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United States Government **Department of Energy**

Bonneville Power Administration

memorandum

DATE: September 6, 2012

REPLY TO ATTN OF: KEC-4

SUBJECT: Kootenai River Ecosystem Project Supplement Analysis (DOE/EA-1518/SA-1)

TO: Lee Watts Project Manager, Kootenai River Ecosystem Project

Proposed Action: Kootenai River Ecosystem Project - Review for substantial change in the proposed action or significant new circumstances or information

Proposed by: Bonneville Power Administration (BPA)

Location: Lincoln County, Montana

Background: In 2005, BPA completed the Kootenai River Ecosystem Environmental Assessment (DOE/EA-1518) and Finding of No Significant Impact (FONSI) that addressed the potential environmental effects of the Kootenai River Ecosystem Project. This project involved proposed BPA funding of the Kootenai Tribe of Idaho (Kootenai Tribe), in partnership with the Idaho Department of Fish and Game (IDFG), to add nutrients (liquid phosphorus and nitrogen) to the Kootenai River. The project is intended to help stimulate production in the Kootenai River's depleted food web to improve overall river health in order to enhance native fish populations such as bull trout, kokanee, mountain whitefish, burbot, and white sturgeon.

As a result of the 2005 EA and FONSI, BPA decided to fund the Kootenai River Ecosystem Project for up to five years (beginning in 2006), with possible project extensions depending on results of fish and water quality monitoring and subject to further environmental analysis and documentation. Monitoring results are now available, and these show that the effects of the nutrient addition on the food chain, ecosystem, and water quality have been beneficial. Because of these positive results, BPA now is proposing to provide ongoing funding for the project with the refinements described below.

Analysis: This Supplement Analysis (SA) evaluates whether providing ongoing funding for the Kootenai River Ecosystem Project, as refined, represents a substantial change to the project considered in the 2005 EA and FONSI relevant to environmental concerns. This SA also evaluates whether the monitoring results, changes in fish and water quality, and other changes in environmental conditions that have occurred with implementation of the project, represent significant new circumstances or information relevant to environmental concerns.

Continued Project Funding and Refinements

The design and implementation of the project to be further funded is largely the same as described in the 2005 EA and FONSI. Consistent with adaptive management, the Kootenai Tribe and IDFG have proposed refining the timing and dosage of nutrient releases to provide further benefit to Kootenai River aquatic productivity. Current project nutrient release protocols are identified in the National Pollution Discharge Elimination System (NPDES) permit that the Kootenai Tribe and IDFG obtained in 2005 to comply with the Clean Water Act. This permit states that phosphorus and nitrogen may be added from June 1st to September 30th of each year. The maximum concentration of phosphorus (P) in receiving waters is currently set at approximately 3.8 micrograms per liter (measured as a minimum dilution rate of 53,000,000:1) after complete mixing. The maximum concentration of nitrogen (N) in receiving waters is currently set at approximately 10 milligrams per liter after complete mixing.

Changes proposed by the Kootenai Tribe and IDFG under a new NPDES permit (currently under review by EPA with a decision anticipated prior to the 2013 nutrient addition season) include:

- Change the nutrient addition period from June 1 – September 30 to March 15 – October 31 annually, with the actual nutrient addition to occur within this time block at the discretion of Kootenai Tribe of Idaho and IDFG.
- Increase maximum P dosage to 5.0 micrograms per liter (41,000,000:1 dilution rate)**,** up from the current 3.8 micrograms per liter concentration.

This adjustment to nutrient release timing and dosage, and for the continuation of the proposed project, does not represent substantial change to the existing project or significant new circumstances or information relevant to environmental concerns. Although the change is an increase from the original 3.8 micrograms per liter, the impacts will not be significantly different than those analyzed in the EA. The proposed increase of approximately 2 ug/L is designed to further increase the beneficial biological impacts gained thus far by nutrient addition. Those impacts will likely be an increase in beneficial algae, macroinvertebrates, and fish metrics. Additionally, it will likely move positive ecological impacts further downstream to other sections of the river that are only minimally benefitting from the current nutrient concentration (3 ug/L). Project proponents will closely monitor for any negative effects such as algae species shifts and blooms, low dissolved oxygen, changes in pH or other negative side-effects nutrient additions could possibly cause. In the unlikely event that monitoring identifies negaticve effects, nutrient releases would be adjusted accordingly.

New Information and Changes in Fish and Water Quality

Monitoring was conducted prior to nutrient enhancement (2002 to 2005) and also during nutrient addition treatment (2005 to 2010). The purpose of the monitoring was to document responses to nutrient addition at all trophic levels including primary productivity (algae), secondary productivity (aquatic macroinvertebrates), and tertiary productivity (fish), as well as to monitor water quality. Sites were monitored for water quality, algae and macroinvertebrate productivity, and fish level responses upstream of the nutrient addition zone (reference sites), within the nutrient addition zone (treatment sites), and downstream beyond the point where added nutrients were expected to have a direct effect on primary productivity. Results for each trophic level are briefly summarized below; detailed results are presented in the specific references cited. Overall, monitoring data indicated that productivity increased at all trophic levels in response to nutrient addition, with no degradation in water quality.

Primary Productivity (algae) Nutrient addition resulted in beneficial biological responses from chlorophyll metrics, and taxa and metrics of the diatom and algal communities (Holderman et al. 2009a; Hoyle et al. 2011). For example: chlorophyll production rates were significantly higher in treatment sites than in reference sites; mean algal biomass and algal cell density was significantly higher at treatment versus reference sites, and diatom algae species increased following nutrient addition, whereas blue-green algae representation decreased. Overall, these are considered desirable results.

Edible forms of the algal community (e.g., green algae and diatoms) were enhanced up to 30 percent, and non-desirable or inedible blue-green algae abundance was reduced from 26 percent to six percent following experimental nutrient addition. Additionally, primary productivity of the Kootenai River now ranks within a range expected for a large, unaltered temperate river (15 to 30 mg/m^2) (Hoyle et al. 2011). In combination, these findings are considered a very positive ecological development.

Secondary Productivity (aquatic macroinvertebrates) Aquatic macroinvertebrate data analysis is available through 2009. Preliminary data analysis indicates that nutrient addition resulted in an increased response in aquatic macroinvertebrate production (abundance and biomass) and, on average, shows higher levels than pre-nutrient addition years. In addition, mayfly, caddis fly and stonefly richness increased significantly in the nutrient addition zone during the course of the nutrient addition treatment (Holderman et al. 2009b). Lower responses in aquatic macroinvertebrate production occurred at the upstream reference sites during the nutrient enhancement period (Statistical Consulting Services, 2010).

Aquatic macroinvertebrate response may not be as pronounced as at the primary productivity level (described above) or tertiary productivity level (fish) described below. The large increase in fish production may have resulted in increased predation on aquatic macroinvertebrates, hence, suppressing aquatic macroinvertebrates abundance in river samples. This supposition is supported by the increased aquatic macroinvertebrate counts in mountain whitefish gut samples. However, even with increased fish predation, macroinvertebrate populations are significantly higher than their pre-nutrient levels (pre: 1,000—3,000 vs. post: 8,000-12,000 per m^2) (Holderman et al. 2009b).

Tertiary Productivity (fish) – Fish catch and biomass per unit effort, and the relative weight of mountain whitefish and largescale sucker, increased to a greater degree in the treatment reach than at the reference sites. A population estimate conducted within the treatment reach found that rainbow trout abundance increased about 1.5-fold, and mountain whitefish and largescale sucker abundance increased about two and three-fold, respectively. Only one site, located downstream of the treatment reach, experienced a decrease in post treatment abundance, and was also the only site at which a slight shift in the fish assemblage occurred with largescale sucker and peamouth chub increasing, while northern pikeminnows declined. No other sites showed any substantial shifts in terms of fish species composition. Mountain whitefish is the most abundant fish species in the river and accounts largely for the increases in catch per unit effort at the treatment sites, although largescale sucker and rainbow trout also experienced increases (Gidley 2010).

Overall, results of nutrient addition at both the fish community level and at the lower trophic levels have been positive. Fish community abundance has nearly tripled and fish biomass has doubled since nutrients were first added to the Kootenai River in 2005 (Gidley 2010).

Water Quality – Concentrations of metals (e.g., arsenic, cadmium, chromium, and mercury**)** generally remained below detection levels, both before and after nutrient addition. Additionally, there were no discernable changes in water-born nutrient concentrations (i.e. NH_4, NO_2 + NO_3, TN, TP, TDP, and SRP) especially in the nutrient enhancement reach. This likely indicates that increased biological demand by algae production is preventing any large changes in the water chemistry following nutrient addition. Lastly, nutrient addition did not result in violation of state water quality standards (e.g. nitrate and total organic carbon) during the first five years of the experiment, and, fish tissue samples taken from the nutrient addition zone in 2009 were well below EPA standards for contamination (Holderman et al. 2010; Gidley pers com).

Changes in Environmental Conditions

Since BPA issued the EA and FONSI, the Kootenai River in Idaho was designated as bull trout critical habitat. Effects to bull trout were analyzed in the 2005 EA, and an updated biological assessment was also submitted to the USFWS in July, 2011 with the determination of "may affect, but it is not likely to adversely affect" Kootenai River white sturgeon, bull trout, and their designated habitat (BPA 2011). Concurrence from the USFWS on this determination was received August 2, 2011.

Critical habitat is defined as having several primary constituent elements (PCEs). PCEs are physical and biological requirements that are essential to the conservation of a given species. These include, but are not limited to: space for individual and population growth, and for normal behavior; food, water, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. The most recent 2010 bull trout critical habitat rule defines nine specific bull trout critical habitat PCEs, of which two PCEs may be influenced by the nutrient enhancement program (75 Federal Register 63898):

- PCE 3: An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

- PCE 8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

The nutrient addition zone of the Kootenai River mainstem is used by bull trout for foraging, migration and overwintering. The nutrient addition program resulted in increased productivity, cascading through all aquatic trophic levels from primary production up to fish populations. Increases in aquatic invertebrates and fish species, including largescale sucker, mountain whitefish, and rainbow trout, support PCE 3 by boosting the forage base, and should be considered beneficial to bull trout. Bull trout prey on a wide variety of aquatic invertebrates and fish species, including suckers, whitefish and trout, species that increased biomass and abundance following nutrient enhancement (Lowery 2009). Additionally, water quality was maintained throughout the nutrient treatments. Thus, the nutrient addition program was beneficial to bull trout designated critical habitat within the nutrient addition zone, approximately from the Idaho-Montana border (rkm 275) to Bonners Ferry, Idaho (rkm 250).

Findings: This Supplement Analysis finds that: 1) there are no substantial changes in the proposed action that are relevant to environmental concerns; and 2) there are no significant new circumstances or information relevant to environmental concerns that have bearing on the proposed action or its impacts, within the meaning of 10 Code of Federal Regulations (CFR) § 1021.314(c)(1) and 40 CFR §1502.9(c). Therefore, no further NEPA documentation is required.

/s/ Hannah Dondy-Kaplan
Hannah Dondy-Kaplan
Environmental Protection Specialist – KEC-4

Concur:

/s/ Stacy L. Mason Date: *September 10, 2012*
Stacy L. Mason
NEPA Compliance Officer

Attachment:
References

References

Bonneville Power Administration. 2005. Kootenai River Nutrient Enhancement Project; Final Environmental Assessment.

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