue of potential off site mitigations was not addressed.

Critique of the Applicant's Conclusions for Visual Quality

Implement the recommendations as outlined by the aesthetics work group.
Applicant's Response: *The BLM supports the Applicant proposal to implement many of the recommendations of the aesthetics work group.*

Roads/Access

(E.5-2, page 14) *"The Snake River Road – for most of its length a well-maintained gravel road – runs parallel…." "The third route takes Homestead Road, which is gravel…."*
Response: It is important to point out that Baker County is responsible for 100% of the maintenance on the Snake River Road and shares maintenance with IPC on Homestead road. It is questionable as to whether these roads would fit the descriptor "well-maintained." The study did not gather any evidence that would indicate the public's satisfaction with these two roads. Two other roads Hells Canyon and Oxbow Roads, are maintained by IPC and are paved. There is a distinct difference in quality. The two county roads are the only access to all of the BLM recreation sites. These roads travel through approximately eighteen miles of BLM lands that are adjacent to the reservoirs.

(E.5-4, page 35) *"Access issues (e.g., roads, boating facilities, trails, etc.) were the subject of about 6% of all comments, about 80% of which were criticisms. Brownlee Reservoir received more of these comments, as well as more of the negative ones…"*

Response: BLM agrees that Brownlee would garner the majority of negative comments. Maintenance of the Snake River Road, dewatered and poorly aligned boat launches, and steep slopes with no trails to get to the water are issues that we hear about on a regular basis. The fact that only 6% of all comments were about access is surprising. BLM would expect that issue to be much higher.

Adequacy of Analysis of Roads/Access

Identified BLM Issues –

- What is the condition of the transportation infrastructure and what is needed?

The Applicant does not adequately address this issue.

Critique of the Applicant's Conclusions for Roads/Access

- Assist in developing and implementing an access and travel management plan on public lands within the planning area (rim to rim from Farewell Bend to Captain John Rapids).
  Applicant's Response*: The Applicant did not address this issue.*

- Provide a percentage for annual maintenance of the Snake River and Homestead Roads in Oregon.
  Applicant's Response*: The Applicant did not address this issue.*

- Provide appropriate percentage to the managing agencies to maintain, upgrade, or construct roads (including Steck Park Road).
  Applicant's Response*: The Applicant did not address this issue.*

- Trends in OHV use and any other currently low use recreation on a ten-year basis.
  Applicant's Response*: The Applicant did not address existing OHV use or trends. The proposed "Adaptive Management Plan" may address this issue.*
- Traffic data on an annual basis and trend analysis on a ten-year basis.
  Applicant's Response*: The Applicant proposes to install permanent traffic counters and share data on an annual basis.*

Operation and Maintenance

(E.5-2, pages 19 & 20) *BLM Sites and Amenities "BLM owns this site, and IPC maintains it."*
Response: This section lists Oxbow Boat Launch which is BLM owned. Carter's Landing is listed under IPC nonpark Recreational Facilities on pg. 17. Since Carter's has the same status as Oxbow Boat Launch, they should be listed in the same section. It has been determined that Oxbow Boat Launch and Carter's Landing areas are located within the boundaries of the Hells

Canyon Project No. 1971, which was licensed by FERC in 1955. Since Idaho Power did not obtain a separate permit from the BLM for these areas prior to the October 24, 1992 date referenced in section 43 USCS 1761(d), no permit or right-of-way is required from the BLM now. However, the past and continuing operation and maintenance of these sites by IPC sets a precedence regarding IPCs responsibility for on-going operations and maintenance of BLM recreation facilities. Virtually all BLM recreation sites, developed and dispersed, lie within the project boundary. There is inconsistency in management and funding.

Adequacy of Analysis of Operations and Maintenance

The BLM identified in the "Analysis of the Management Situation" (AMS) document that on-going operations and maintenance were a need to be assessed. However, the technical reports were silent regarding this issue.

Critique of the Applicant's Conclusions for Operations and Maintenance

- Contribute an appropriate share to the operations and maintenance, replacement, and development of recreational sites and facilities on BLM lands. Also included are detailed site designs, engineering survey and design work, environmental analysis and NEPA documentation.
  Applicant's Response*: The Applicant has proposed that operations and maintenance will be the sole responsibility of the individual landowners, with the exceptions of two sites that are located on BLM lands but have been under the control and management of IPC since the original license was issued. The Applicant has proposed to work cooperatively with the BLM to develop and implement site plans for several BLM sites. However, the applicant is silent regarding environmental analysis required prior to implementation and on-going operation and maintenance costs.*

Land Acquisition

(E.5-2, page 52) *"As mentioned earlier, site PDCV is the only site in Zone 3 that is accessible by road. This site is on private land at the southern end of the zone, a short distance downstream of Swede's Landing. Site PDCV received 2,830 hours of use."*

Response: This is strong evidence that this private land is being impacted by public use.

(E.5-2, page 56) *"The southern half of the Oregon side includes 26 designated sites, …that provide camping sites and convenient reservoir access. Several of these sites are on private land… received a total of 50,416 hours of recreational use… Three of these sites received more than 5,000 hours of use. Hibbards Landing, with the most use, totaled 8,227 hours. It is a large site on private land that is* ***open to the public*** *for both day use and camping."*

Response: This finding indicates a need to acquire private properties for public use. The use hours are very high when compared to IPC and public land sites in the vicinity. "Open to the public" is an interesting choice of words. In a private conversation with the landowner, he told BLM he had done everything he could to eliminate the public use, but has given up. He doesn't want to become the "bad guy." If the private landowner became successful in closing his

properties, these displaced users would be forced onto other sites or would no longer come to the area. Public lands are not currently available to accommodate them without resource damage.

Adequacy of Analysis of Land Acquisition

Identified BLM Issues –

- What recreation conflicts exist with the private sector and what fixes are needed?
- What is the potential for off site mitigation of impacts to recreation opportunities?

Use data was collected that illustrates the public use of private lands for recreation along the reservoirs. The Applicant does not draw a conclusion regarding this finding. The technical reports are silent regarding these issues.

Critique of the Applicant's Conclusions for Land Acquisition

- Acquire river frontage easement or fee title land to provide additional mainstream free flowing river recreation opportunities. Acquire access on the Little Salmon River between Rapid River and Salmon to provide access for fishing of releases from Rapid River Hatchery.
  Applicant's Response*: The Applicant did not address this issue.*

- Acquire, in fee title or easement, the rights for the public to recreate on the following parcels: (identification of general parcel locations were provided in a communication dated May 1, 2001).
  Applicant's Response*: The Applicant did not address this issue.*

Recreation PM&Es

(E.5.4.3.1.1) *Continuation of Litter and Sanitation Plan. The Applicant maintains litter receptacles at its recreation facilities and places portable toilets at several highly used dispersed recreation sites along HCC reservoir in Zones 1, 2, 3, and 6. O&M of the existing litter and sanitation plan would be ongoing and would remain the responsibility of the Applicant for the duration of the new license period.*
Response: BLM supports this PM&E. However, further definition of the existing plan is needed in order to establish a base line from which to identify future needs.

(E.5.4.3.1.3) *Continuation of Aid to Local Law Enforcement. This measure proposes to continue to enhance local law enforcement protection for the HCC. The Applicant would continue to implement the existing agreement.*
Response: Further definition of the existing situation is needed in order to establish a base line from which to identify future needs. It is unclear what IPC currently does to enhance local law enforcement. Therefore, BLM is unable to determine suitability of proposed measure. Adams County is obviously enhanced, but what about the remaining adjacent counties?

(E.5.4.3.1.4) *Continuation of Road Maintenance. The Applicant currently maintains three*

roads within Recreation Zones 1 and 2 of the HCC: Oxbow-Hells Canyon Road, 22 miles; Homestead Road from Oxbow to Ballard Creek, 6 miles; and Brownlee-Oxbow Road, 12 miles. O&M of Applicant roads would remain the responsibility of the Applicant for the duration of the new license.

Response: BLM supports the continuation of maintenance by IPC on these roads. However, the DLA does not identify all roads which access the HCC and what percentage of their use is project related. If roads are used for project related purposes, the BLM believes the maintenance costs should be prorated between IPC and the appropriate county road district.

(E.5.4.3.2.1) *Continuation of Operation and Maintenance of Applicant-Managed Parks and Recreation Facilities. The Applicant currently operates and maintains six parks and recreation facilities within Zone 2 of the HCC: Hells Canyon Park, Copperfield Park, Oxbow Boat Launch, Carters Landing, McCormick Park, Woodhead Park. O&M of existing Applicant managed parks and recreation facilities would remain the responsibility of the Applicant for the duration of the new license period.*

Response: BLM supports the continuation of O&M by IPC at these parks. However, Oxbow Boat Launch and Carter's Landing are located on BLM managed lands. Laws and regulations that dictate management of public lands will also apply to these two sites. As an example, any land disturbing activities will be subject to NEPA review and documentation.

(E.5.4.4.1.1) *Provision of Boat Moorage on HCC Reservoirs. The Applicant proposs to work cooperatively with counties and agencies to develop and implement a plan to provide moorage facilities and docks at developed and dispersed recreation sites in the HCC. O&M of boat moorage facilities for HCC reservoir would be the cooperative responsibility of the Applicant, counties, and agencies.*

Response: BLM supports this measure in principle but IPC needs to provide specific justification for this proposed measure. Additionally, IPC needs to specify which counties and agencies they plan to cooperate with to develop the plan and expected financial contributions of these counties and agencies. Also, IPC needs to outline how participation will occur and decisions made.

(E.5.4.4.1.2) *Enhancement of Litter and Sanitation Plan. The Applicant proposes to enhance the existing litter and sanitation program by providing additional portable and vault toilets at appropriate dispersed recreation sites and by implementing a biannual litter pick-up program for the HCC. The Applicant would operate and maintain the litter and sanitation program and its enhancements.*

Response: BLM supports this measure. IPC should provide information on number, location, and cost of portable and vault toilets it plans to provide at dispersed recreation sites. If "appropriate" sites are located on non-IPC lands, will IPC still operate and maintain? Specific information on the litter and sanitation program needs to be provided to determine if applicant funding levels are suitable.

(E.5.4.4.1.3) *Information and Education (I&E) Plan. The Applicant proposes to develop and implement an I&E plan by 1) providing interpretive and directional information within the HCC and related recreation facilities in the area about cultural, natural, and historical resources and about public safety and 2) further enhancing visitor information provided within the Oxbwo vicinity. The Applicant would operate and maintain the I&E amenities and associated facilities resulting from this plan.*

Response: BLM supports development and implementation of an I&E Plan in Hells Canyon. IPC needs to identify agencies it will consult in development of the I&E Plan. IPC also needs to provide specific information on elements of the plan, projects to be implemented and associated costs. BLM is unable to provide comment on funding level since IPC has not provided any detailed information for this measure.

(E.5.4.4.1.4) *Law Enforcement Program. The Applicant proposes to provide a forum and limited funds to coordinate resources among law enforcement agencies. The Applicant would organize biannual meetings about law enforcement, provide access to its property and facilities, and contribute to the O&M costs associated with this measure. This proposed measure would supplement the measure in section E.5.4.3.1.3.*

Response: BLM supports this measure but feels it is inadequate. The measure does not mitigate findings in the technical report E.5-4. The technical report did not address project operation impacts that establish IPC's level of responsibility for funding law enforcement needs.

(E.5.4.4.1.5) *Recreation Adaptive Management Plan. The Applicant proposes a recreation adaptive management plan to ensure the adequacy of existing recreation measures. Whenever monitoring results indicate that change may be needed, the plan would provide a way to evaluate the appropriate level of recreation development or management in relation to use of recreation sites, while protecting other resource values. Changes or additions to PM&E measures would be based on trends, visitor preferences, facility conditions, monitoring, and other requirements as established.*

Response: BLM strongly supports development and implementation of a recreation adaptive management plan. IPC needs to identify agencies and entities that will be consulted and which will be involved in actual plan development. The measure states that IPC would fund construction and O&M associated with the measure but it does not identify who would fund development of the plan itself.

(E.5.4.4.1.6) *Enhancement of Road Maintenance. The Applicant proposes to enhance ongoing road maintenance by establishing a road maintenance program identifying best management practices. Best management practices for road maintenance would address ongoing maintenance concerns regarding cultural resources, noxious weeds, sensitive plants, threatened and endangered species, soil erosion, and side casting. The Applicant would implement best management practices during regularly scheduled road maintenance.*

Response: IPC should clarify that it intends to coordinate development of BMPs for ongoing road maintenance with appropriate federal and state agencies. Identify how $10,000 will be spent.

(E.5.4.4.3.2) *Enhancement of Copper Creek Dispersed Recreation Site*
(E.5.4.4.3.4) *Enhancement of Airstrip A&B Dispersed Recreation Sites*
(E.5.4.4.3.7) *Enhancement of Bob Creek Section C Dispersed Recreation Site*
(E.5.4.4.3.8) *Enhancement of Westfall Dispersed Recreation Site*
The Applicant proposes to work cooperatively with the BLM to develop a site pan and to implement elements of the site plan.
Response: BLM supports this measure however, no specific details or justification are provided. BLM is unable to determine the suitability of proposed funding levels, the appropriate level of O&M costs, and integration with other resource values. All proposed development and enhancements of dispersed recreation sites require detailed site plans.

(E.5.4.4.3.10) *Enhancement of Oxbow Boat Launch*
(E.5.4.4.3.11) *Enhancement of Carters and Old Carters Landing Recreation Sites*
The Applicant has developed site plans and proposes to implement elements of those site plans. Elements may include but are not limited to…. The Applicant would continue to operate and maintain the sites and their enhancements.
Response: BLM generally supports this measure. However, since they are located on public lands, any land disturbing activities will be subject to applicable law and regulations, specifically NEPA.

(E.5.4.4.5) *Enhancement of Low-Water Boat Launch at or near Swedes Landing. The Applicant proposes to work cooperatively with the BLM, Baker County, and the Oregon State Marine Board to find a suitable location, develop a site plan, and implement the site plan for a low-water boat launch. O&M of the boat launch at or near Swedes Landing would be the responsibility of the Applicant.*
Response: IPC does not provide estimates of funding required from Baker County, BLM and OSMB. No specific details are provided. Therefore, BLM is unable to determine impacts or if IPC funding levels are adequate. BLM is concerned that a significant boat ramp may require auxiliary facilities that do not currently exist such as parking area, campground, and appropriate access road. BLM supports the proposal for IPC to provide O&M. O&M for the auxiliary facilities would also be appropriate.

(E.5.4.4.5.2) *Enhancement of Swedes Landing.*
(E.5.4.4.5.3) *Enhancement of Spring Recreation Site.*
The Applicant proposes to work cooperatively with the BLM to develop a site plan and to implement that site plan.
Response: BLM supports these measures however, no specific details are provided. BLM is unable to determine the suitability of proposed funding levels.

Economic Issues

The Economics Workgroup (EWG) developed a number of study proposals to facilitate discussions and evaluate potential protection, mitigation and enhancement measures related to the Hells Canyon Complex of Dams (HCC) along the Snake River Corridor. These proposed studies where developed by economists, biologists and the public at large in concert with the scoping process and identified in the Formal Consultation Package (FCP). They were intended to balance resource values with the power benefits in the investigation of proper licensing requirements for the HCC over the next 30 to 50 years.

The study requests were submitted to Idaho Power for investigation and were subsequently turned down by the Company with the proviso that they would be doing a composite study (which was never completed) to review recreational values associated with warm water recreational fishing along Brownlee reservoir in support of economic development within Baker County, Oregon.

Conclusion:

Since these studies where never done it is difficult to evaluate the DLA in view of the potential for natural resource damages, economic stimulation to local communities and the region. We cannot evaluate the effects of current operations on the social cultural values that tribal communities place on the land and water resources that are a part of their heratige either.

The DLA and technical reports are considered incomplete based on this lack of information. It is important that these studies be completed prior to submission of the FLA or be considered as part of the additional information request that FERC must require prior to investigating the environmental effects subsequent licensing alternatives.

Study Adequacy:

The studies are considered inadequate because they were never done.

Specific Comments

Exhibit D:
D.2.1 Fair Value
The applicant estimates current cost of replacement based on gas-fired turbine generation at $4.6 billion. The applicant states this amount is based on their own analysis of cost of replacement. Does the applicant have documentation which specifies how these costs were derived? If so, it would be beneficial to understand the methodology and manner for these numbers whether or not additional analysis may be necessary for determining fair value, net investment or severance damages.

Based on the estimate of $30 a MWh (short-term purchases) the purchase of 1,500 megawatts of power for a year is approximately $370 million. If long-term purchases were to be made, what would be the estimated contracted cost? Since Idaho Power does not provide 100 percent of their energy needs, current contracts could be extended to cover the replacement of any megawatts lost regardless of the reason for replacement.

D.2.3 Severance Damages
The applicant specifies that $70.4 million in expenditures we made for preparation of the draft license application through 2005. Are any of these expenditures incorporated into the cost of doing business and subject to incorporation of the current operations of the company or corporation? If so, then they would be automatically reimbursed as part of the current revenues generation by Idaho Power or its parent Company. Could more information be provided to understand how costs are incurred for preparation of the application package in light of doing ongoing business and how these costs are separated from other ongoing application packages under current FERC Relicensing efforts?

D.4.4 Expenses
The applicant states that total annual estimate of future expenses and lost generation over the 30-year license period is $24.9 million (in 2005 dollars). Expenses estimated for PM&E are based on descriptions of proposed PM&E measures in sections E.2.4.2.1., E.3.1.3.2., E.3.2.3.2., E.3.3.3.2., E.4.2.5.1., E.4.2.5.2., E.4.2.5.3., E.5.4.4.1., E.5.4.4.2., E.5.4.4.3., E.5.4.4.4., E.5.4.4.5., and E.6.4.3. However, PM&E measures in section E.2.4.2.1 describes a number of aeration devises for incorporating dissolved oxygen into Brownlee reservoir but does not specify the one technique to be used and therefore cannot provide a reliable cost estimate. This should be acknowledged or a devise should be specified to make the cost estimate.

E.1.8 Human Population Size and Density
The statement is made that population change in the three states (Oregon, Idaho, and Washington) is expected to increase by about 31 percent between 2000 and 2001. This is incorrect. A growth rate of this magnitude would be so tremendous that all available resources would be exhausted within that time frame. This growth rate is estimated over a longer period of time and needs to be corrected.

Descriptions of proposed PM&E measures in sections E.2.4.2.1., E.3.1.3.2., E.3.2.3.2., E.3.3.3.2., E.4.2.5.1., E.4.2.5.2., E.4.2.5.3., E.5.4.4.1., E.5.4.4.2., E.5.4.4.3., E.5.4.4.4., E.5.4.4.5., and E.6.4.3.
Throughout the discussions of proposed PM&E measures, derived benefits are described and discussed on why these are worthwhile measures. However, there is no discussion on the value to the applicant or society in general about the worthiness of pursuing these measures. No doubt, at a minimum, the opportunity cost of lost benefits by not pursuing such measures would be a minimum starting point for those resources for which non market benefits are derived. In addition, there is the investment in maintaining marketable resources, such as fee recreation sites, that are a part of the capital inventory of Idaho Power which would be recaptured (in-whole or in-part) should a willing buyer be found to purchase the company at some point in the future.

These benefits should be described and discussed as part of the basis for measuring the benefits in relation to the costs of PM&E measures. This will help establish which PM&E measures best fit the range of choices needed in the application package.

BLM Conclusions and Recommendations:

Conclusions:
The studies need to be completed prior to any further analysis of the DLA due to the importance in making rational decisions based on best available information. This information would have been available if these studies were conducted as recommended and incorporated with the numerous studies that were done during the study phase of Idaho Power's Relicensing effort.

Recommendations:
It is therefore our recommendation that Idaho Power begin forthwith the following studies:

ECONOMIC PROFILE OF SNAKE RIVER RECREATION

The Federal Energy Regulatory Commission (FERC) license to operate the Hell's Canyon Complex (HCC), comprised of Brownlee, Oxbow, and Hell's Canyon Dams, appurtenant reservoirs and related features and affected upstream and downstream reaches of the Snake River and its tributaries will expire on July 31, 2005.

The recreation use associated with the Hell's Canyon Dam Complex consists of fishing and other activities on project reservoirs, as well as private and commercial jet boat use, fishing, and private and commercial river running downstream of Hell's Canyon Dam. Although aggregate visitation, recreational use value and the regional economic impacts of this use are thought to be quite large, they have never been quantified. Additionally, judging by the results of other studies of nationally significant resources, the nonuse or passive use value of HCC resources may also be substantial.

The objectives of this proposed study are (1) to document the type, extent and location of recreation use, (2) to obtain existing estimates of the economic value of such uses, (3) to obtain existing estimates of the regional economic impact of this recreation use, and, (4) to identify and obtain existing studies of nonuse or passive use economic value which may be applicable to this effort. If judged to be feasible and defensible, these data may later be used for an application of benefits transfer (see: *Water Resources Research* Vol. 28 No. 3 March 1992) or may serve as a basis for subsequent primary site specific studies.

Use appropriate techniques to obtain the following for the years 1963 (or before) through the present:

- Recreation use data by activity and location
- Existing site specific and/or representative estimates of the economic use value of these activities for the time periods available
- Existing site specific and/or representative estimates of the regional economic impact of these activities for the time periods available.

- Identify and obtain studies of nonuse or passive use value pertinent to HCC resources.

- Provide professional opinions as to the applicability of these studies for the HCC re-licensing effort.

ECONOMIC PROFILE OF SNAKE RIVER FISHERIES

The Federal Energy Regulatory Commission (FERC) license to operate the Hell's Canyon Complex (HCC), comprised of Brownlee, Oxbow, and Hell's Canyon Dams, appurtenant reservoirs and related features and affected upstream and downstream reaches of the Snake River and its tributaries will expire on July 31, 2005. A new license application is now being prepared by Idaho Power Company (IPC.

Historically, the Hell's Canyon fishery was composed primarily of coldwater anadromous and resident fishery stocks. These included Pacific lamprey, fall and spring/summer chinook salmon, steelhead and sockeye salmon downstream of the Snake and Salmon River confluence. Native resident species of concern include bull trout, redband trout and white sturgeon. Following construction of the HCC, the anadromous fishery was largely supplanted by a mixed warm water resident fishery. All salmon and steelhead stocks have been extirpated from the reach upstream of the HCC because of the failure of passage facilities at there structures. As a result of this and other environmental perturbations and human caused losses, all the extant anadromous fish populations in the Snake River basin are presently listed pursuant to the Endangered Species Act. Resident bull trout are also listed as threatened in the Hells Canyon area. Commercial fishing for anadromous species has been eliminated from the Snake River and most of the Columbia River basin downstream. Current recreational fishing use consists mostly of angling on project reservoirs for introduced warm or cool water fisheries, as well as private and guided fishing in the river reaches upstream and downstream for white sturgeon on a catch and release basis. Although in aggregate, recreational fishing use, the economic value of this use and the associated regional economic impacts are thought to be quite large, they have never been quantified. Additionally, judging by the results of other studies of nationally significant resources, the nonuse or passive use value of HCC fisheries resources may also be substantial.

The objectives of this proposed study are (1) to document the type, extent and location of recreational fishing use, (2) to document the type, extent and location of commercial fishing use, (3) to obtain existing estimates of the economic value of such uses, (4) to obtain existing estimates of the regional economic impact of these uses, and, (5) to identify and obtain existing studies of nonuse or passive use economic value which may be applicable to this effort. If judged to be feasible and defensible, these data may later be used for benefits transfer purposes (see: *Water Resources Research* Vol 28 No. 3 March 1992) or may serve as a basis for subsequent primary site specific studies.

Use appropriate techniques to obtain the following for the years 1963 (or before) through the present:

- Recreational fishing use data by activity and location

- Commercial fishing used data by activity and location

ECONOMIC PROFILE OF WATER USE ON THE SNAKE RIVER

The Federal Energy Regulatory Commission (FERC) license to operate the Hell's Canyon Complex (HCC), comprised of Brownlee, Oxbow, and Hell's Canyon Dams, appurtenant reservoirs and related features and affected upstream and downstream reaches of the Snake River and its tributaries will expire on July 31, 2005.

The existence and operation of the HCC provides a number of water-related goods and services, including flood control, irrigation water and water for municipal, commercial and industrial use. The amount and timing of water use for these purposes is determined, in part, by a combination of the demand for these goods and services, water availability, the distribution of water rights, and administrative and regulatory agreements and obligations. In turn, water availability for terrestrial and aquatic habitat, fish passage and recreational use of the river may be affected by water use for these other uses. At times, water flows will be complementary between different types of uses; at other times water flows will be competitive between uses. To more fully understand the potential economic trade-offs between these different water uses, this study seeks to identify historical and current water uses, quantify these, estimate the economic value and impact of such use.

The objectives of this proposed study are (1) to identify and obtain existing studies pertinent HCC water use which may be applicable to the relicensing effort, (2) to document the historical type, extent and location of water use in the HCC, (3) to document the current type, extent and location of water use in the HCC, (4) to obtain existing estimates of the economic value of such uses, and, (5) to obtain existing estimates of the regional economic impact of these uses as appropriate.

Use appropriate techniques to obtain the following for the years 1963 (or before) through the present:

- Historical water use data by activity and location
- Current water use data by activity and location

- Existing site specific and/or representative estimates of the economic use value of these activities for the time periods available.

- Existing site specific and/or representative estimates of the regional economic impact of these activities for the time periods available.

- Identify and obtain studies of HCC water use and economic value.

- Provide professional opinions as to the applicability of these studies for the HCC re-licensing effort.

ECONOMIC PROFILE OF TRIBAL USE OF THE SNAKE RIVER

The Federal Energy Regulatory Commission (FERC) license to operate the Hell's Canyon Complex (HCC), comprised of Brownlee, Oxbow, and Hell's Canyon Dams, appurtenant reservoirs and related features and affected upstream and downstream reaches of the Snake River and its tributaries will expire on July 31, 2005.

The Snake River plays an important role in the cultural, social and religious life of American Indian tribes in the surrounding region. This study expected to identify historical and current use of the Snake River by American Indian tribes and, where appropriate, estimate the economic value and impacts of this use.

The objectives of this proposed study are (1) to document the type, extent and location of historical tribal use of HCC resources, (2) to document the type, extent and location of current HCC tribal use, (3) to obtain existing estimates of the economic value of such uses, (4) to obtain existing estimates of the regional economic impact of these uses, and, (5) to identify and obtain existing accounts documenting the social and cultural importance of this area to Native Americans value which may be applicable to this effort.

Use appropriate techniques to obtain the following for the years 1963 (or before) through the present:

- Historical tribal use data by activity and location
- Current tribal use data by activity and location
- Existing site specific and/or representative estimates of the economic use value of these activities for the time periods available.
- Existing site specific and/or representative estimates of the regional economic impact of these activities for the time periods available.
- Identify and obtain studies of the social and cultural importance of HCC resources to Native Americans. Provide professional opinions as to the applicability of these studies for the HCC relicensing effort.

Further analysis may become necessary once these profile studies are completed because of the conclusions drawn from their results. It will then become necessary to evaluate what additional study needs will best result in obtaining the required information if it is necessary.