Region 10, NPDES Permits Unit
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Fact Sheet

Public Comment Start Date: March 23, 2011
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Proposed Issuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA)

US Army Corps of Engineers
Dworshak Reservoir Nutrient Supplementation Pilot Project

EPA Proposes To Issue NPDES Permit
EPA proposes to issue an NPDES permit for the project referenced above. The draft permit places conditions on the discharge of pollutants (i.e., nutrient supplementation) from tanks mounted on a barge, to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the project
- a map and description of the discharge locations, and
- technical material supporting the conditions in the permit

State Clean Water Act Section 401 Certification
EPA is requesting that the Idaho Department of Environmental Quality (IDEQ) certify the NPDES permit for this facility, under Section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Idaho Department of Environmental Quality
1118 "F" Street
Lewiston, ID 83501
(208) 799-4370

Public Comment
Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water and Watersheds will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review
The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "http://epa.gov/r10earth/waterpermits.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OWW-130
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

US EPA Region 10
1435 N. Orchard
Boise, ID 83706
(208) 378-5746

Idaho Department of Environmental Quality
1118 "F" Street
Lewiston, ID 83501
(208) 799-4370

Acronyms and Abbreviations

BMP	Best Management Practices
ºC	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
COE	Corps of Engineers
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDEQ	Idaho Department of Environmental Quality
lb	Pound
lbs/day	Pounds per day
mg/L	Milligrams per liter
ML	Minimum Level
µg/L	Micrograms per liter
MDL	Maximum Daily Limit or Method Detection Limit
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
QAP	Quality assurance plan
RP	Reasonable Potential
RWC	Receiving Water Concentration
sp.	Species
s.u.	Standard Units
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
USACOE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WHO	World Health Organization
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards

I. Applicant

A. General Information

This fact sheet provides information on the draft NPDES permit for the following entity:

US Army Corps of Engineers (Corps)
Dworshak Reservoir Nutrient Supplementation Pilot Project
NPDES Permit # ID0028444

Physical Location:
Dworshak Reservoir, starting approximately 3 miles upstream of Dworshak Dam up the reservoir to about five miles upstream of Grandad Bridge, near slack water at the upper end of the reservoir.

Mailing Address:
US Army Corps of Engineers
Walla Walla District
201 N. Third Street
Walla Walla, Washington 99362-1876

Contacts:
John Bailey, Fishery Biologist, Corps of Engineers, Walla Walla, WA
Joe Dupont, Regional Fishery Manager, IDFG, Lewiston, ID
Paul Pence, Natural Resources Manager, Corps of Engineers, Ahsahka, ID

II. Discharge Information

A. Project Objectives

The objectives for this project are:

- Provide a balanced nutrient loading for Dworshak Reservoir throughout the spring and summer,
- Improve the carbon flow within the reservoir, which may result in an increase in the phytoplankton community, promoting a strong zooplankton community that may become an abundant forage base for kokanee, rainbow trout, and smallmouth bass fry,
- Improve water quality by decreasing blue-green algae abundance, promote desirable phytoplankton and zooplankton, and improve late season water clarity, and
- Improve the overall health and size structure of the kokanee population in the reservoir.

Kokanee will be the primary species benefiting from this project. An improved kokanee population provides forage for the reservoir's bull trout and smallmouth bass. Also, having 300,000+ adult kokanee migrate up tributary streams and die each fall would add nutrients to these stream systems, thereby enhancing populations above the reservoir.

B. Background Information

In April 2007 the Corps, in coordination with the Nez Perce Tribe and Idaho Department of Fish and Game, started a nutrient supplementation pilot project on Dworshak Reservoir.

The Corps submitted to the EPA an application Form 2E for "Facilities Which Do Not Discharge Process Wastewater", dated April 23, 2007. On April 12, 2010, Idaho DEQ issued a Consent Order to the Idaho Department of Fish and Game to conduct nutrient enhancement activities in 2010 pursuant to Idaho Administrative Procedures Act (IDAPA).

This project would be financed by the Corps and the Idaho Department of Fish and Game (IDFG). A Memorandum of Understanding between the Corps and IDFG was signed on May 10, 2007. Although there is no non-federal sponsor for this project, the IDFG actively supports this effort with biological monitoring. The IDFG, as the Corps' partner in this project, signed the necessary documents for this state permit, including a Consent Order from the Idaho Department of Environmental Quality.

The permit only authorizes a discharge from April 1st through September 30th each year, because this is the season indicated in the permit application.

III. Receiving Water

The proposed discharges will be to Dworshak Reservoir east of Ahsahka, Idaho. The receiving water for this permit will be considered to be that portion of Dworshak Reservoir that receives nutrient supplements. Supplements consist of liquid nitrogen-bearing fertilizer (urea-ammonium nitrate).

Dworshak Reservoir was created by the construction of Dworshak Dam on the North Fork Clearwater River in 1971. The reservoir and dam are located in Clearwater County, Idaho, near the town of Orofino. The reservoir is 54 miles long with 184 miles of shoreline. The reservoir covers over 19,000 surface acres of water.

As is typically the case with man-made reservoirs, the biological productivity of Dworshak Reservoir has gone through an aging process. The nutrient content of the reservoir is now a reflection of the watershed characteristics and inflowing nutrient concentrations. The North Fork Clearwater River, and subsequently the reservoir, also experience nutrient declines due to the loss of decomposing carcasses of steelhead and Chinook salmon that used to spawn in the river each year. The proposed action is to complete the pilot study on the feasibility of increasing the biological productivity of Dworshak Reservoir by adding inorganic, liquid fertilizer.

Kokanee, a land-locked form of sockeye salmon (Oncorhynchus nerka) were introduced into Dworshak Reservoir from 1972 through 1975, and in 1977 and 1979 (Dworshak Reservoir Investigations, 1987). Several factors have been suspected of causing age and density variability of the kokanee population. These factors include dam operations, low or high water years, and misleading spawning counts that include more than one year class of fish (Dworshak Dam Impacts Assessment, 1993). The cyclic and sometimes apparently declining fertility of the reservoir could also be a factor in the health of the kokanee population. Variations in the abundance of the zooplankton populations within the reservoir, which kokanee feed on, could also have an effect on their health or population dynamics. One goal of nutrient supplementation is to increase the zooplankton population and distribution in the reservoir and result in better

health and overall size structure of kokanee in the reservoir. Reservoir monitoring for the proposed nutrient supplementation study began in 2004. The pilot study began in 2007.

The fertilizers originally used in this project were formulated 10-34-0 (N-P205-K20 ammonium polyphosphate) and 32-0-0 (urea-ammonium nitrate). For at least the last two years only urea-ammonium nitrate has been discharged, and the draft permit authorizes only the discharge of urea-ammonium nitrate fertilizer. To determine the impact of the nutrient addition, a comprehensive monitoring plan (TerraGraphics, 2008) was developed to track biological and chemical changes within the reservoir.

Appendix A shows each of the application areas on Dworshak Reservoir.

A. Water Quality Standards

Overview

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Federal regulations at 40 CFR 122.4(d) require that the conditions in NPDES permits ensure compliance with the water quality standards of all affected States. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as domestic water supply, contact recreation, and aquatic life) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

This facility discharges to the Dworshak Reservoir. The Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02.101.120) designate specific use classifications for North Fork Clearwater River, from the Dworshak Reservoir Dam to its mouth, and to Dworshak Reservoir. The applicable use designations are: cold water aquatic life, salmonid spawning, primary contact recreation and domestic water supply. Dworshak Reservoir is also designated as a "Special Resource Water." This designation places additional restrictions on point source discharges through IDAPA 58.01.02.400.01b, which states:

> "No new point source can discharge pollutants, and no existing point source can increase its discharge of pollutants above the design capacity of its existing wastewater treatment facility to any water designated as a special resource water, or to a tributary of, or to the upstream segment of a special resource water: if pollutants significant to the designated beneficial uses can or will result in a reduction of the ambient water quality of the receiving special resource water as measured immediately below the applicable mixing zone."

In addition, the Idaho Water Quality Standards state that all waters of the State of Idaho are protected for industrial and agricultural water supply (Section 100.03.b and c), wildlife habitats (100.04) and aesthetics (100.05). The WQS state, in Sections 252.02, 252.03, and 253 that these uses are to be protected by narrative criteria which appear in Section 200. These narrative criteria state that all surface waters of the State of Idaho shall be free from hazardous materials; toxic substances; deleterious materials; radioactive materials; floating, suspended or submerged

matter; excess nutrients; oxygen-demanding materials; and sediment in concentrations which would impair beneficial uses. The WQS also state, in Section 252.02 that the criteria from *Water Quality Criteria 1972*, also referred to as the "Blue Book" (EPA-R3-73-033) can be used to determine numeric criteria for the protection of the agricultural water supply use.

Antidegradation

Overview

EPA is required under Section 301(b)(1)(C) of the Clean Water Act (CWA) and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure compliance with State water quality standards, including antidegradation requirements. The fact that the State of Idaho has not identified methods for implementing its antidegradation policy does not necessarily prevent EPA from establishing such permit conditions.

This NPDES permit contains limits as stringent as necessary to ensure compliance with all applicable water quality standards, including Idaho's antidegradation policy (IDAPA 58.01.02.051). As explained in detail below, the draft permit ensures that "the existing in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected" consistent with the requirements of 40 CFR 131.12(a)(1) and IDAPA 58.01.02.051.01. Furthermore, the permit does not allow lower water quality, therefore, the draft permit maintains and protects the existing level of water quality, consistent with 40 CFR 131.12(a)(2) and IDAPA 58.01.02.051.02. Finally, the antidegradation policy for outstanding resource waters is inapplicable to this permit because no waters of the State of Idaho are designated as "outstanding resource waters" (IDAPA 58.01.02.051.03).

The draft permit ensures compliance with the State of Idaho's antidegradation policy and CWA regulations because the permit conditions ensure protection of existing uses and do not allow lower water quality. Under the circumstances of this draft permit, EPA may issue an NPDES permit even though the State has not yet identified methods for implementing its antidegradation policy. In its antidegradation analysis below, EPA is applying a parameter-by-parameter approach in determining compliance with Idaho's antidegradation requirements.

EPA Antidegradation Analysis

Protection of Existing Uses (IDAPA 58.01.02.051.01 and 40 CFR 131.12(a)(1))

The Dworshak Reservoir, which receives the discharges, has the following designated beneficial uses: cold water aquatic life; salmonid spawning; primary contact recreation; aesthetics; wildlife habitats; and domestic, agricultural, and industrial water supply. The effluent limits in the draft permit ensure compliance with applicable numeric and narrative water quality criteria. The numeric and narrative water quality criteria are set at levels that ensure protection of the designated uses. As there is no information indicating the presence of existing beneficial uses other than those that are designated, the draft permit ensures a level of water quality necessary to protect the designated uses and, in compliance with IDAPA 58.01.02.051.01 and 40 CFR 131.12(a)(1), also ensures that the level of water quality necessary to protect existing uses is maintained and protected. If EPA receives information during the public comment period demonstrating that there are existing uses for which the receiving waters are not designated, EPA will consider this information before issuing a final permit and will establish additional or more stringent effluent limitations if necessary to ensure protection of existing uses.

High Quality Waters (IDAPA 58.01.02.051.02 and 40 CFR 131.12(a)(2))

The Dworshak Reservoir is not on the State of Idaho's 2008 303(d) list of impaired waters. Therefore, for the purposes of Idaho's antidegradation policy, Dworshak Reservoir is considered a high quality water and therefore subject to the provisions of IDAPA 58.01.02.051.02 for all parameters. As explained below, the issuance of this permit will not allow lower water quality in Dworshak Reservoir.

The intent of this project is to restore water quality and improve the fisheries within Dworshak Reservoir. The monitoring program was established to quickly assess conditions within the reservoir and if conditions decline the program can be quickly altered to address these changes. Every effort has been made and will continue to be made for the program to have a positive impact on the overall water quality within the reservoir.

This project involves the addition of nutrients to Dworshak reservoir. Therefore, nutrients are the only pollutants of concern for this discharge.

1. Description of Dworshak Nutrient Supplementation Program: Dworshak Reservoir was found to be in a state of nutrient imbalance following recent sampling (Schofield et al. 2010). The nitrogen to phosphorus (N:P) ratio was very low, indicating nitrogen limitation. A low N:P ratio is not conducive to sustaining a balanced and efficient aquatic community. Lakes and reservoirs with low N:P ratios are susceptible to blue-green algae blooms and poor transfer of energy and carbon up the food chain. Because some blue-green algae taxa can fix nitrogen from the atmosphere and others can utilize nitrogen from the water column at very low concentrations, they are able to avoid the population bottleneck imposed by low nitrogen concentrations in the ambient water (EPA 1999, Smith 1983), which is likely the case with Dworshak. Nitrogen has been added to Dworshak Reservoir in the epilimnion layer from April 2007 – July 2010. The epilimnion is the section of the water that is above the thermocline and is usually well mixed. In the case of Dworshak Reservoir it is also the section of the reservoir that has sufficient light penetration for photosynthesis to occur; typically between 9 and 12 meters from the surface in Dworshak. This information, in addition to volume estimates for the reservoir at different elevations, can then be used to determine the expected increase in nitrogen concentration after application. The hypolimnion (or the portion of the water column below the epilimnion) is not considered in these calculations because mixing generally does not occur between the epilimnion and hypolimnion. Additionally, since the hypolimnion does not have sufficient light penetration for photosynthesis to occur, the hypolimnion volume is not considered in the determination of nitrogen application rates.

2. Impact of Fertilizer Application on the Epilimnion: To illustrate the impact of the nitrogen application on water column nitrogen concentrations, EPA determined what maximum increase could be expected given the permitted application rates. The permit allows a maximum of 3,100 gallons of 32:0:0 urea ammonium nitrate to be added to the system on a weekly basis. The fertilizer is 32% nitrogen by weight, and the remaining 68% consists of filler material, in this case mostly water. Every gallon of 32:0:0 fertilizer has 3.54 pounds (lbs) of nitrogen in it. This means that the permit allows 11,000 lbs of total nitrogen to be added on a weekly basis.

This nitrogen is being added to approximately 137 billion gallons (520.4 billion liters) of lake water. This is only the volume for the upper 33 feet (10 meters) of the reservoir or epilimnion. The total volume of water in the reservoir is over 766 billion gallons (2.9 trillion liters). When one determines the amount of nitrogen that is being added to the system per liter of water within

the epilimnion, the expected increase is around 9 µg/L. When one considers the entire lake volume, the nitrogen is so diluted that one would expect less than a 2 µg/L increase. The reportable limit from the water quality laboratories is 1 µg/L. This means that the amount of nitrogen added to the system would be difficult to quantify given the current methods for water analysis.

Another aspect of nutrient addition projects is that the nutrients are taken up by the biological community. Therefore, one would not expect to see a change in the nitrate + nitrite concentration in the water column. The data collected since 2004 has documented no increase in nitrate + nitrite concentrations within Dworshak Reservoir. There appears to be a decrease in nitrate + nitrite since application was started. This could be due to the project increasing the uptake efficiency of the system.

3. Benefits of the Nutrient Supplementation Program: It is difficult to determine the benefit of the project for the fishery at this time. The Contractor and IDFG monitoring staff have started to observe some increases in the productivity of both the phytoplankton and zooplankton communities in 2008 and 2009. Based on preliminary information from 2010 this trend appears to be continuing. In 2008 and again in 2009, the abundance of edible phytoplankton increased from previous years. As one would expect, it appears that this increase in edible phytoplankton taxa is resulting in an increase in both abundance and biomass in the next level of the food chain, zooplankton.

It is also difficult to determine if the project has been beneficial to water quality in helping to control blue-green algae. The phytoplankton community appears to respond strongly to precipitation and run-off patterns. As a result, there has been considerable variation from year to year in the blue-green community. In 2009, the runoff was considerably higher due to a healthy snow pack, so it was not surprising that a significant Microcystis sp. bloom was observed in 2009. Microcystis blooms occurred in several lakes throughout Idaho and Washington in 2009. (Please refer to Tables 8 – 10 and Figure 30 in Schofield et al., 2010).

There has been a shift from a system where the most abundant blue-green taxa were Anabaena sp. to one where the dominant blue-green taxa are Microcystis sp. In pre-application years, Oscillatoria sp. was relatively common in the spring; however, these taxa have not been observed since nutrient application started. One potential explanation for the shift in blue-green taxa is that both Anabaena and Oscillatoria sp. can fix atmospheric nitrogen. Microcystis sp. cannot fix nitrogen but can utilize it in very low ambient conditions. By adding nitrogen to the system it may have provided enough nitrogen for the Microcystis sp. to grow and taken away the competitive advantage of the nitrogen fixers, Anabaena sp. and Oscillatoria sp. Elk Creek and Little North Fork Clearwater arms of the reservoir had the first occurrences of Microcystis sp. in both 2009 and 2010. These two areas are the only areas within the reservoir that do not have nitrogen added. This could indicate that the addition of nitrogen within the reservoir could be resulting in a delay in the onset of blue-green algae blooms, including Microcystis sp. There may be other explanations for these two sites having the early Microcystis sp. occurrence, such as orientation, microclimates, and land use practices. Additional studies would need to be conducted to support the supposition that the lack of nitrogen addition is the primary factor resulting in the early occurrence of Microcystis sp. The occurrence of blue-green taxa in areas of the reservoir with no nitrogen addition is another indication that the nutrient enhancement program is not the cause of the blue-green blooms.

4. Negative Impacts of the Nutrient Supplementation Program: The data collected over the last several years indicates that the project has not had any negative impacts to the chemical or biological conditions within the reservoir. It appears that the biggest factor impacting the chemistry and biology of the systems is the amount of winter precipitation and the run-off pattern in the spring. The amount of nutrients coming into the system from the upper watershed appears to be the key factor affecting the phytoplankton community within the reservoir. In years of high run-off there is more phosphorus added to the system. When this occurs there is an increase of Microcystis sp. in the system. Under low to moderate run-off years there is a bloom of the diatom Fragillaria crotonensis.

Some blue-green taxa including Microcystis sp. and Anabaena sp. can release toxins under the right conditions. There are some blooms of these taxa that don't result in toxins being produced and others that can be toxic. The production of microcystins and other cyanotoxins in blue-green algae such as Microcystis sp. is not well understood (Graham et al. 2008). If Microcystis sp. densities observed in 2009, reaching as high as 38,782 cells/mL, did have microcystins present at 0.2 pg/cell, these densities could be considered to pose a potential moderate health risk during recreational contact with lake or river water (Graham et al. 2009, Table 1). These World Health Organization (WHO) guidelines assume the presence of microcystin in Microcystis sp.; however, it is unknown if Microcystis sp. from Dworshak Reservoir contained microcystin. Test strip kits used to qualitatively test for microcystin did not indicate detectable levels of microcystin at sites tested on Dworshak Reservoir in 2009 (Paul Pence 2009, pers. comm.).

Table 1: Relative Probability of Acute Health Effects from Blue-green Algae Exposure During Recreational Contact in Lakes, Reservoirs, or Rivers Developed by the WHO

Relative Probability of Acute Health Effects	Blue-Green Algae [3] (cells/mL)
Low	<20,000
Moderate	20,000 – 100,000
High	100,000 – 10,000,000
Very High	> 10,000,000

[3] The WHO guidelines were developed for *Microcystis sp.* dominated samples with an assumed toxin content of 0.2 pg of microcystin per *Microcystis sp.* cell or 0.4 µg of microcystin per µg of chlorophyll *a* with a minimum criteria of at least blue-green algae dominance (Graham et al. 2009).

Although microcystin is concerning, EPA has no evidence to show that the project is the principle cause of the blue-green blooms. By adding the nitrogen to the system, the permittee should be promoting the growth of non blue-green taxa. The increased growth of the non blue-green taxa would then result in increased competition for the remaining phosphorus and other nutrients. This increased competition should act to suppress the blue-green population or delay its onset. There are several studies from the literature that support this hypothesis. In a series of whole lake experiments, both Schinder (1977) and Stockner and Shortreed (1988) found that additions of fertilizer with a low N:P ratio resulted in blooms of nitrogen fixing blue-green algae, whereas fertilizers with high N:P ratios did not. Furthermore, Smith (1983) found that blue-green algae are rare in lakes with a high N:P ratio, and further suggested nitrogen supplementation as a means of improving water quality. Graham et al. (2004) found that blue-green algae were less prevalent in midwestern lakes with relatively high total nitrogen. As

explained in the monitoring requirements section below, the permit includes monitoring and reporting requirements to characterize the blue-green algae community in the reservoir.

5. Domestic Drinking Water and Nutrient Enrichment Concerns: The EPA-recommended water quality criterion for nitrate + nitrite as N for drinking water supplies is 10 ppm or mg/L. The maximum nitrate + nitrite as N concentration observed in Dworshak reservoir is 0.17 ppm and maximum recorded in the North Fork Clearwater River (NFC) is 0.069 ppm. The concentrations observed in Dworshak Reservoir are orders of magnitude lower than the drinking water criteria.

The State of Idaho does not have numeric criteria for nitrogen levels in regards to aquatic life protection. However, the State of Idaho has a narrative water quality criterion for nutrients which reads as follows: "Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses." Federal regulations allow NPDES permitting authorities to interpret narrative nutrient criteria in order to establish permit limits. This may be done using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, or using EPA's water quality criteria, published under Section 304(a) of the Clean Water Act (40 CFR 122.44(d)(1)(vi)(A) and (B)). This criterion is one of the principle reasons chlorophyll a concentrations are being measured within the reservoir. The State of Idaho has chosen 3 ppb or ug/L of chlorophyll a as the level where they begin to become concerned that the algae population has the potential to be considered a nuisance (IDEQ 2010). The seasonal median has not exceeded 3 ppb in the life of the project. Furthermore, Chlorophyll a concentrations have not increased as a result of the project.

As for the impact of the project on parameters other than changes in nitrate + nitrite concentrations, it is important to note that the water discharged from the dam into the North Fork Clearwater River is primarily hypolimnetic water (Wilson, 2010). The nitrogen addition is occurring several miles upstream of the dam and within the epilimnion of the reservoir. Dworshak Reservoir has a very strong thermocline. This means that there is a strong density gradient between the less dense warm water and more dense cool water. This density difference essentially isolates the top 10 to 12 meters of the reservoir from the deeper sections of the reservoir. During the time when nitrogen is being applied there is essentially no interaction between the epilimnion and the hypolimnion. These two sections of the reservoir will mix in the fall and spring when the density gradient breaks down as the surface water temperature cools. It would be at this time of the year that the additional nitrogen would be mixed with the rest of the reservoir and subsequently discharged into the NFC.

There are several years' worth of data on the hypolimnion and the NFC itself. Hypolimnetic nitrate + nitrite as nitrogen (N) levels have been decreasing as the nutrification project has progressed (Scofield et al. 2010). All of the other water chemistry and biological data collected on the NFC shows no change during the course of the project. The rationale mentioned above for the hypolimnic layer of the reservoir regarding the potential impact of the nitrogen application on water quality in the reservoir and the NFC also applies to the potential to impact domestic water supplies. At this time, there is no evidence that show that the nitrification project has caused adverse changes in the water quality of the NFC or the public drinking water that is drawn from the NFC.

6. Summary of the Dworshak Nutrient Supplementation Program Impacts: EPA does not anticipate that the discharge will result in a reduction of the ambient water quality of this special resource water. The EPA expects that IDFG's and the Corps' objectives to improve the Dworshak Reservoir ecosystem should be met, and the discharge would improve water quality if the permittee maintains compliance with its NPDES permit. This project has had an extensive monitoring program in place to assess changes in water quality and productivity within the system since its inception. A complete summary of this information can be found in the annual progress reports (Stockner and Brandt, 2008; Brandt and Scofield, 2009; and Scofield et al. 2010).

Based on the data collected through 2009 there has been no change in epilimnetic phosphorus or nitrate + nitrite concentrations. Hypolimnetic nitrate + nitrite concentrations have shown a statistically significant reduction since the implementation of the program. Chlorophyll a concentrations and Secchi readings have been within the historical range observed prior to application. These two parameters are highly subject to inter-annual variability and may take time for changes to be observed.

The amount of edible phytoplankton taxa has increased since the start of the program; this has resulted in a significant increase in the zooplankton biomass. These responses are within the range predicted at the start of the program and are indicative of improved water quality. Blue-green taxa have been highly variable during the study period but there are no indications that the project has or will result in an increase in blue-green taxa. The scientific evidence from other studies indicates that the addition of nitrogen to the system should result in a reduction in the percentage of the phytoplankton community made up of inedible blue-green taxa (Schindler 1977; Smith 1983; Stockner and Shortreed 1988; Graham 2004).

Summary

As explained above, the effluent limits in the draft permit are adequately stringent to ensure that existing uses are maintained and protected, in compliance with IDAPA 58.01.02.051.01 and 40 CFR 131.12(a)(1).

As explained above, the issuance of this NPDES permit will not allow lower water quality, in compliance with IDAPA 58.10.02.051.02, 58.01.02.400.01.b, and 40 CFR 131.12(a)(2). Consequently, there is no need for the State of Idaho to make a finding that "allowing lower water quality is necessary to accommodate important economic or social development" under IDAPA 58.01.02.051.02. Under these circumstances, EPA may issue an NPDES permit even though the State of Idaho has not yet identified methods for implementing its antidegradation policy.

B. Restrictions on Permitting New Dischargers

The federal regulation 40 CFR 122.4(i) places restrictions on the issuance of NPDES permits to new sources or new dischargers. The subject project is a new discharger as that term is defined in 40 CFR 122.2. Specifically, 40 CFR 122.4(i) states that:

> "No permit may be issued….to a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or new discharger proposing to discharge into a water segment which does not meet applicable water

> quality standards or is not expected to meet those standards even after the application of the effluent limitations required by sections 301(b)(1)(A) and 301(b)(1)(B) of CWA, and for which the State or interstate agency has performed a pollutants load allocation for the pollutant to be discharged, must demonstrate, before the close of the public comment period, that: (1) There are sufficient remaining pollutant load allocations to allow for the discharge; and (2) The existing dischargers into that segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards. The Director may waive the submission of information by the new source or new discharger required by paragraph (i) of this section if the Director determines that the Director already has adequate information to evaluate the request. An explanation of the development of limitations to meet the criteria of this paragraph (i)(2) is to be included in the fact sheet to the permit under Sec. 124.56(b)(1) of this chapter."

The draft permit is consistent with 40 CFR 122.4(i). As explained in the section titled "Water Quality Standards," above, and in Appendix B, the project will not cause or contribute to the violation of water quality standards. Dworshak Reservoir has not been identified as not meeting or not being expected to meet any water quality standards, and the State of Idaho has not performed a pollutants load allocation for Dworshak Reservoir for the pollutant to be discharged. Thus it is not necessary to demonstrate that there are sufficient remaining pollutant load allocations to allow for the discharge or that the existing dischargers into this segment are subject to compliance schedules designed to bring the reservoir into compliance with water quality standards.

IV. Effluent Limitations

A. Basis for Effluent Limitations

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a water body are being met and may be more stringent than technology-based effluent limits. The basis for the effluent limits proposed in this draft permit is provided in Appendix B.

B. Proposed Effluent Limitations

The permittee must not discharge excess nutrients in amounts that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses of the receiving water (see IDAPA 58.01.02.200.06).

After reviewing the data from the 2007 growing season it was determined that there was sufficient bio-available phosphorus in the system due to the watershed contributions. Subsequent applications have consisted solely of nitrogen in the form of urea-ammonium nitrate blend (32-0-0). The Corps does not anticipate the need to add phosphorus to the system in the future due to the observed phosphorus concentrations within the epilimnion of the reservoir, and

the permit does not authorize the discharge of phosphorus-containing fertilizer. (Please refer to Appendix B for additional information related to sample data, criteria for determining the proper amount of nitrogen, and an explanation of why the Corps discontinued adding phosphorous to the reservoir in 2008).

The permittee must not add 32-0-0 fertilizer in excess of 3,100 gallons per week, which would contain approximately 11,000 pounds of nitrogen. This is 20% more than the maximum amount added during the first four years of the pilot study. This amount would result in a dilution ratio (volume of the epilimnion to the volume of fertilizer added) of at least 16,000,000:1, given that the thermocline is at least 3.5 m deep.

Table 2: Proposed Effluent Limitations

Parameter	Units	Weekly Maximum
Volume, 32-0-0	Gallons	3,100
Total Nitrogen	Pounds	11,000

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) or on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (EPA).

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. Table 3, below, presents the proposed effluent monitoring requirements. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Table 3: Proposed Effluent Monitoring Requirements

Parameter	Units	Sample Frequency	Sample Type
Volume, 32-0-0	gallons/discharge	Once per discharge	Measure
Total Nitrogen	pounds/discharge	Once per discharge	Calculation
Total Ammonia as N	pounds/discharge	Once per discharge	Calculation
Nitrate + Nitrite as N	pounds/discharge	Once per discharge	Calculation
Effluent Dilution Ratio, Gross, 32-0-0	ratio	Once per discharge	Calculation
Total Nitrogen (concentration added to reservoir)	µg/L	Once per discharge	Calculation

C. Surface Water Monitoring

Table 4, below, presents the proposed surface water monitoring requirements for the draft permit. Permittees have the option of taking more frequent samples than are required under the permit. Surface water monitoring results must be submitted annually by December 31st.

The permit contains receiving water monitoring and notification requirements that are triggered whenever blue-green algae are observed (see the draft permit at I.C.10 and I.C.11). Notification thresholds are based on the draft Blue-Green Algae Bloom Response Plan developed by the Coeur d'Alene Regional Office of the Idaho Department of Environmental Quality (IDEQ 2008) which are in turn based on WHO guidelines (Chorus and Bartram 1999) and notification procedures followed by the State of Oregon (Stone and Bress 2007, see also OPH 2010).

Table 4: Receiving Water Monitoring Requirements

Parameter (units)	Units	Sample Locations	Sample Frequency	Sample Type
Chlorophyll *a*	µg/L	Reservoir epilimnion and NFC	1/month[2]	Depth-integrated composite
Dissolved Oxygen	mg/L	Reservoir – surface to 60 m	1/month[2]	Measure
Epilimnetic volume	m^3	Reservoir	1/month[1]	Calculation
Nitrate + Nitrite as N	µg/L	Reservoir epilimnion and NFC	1/month[2]	Depth-integrated composite
Total ammonia as N	µg/L	Reservoir epilimnion and NFC	1/month[2]	Depth-integrated composite
Total Nitrogen	µg/L	Reservoir epilimnion and NFC	1/month[2]	Depth-integrated composite
Phytoplankton, zooplankton and bacterioplankton (see I.C.7. – I.C.9.)	cells/ml	Reservoir epilimnion	1/month[2]	Depth-integrated composite
pH	s.u	Reservoir epilimnion and NFC	1/month[2]	Measure
Pool elevation	m	Dworshak Dam	1/month[2]	Measure
Secchi depth	m	Reservoir	1/month[2]	Measure
Temperature	ºC	Reservoir – surface to 60 m	1/month[2]	Measure
Thermocline depth	m	Reservoir	1/month[2]	Measure
Total Dissolved Phosphorus	µg/L	Reservoir epilimnion and NFC	1/month[2]	Depth-integrated composite
Total Phosphorus	µg/L	Reservoir epilimnion and NFC	1/month[2]	Depth-integrated composite

Notes:
1. The permittee must calculate and record the receiving water epilimnion volume for every month in which a discharge occurs.
2. The permittee must sample the receiving water once during every month in which a discharge occurs.

VI. Other Permit Conditions

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The permittee is required to establish a Quality Assurance Plan for the project within 30 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan shall be retained on site and made available to EPA and IDEQ upon request.

B. Best Management Practices Plan

The permit requires the permittee to properly operate and maintain all facilities and control systems. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement a best management practices plan for their facility within 90 days of the effective date of the final permit. The plan shall be retained on site and made available to EPA and IDEQ upon request.

C. Standard Permit Provisions

Sections III, IV, and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because these requirements are based directly on NPDES regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species.

The Corps received a letter of concurrence from NMFS on December 5, 2006, expressing their concurrence that the Dworshak nutrient supplementation was not likely to adversely affect Snake River fall Chinook (Oncorhynchus tshawytscha) or Snake River steelhead (Oncorhynchus mykiss). In a letter dated September 12, 2006, USFWS also concurred with the Corps' determination that the Dworshak project was not likely to adversely affect bull trout (Salvelinus confluentus), bald eagle (Haliaeetus leucocephalus) and the gray wolf (Canis lupus). The bald eagle was delisted effective August 8, 2007. If the project successfully produces a healthier kokanee population, both bald eagles and bull trout could benefit.

EPA will provide copies of the fact sheet and draft permit to USFWS and NMFS during the public comment period. EPA will consider any comments made by USFWS and NMFS on the draft permit prior to issuance.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EPA has determined that the discharge will not affect any EFH species in the vicinity of the discharge, therefore consultation is not required for this action.

C. State Certification

Section 401 of the CWA requires EPA to seek State certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards, or treatment standards established pursuant to any State law or regulation. EPA is required to include any conditions identified by the State as being necessary to comply with the Clean Water Act and appropriate requirements of State law as permit conditions (40 CFR 124.53(e), 124.55(a)(2)). Some requirements of the draft permit have been included in order to incorporate requirements of the draft certification, specifically Part II.C. of the permit. Other requirements of the draft certification have been incorporated into the Best Management Practices Plan requirements (Part II.B.4.b).

D. Permit Expiration

The permit will expire five years from the effective date.

VIII. References

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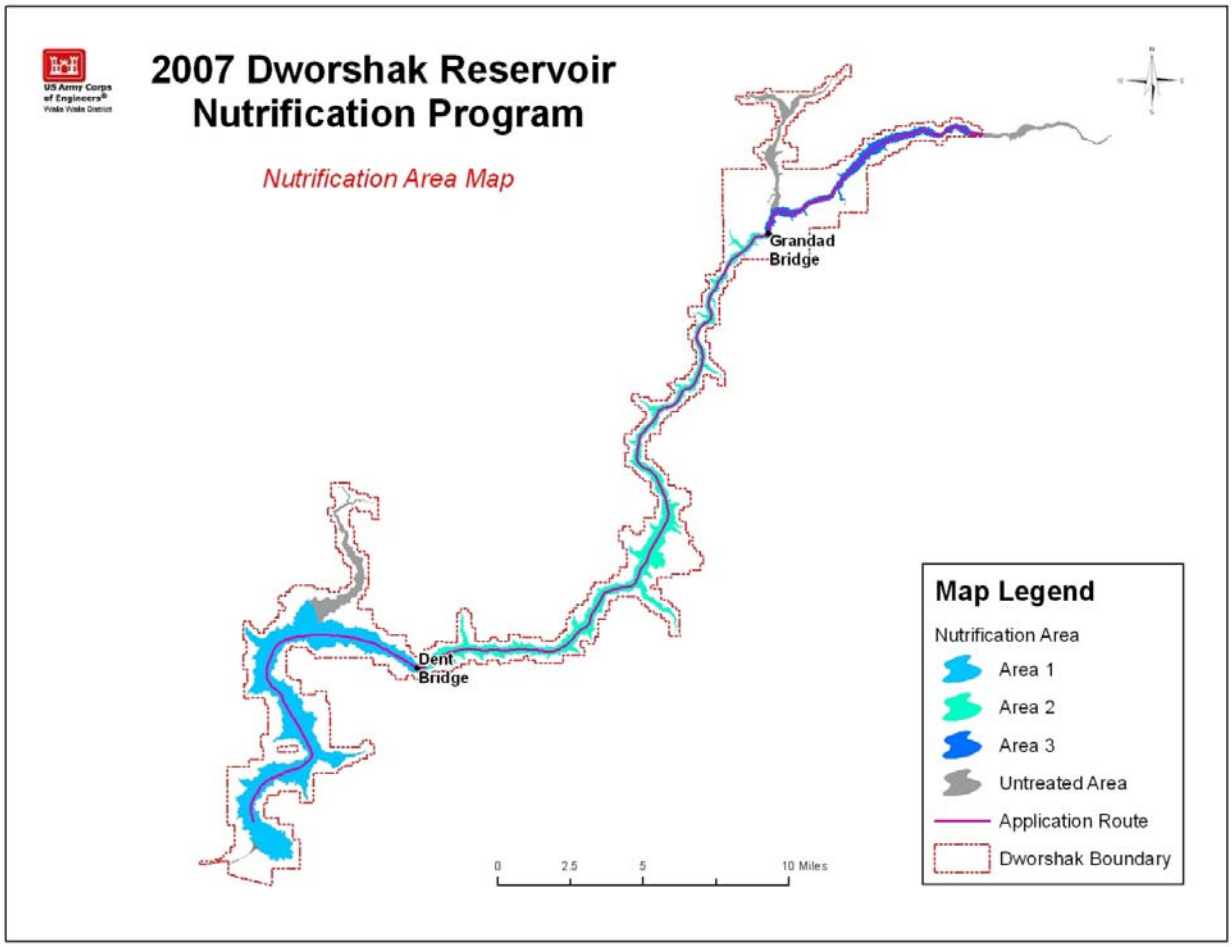
Appendix A: Dworshak Reservoir Nutrification Program Map



Appendix B: Basis for Effluent Limits

The following discussion explains in more detail the statutory and regulatory basis for the effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

A. Technology-Based Effluent Limits

There are no federal effluent limit guidelines for discharges of this type, and it is not feasible for EPA to develop numeric "best professional judgment" technology-based effluent limits for this discharge. Therefore, no numeric technology-based effluent limits have been imposed on this discharge. However, when numeric effluent limits are infeasible, permits may require best management practices to control or abate the discharge of pollutants (40 CFR 122.44(k)(3)). The permit includes best management practices requirements in Part II.B.

B. Water Quality-based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States. The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

Mixing Zones

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and will decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and when the receiving water meets the criteria necessary to protect the designated uses of the water body.

Mixing zones must be authorized by IDEQ. In its draft Clean Water Act Section 401 Certification of this draft permit, IDEQ proposed to authorize a mixing zone limited to 10% of the epilimnion of Dworshak Reservoir. If IDEQ does not grant a mixing zone in its final

certification, the water quality-based effluent limits will be recalculated such that the criteria are met before the effluent is discharged to the receiving water.

EPA believes that a mixing zone is appropriate for this discharge. The discharge volume will be extremely small compared to volume of the reservoir. Furthermore, the purpose of the discharge is to add nitrogen to the Dworshak reservoir in order to provide a balanced nutrient loading for Dworshak Reservoir, improve the reservoir's carbon flow, promote a strong zooplankton community and in turn an abundant forage base for kokanee, rainbow trout, and smallmouth bass fry, decrease blue-green algae abundance, promote desirable phytoplankton and zooplankton, and improve late season water clarity, and improve the overall health and size structure of the kokanee population in the reservoir. Requiring water quality criteria for nitrogen to be met at the point of discharge would make it impossible to accomplish these goals.

C. Facility-Specific Water Quality-based Limits

Background

Reservoirs may appear very similar to lakes, but unfortunately they have a number of different characteristics that can result in a system that is difficult to manage for both water quality and fishery purposes. Dworshak reservoir is a prime example of the differences between natural lakes and impounded river systems. The two primary differences between lakes and reservoirs are residence time and the morphology. The residence time refers to the average time that a given water molecule will remain within a lake or reservoir. In lakes this figure is typically on the order of years or decades. Within reservoir systems this is typically weeks or months. This reduced residency time means that there is less time for internal recycling of nutrients to occur. The result is that the reservoir tends to flush the nutrients it receives from the watershed too quickly for sustained biological activity to occur. This is not a problem in the first one or two decades after impoundment due to the large amount of organic material that is within the newly inundated portion of the reservoir. This source of nutrients is in typically depleted in the 2nd decade post impoundment. Once these terrestrial nutrients are depleted, the reservoirs will have significantly reduced productivity. The shorter the residency time the faster the terrestrial nutrients will be depleted and the lower the long term sustainable productivity will become.

The morphology of reservoirs can have a significant impact on the productivity of the system. Most lake systems have well developed littoral zones. This results in significant internal cycling of nutrients preventing rapid flushing of nutrients out of the system. Reservoirs have very poorly developed littoral zones that undergo extreme water level fluctuations. These fluctuations result in the inability for a productive littoral biological community to develop and therefore perpetuate rapid flushing of nutrients out of the system. Dworshak Reservoir has short residency time (10 months) and poorly developed littoral zones. This results in the reservoir acting as an active conduit of nutrients from the upper watershed to the Clearwater River system.

Project Goal

The goal of this project is to provide improved cycling of nutrients within the reservoir resulting in a more productive fishery. To accomplish this objective the Corps performed a detailed evaluation of the nutrient conditions within the reservoir and developed a nutrient application

plan that would result in improved carbon flow through the system with no degradation in water quality.

The existing nutrient condition within the reservoir was determined based on information collected in several years prior to 2007. Nutrient, phytoplankton, zooplankton samples were taken throughout the reservoir in the years preceding the development of the nutrient prescription. This data pointed to a system that had severe nitrogen limitation, based on the rapid depletion of nitrate + nitrite within the epilimnion as well as the abundance of nitrogen fixing blue-green algae (Anabaena sp.).

Prescription Development

The prescription was developed using the area/volume/elevation curves. The prescribed dosages are sensitive to changes in reservoir elevation due the resultant changes in reservoir surface area. Initially, the Corps used the 2004 elevation curve to compute the volumes to be treated in each of the 3 reservoir sectors. In 2007 both nitrogen and phosphorus were added to the system. After reviewing the data from the 2007 growing season it was determined that there was sufficient bio-available phosphorus in the system due to the watershed contributions. Subsequent applications have consisted solely of nitrogen in the form of urea-ammonium nitrate blend (32-0-0). The Corps does not anticipate the addition of phosphorus to the system in the future due to the observed phosphorus concentrations within the epilimnion of the reservoir, and the permit does not authorize the discharge of fertilizers containing phosphorus.

The application protocol calls for weekly addition of urea-ammonium nitrate to the epilimnion during the primary growing season of the reservoir. The prescription was developed to supplement the nitrogen concentrations within the reservoir to prevent the exhaustion of nitrogen within the epilimnion. Many blue-green taxa have the ability to fix nitrogen from the atmosphere. Others can utilize ambient nitrogen at very low concentrations. When a system becomes depleted of nitrogen, the nitrogen fixing taxa can become the dominant taxa. By adding a small amount of nitrogen on a weekly basis it prevents the nitrogen levels from becoming depleted to levels that preclude the growth of non-nitrogen fixing taxa. The end result is a greater abundance of desirable edible phytoplankton taxa.

The 2009 weekly additions to each sector of the urea-ammonium nitrate are presented in Table 1. The application table is developed at the beginning of each field season and is based on historical reservoir elevation levels on a given date. If the reservoir is being operated differently from historically the application tables are recalculated to reflect actual conditions. The application occurs within the main body of the reservoir and does not include the Elk Creek or Little North Fork Clearwater arms. The application within the lower reservoir does not occur in the lower 5 kilometers of the reservoir. This allows time for the nitrogen to be utilized by the biological community rather than flushed out of the system. The average concentration of nitrogen being added to the system on a weekly basis is around 5 µg/L based on a 12 meter deep epilimnion. The application is so light it is not anticipated that sampling will be able to detect a change in nitrogen concentrations within the epilimnion. Data collected over the past 4 application seasons have confirmed that the nitrogen being added to the system is not significantly different from historical concentrations.

Proposed Effluent Limits

It has been determined that the application rates used in 2009 resulted in a positive response within the reservoir and should be the basis for future application efforts. The actual date of application and amount of application will need to be adjusted based reservoir levels and logistical concerns. The proposed effluent limits reflect the maximum amount of fertilizer that has been applied to date, plus 20%.

Table 1. Application Schedule for 2009.

2009 Schedule - Area 1 applications

Week	Date	M. Tons 32-0-0	Liters 32-0-0	Gallons 32-0-0	Lbs of Nitrogen	Application rate litres/min for 60 minutes	Assumed Elevation (M)	Assumed Elevation (Ft)
1	May 7	2.31	1,750	462	162	29	453	1486
2	May 14	2.38	1,800	475	167	30	458	1503
3	May 21	2.58	1,850	488	171	31	463	1519
4	May 28	2.69	2,000	528	185	33	468	1536
5	Jun 4	2.72	2,061	544	191	34	473	1552
6	Jun 11	3.42	2,588	683	240	43	478	1568
7	Jun 18	3.42	2,588	683	240	43	483	1585
8	Jun 25	3.51	2,657	702	246	44	487.1	1598
9	Jul 2	3.86	2,927	773	271	49	487.1	1598
10	Jul 9	3.86	2,927	773	271	49	487.1	1598
11	Jul 16	3.68	2,788	736	258	46	483.1	1585
12	Jul 23	5.57	4,217	1,113	391	70	483.1	1585
13	Jul 30	5.57	4,217	1,113	391	70	483.1	1585
14	Aug 6	5.57	4,217	1,113	391	70	483.1	1585
15	Aug 13	6.65	5,036	1,329	466	84	471.8	1548
16	Aug 20	6.65	5,036	1,329	466	84	471.8	1548
17	Aug 27	6.65	5,036	1,329	466	84	471.8	1548
18	Sep 3	6.65	5,036	1,329	466	84	471.8	1548
19	Sep 10	6.16	4,670	1,233	432	78	471.8	1548
20	Sep 17	6.16	4,670	1,233	432	78	465.4	1527
21	Sep 24	6.16	4,670	1,233	432	78	465.4	1527
22	Oct 1	6.16	4,670	1,233	432	78	465.4	1527
23	Oct 8	6.16	4,670	1,233	432	78	465.4	1527

2009 Schedule - Area 2 applications

Week	Date	M. Tons 32-0-0	Liters 32-0-0	Gallons 32-0-0	Lbs of Nitrogen	Application rate litres/min for 60 minutes	Assumed Elevation (M)	Assumed Elevation (Ft)
1	May 7	1.59	1,200	317	111	20	453	1486
2	May 14	1.69	1,280	338	119	21	458	1503
3	May 21	1.80	1,340	354	124	22	463	1519
4	May 28	1.88	1,390	367	129	23	468	1536
5	Jun 4	1.91	1,447	382	134	24	473	1552
6	Jun 11	2.33	1,769	467	164	29	478	1568
7	Jun 18	2.43	1,838	485	170	31	483	1585
8	Jun 25	2.52	1,908	504	177	32	487.1	1598
9	Jul 2	2.61	1,978	522	183	33	487.1	1598
10	Jul 9	2.69	2,039	538	189	34	487.1	1598
11	Jul 16	2.61	1,978	522	183	33	483.1	1585
12	Jul 23	3.92	2,971	784	275	50	483.1	1585
13	Jul 30	3.92	2,971	784	275	50	483.1	1585
14	Aug 6	3.92	2,971	784	275	50	483.1	1585
15	Aug 13	4.67	3,537	934	328	59	471.8	1548
16	Aug 20	4.67	3,537	934	328	59	471.8	1548
17	Aug 27	4.67	3,537	934	328	59	471.8	1548
18	Sep 3	4.67	3,537	934	328	59	471.8	1548
19	Sep 10	4.31	3,267	863	303	54	471.8	1548
20	Sep 17	4.31	3,267	863	303	54	465.4	1527
21	Sep 24	4.31	3,267	863	303	54	465.4	1527
22	Oct 1	4.31	3,267	863	303	54	465.4	1527
23	Oct 8	4.31	3,267	863	303	54	465.4	1527

2009 Schedule - Area 3 applications

Week	Date	M. Tons 32-0-0	Liters 32-0-0	Gallons 32-0-0	Lbs of Nitrogen	Application rate litres/min for 60 minutes	Assumed Elevation (M)	Assumed Elevation (Ft)
1	May 7	0.59	450	119	42	8	453	1486
2	May 14	0.64	485	128	45	8	458	1503
3	May 21	0.79	525	139	49	9	463	1519
4	May 28	0.83	575	152	53	10	468	1536
5	Jun 4	0.86	652	172	60	11	473	1552
6	Jun 11	1.15	871	230	81	15	478	1568
7	Jun 18	1.16	880	232	81	15	483	1585
8	Jun 25	1.21	915	242	85	15	487.1	1598
9	Jul 2	1.25	950	251	88	16	487.1	1598
10	Jul 9	1.30	984	260	91	16	487.1	1598
11	Jul 16	1.18	897	237	83	15	483.1	1585
12	Jul 23	1.76	1,333	352	123	22	483.1	1585
13	Jul 30	1.76	1,333	352	123	22	483.1	1585
14	Aug 6	1.76	1,333	352	123	22	483.1	1585
15	Aug 13	1.73	1,307	345	121	22	471.8	1548
16	Aug 20	1.73	1,307	345	121	22	471.8	1548
17	Aug 27	1.73	1,307	345	121	22	471.8	1548
18	Sep 3	1.73	1,307	345	121	22	471.8	1548
19	Sep 10	1.37	1,037	274	96	17	471.8	1548
20	Sep 17	1.37	1,037	274	96	17	465.4	1527
21	Sep 24	1.37	1,037	274	96	17	465.4	1527
22	Oct 1	1.37	1,037	274	96	17	465.4	1527
23	Oct 8	1.37	1,037	274	96	17	465.4	1527

D. Impact of Discharges upon Nitrogen Concentrations

To determine if the discharges would be protective of water quality, EPA has compared the maximum projected receiving water concentration of total nitrogen to the water quality criteria for nitrate + nitrite and ammonia.

Maximum Projected Receiving Water Concentration

The deleterious effects of excess nutrients are generally observed over large areas and over long periods of time. In addition, the nutrients are applied from a barge, immediately in front of the vessel's propellers (Scofield and Brandt 2009), which encourages rapid mixing of the fertilizer with the receiving water. Therefore, EPA has evaluated the impact of the discharge of nutrients on the reservoir based on complete mixing.

The only nutrient to be added in this project is urea-ammonium nitrate. This formulation is not a mineral and therefore is not subject to contamination by heavy metals. The calculation used in this section is for the concentration of nitrogen being added to the epilimnion. The maximum projected receiving water concentration is calculated from the following equation:

$$C_{max} = \frac{C_{Rec.\ water} \times V_{Rec.water} + C_{Nut} \times V_{nut}}{V_{Rec.water} + V_{nut}}$$

The application schedule calls for very low levels of nutrient addition in the spring and early summer. This is due to the amount of nitrogen entering the reservoir from watershed sources and the relatively low productivity that is occurring with colder water temperature. The maximum nutrient application occurs in the month of August. To determine the maximum receiving water concentration that would be most likely be impacted by the addition of urea-ammonium nitrogen EPA determined the maximum observed concentration of nitrite+nitrate observed in the month of August (2009) and determined the final concentration based on the maximum application rate.

Mass Balance

The effluent limit for the volume of fertilizer added is 3,100 gallons per application. This is equal to 11,735 liters. Every liter of 32:0:0 fertilizer has 0.420 kg (4.2×10^5 mg) of nitrogen in it. A discharge at the effluent limit would therefore result in 4,929 kgs of nitrogen being added on a weekly basis.

The volume of the epilimnion is approximately 520.4 billion (5.204×10^{11}) liters. However, Idaho's mixing zone policy states that, in lakes, "the total horizontal area allocated to mixing zones is not to exceed ten percent (10%) of the surface area of the lake" (IDAPA 58.01.02.060.01.f.i). The State of Idaho proposes to authorize a mixing zone that is limited to 10% of the epilimnion of Dworshak Reservoir. Therefore, only 10% of the reservoir's surface area and, in turn, 10% of the volume of the epilimnion (52.04 billion or 5.204×10^{10} liters), may be considered in this calculation.

The maximum ambient concentration of nitrite+nitrate observed in the month of August was 0.040 mg/L. Using this as an estimate of the background total nitrogen concentration, the maximum projected receiving water concentration can be calculated as follows:

$$\frac{0.040\ mg/L_{Rec.\ water} \times 5.204\times10^{10}L_{Rec.water} + 4.2\times10^{5}\ mg/L_{Nut} \times 11{,}735\ L_{nut}}{5.204\times10^{10}L_{Rec.water} + 11{,}735L_{nut}} = 0.135\ mg/L$$

The maximum projected receiving water concentration of total nitrogen is much less than the EPA-recommended drinking water criterion for nitrate + nitrite of 10 mg/L (EPA 1986), and also much less than the chronic water quality criterion for ammonia, which is 0.43 mg/L, evaluated at critical conditions for pH and temperature. Because the above equation calculates the *total* nitrogen concentration within the mixing zone, the concentrations of both ammonia and nitrate + nitrite (which are specific forms of nitrogen) will be less than the calculated value.

When one determines the amount of nitrogen that is being added to the system per liter of water within the entire epilimnion, the expected receiving water concentration is increase is 0.049 mg/L, which is an increase of 9 µg/L above ambient. When one considers the entire lake volume, the nitrogen is so diluted that one would expect less than a 2 µg/L increase. The reportable limit from the water quality laboratories is 1 µg/L. This means that the amount of nitrogen added to the system would be difficult to measure in the environment given the current methods for water analysis.

Another aspect of nutrient addition projects is that the nutrients are taken up by the biological community. Therefore, one would not expect to see a change in the nitrate + nitrite concentration in the water column. The data collected since 2004 has documented no increase in nitrate + nitrite concentrations within Dworshak Reservoir. There appears to be a decrease in nitrate + nitrite since application was started. This could be due to the project increasing the uptake efficiency of the system.

Appendix C: Draft Clean Water Act Section 401 Certification

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1118 F Street • Lewiston, Idaho 83501 • (208) 799-4370

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

March 4, 2010

Mr. Michael Lidgard
U.S. Environmental Protection Agency, Regional 10
1200 6th Avenue, OW-130
Seattle, Washington 98101

RE: Draft §401 Water Quality Certification and Antidegradation Review for the Draft NPDES Permit No. ID-00, for the U.S. Army Corps of Engineers

Dear Mr. Lidgard:

The State of Idaho Department of Environmental Quality (DEQ) received a preliminary draft NPDES permit for the U.S. Army Corps of Engineers discharge for the Dworshak Reservoir Nutrient Enhancement Pilot Project.

After review of the draft permit and fact sheet, DEQ submits the draft §401 water quality certification and antidegradation review for this draft permit. After the public comment period ends, DEQ will address any comments and issue a final certification after reviewing the proposed final permit.

Please direct any questions to John Cardwell at (208) 799-4370 or John.Cardwell@deq.idaho.gov.

Sincerely,

Clayton Steele
Regional Administrator
Lewiston Regional Office

Enclosures (2)

c: Doug Conde, Deputy Attorney General
Barry Burnell, Water Quality Division Administrator
Brian Nickel, EPA Region 10, Seattle
Johnna Sandow, DEQ

Idaho Department of Environmental Quality

DRAFT §401 Water Quality Certification

March 4, 2011

NPDES Permit Number: ID-00; Dworshak Reservoir Nutrient Enhancement Pilot Project

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Pursuant to the provisions of Section 401(a)(1) of the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 USC Section 1341 (a)(1), and Idaho Code §§ 39-101 et.seq., and 39-3601 et.seq., the Idaho Department of Environmental Quality (DEQ) has authority to review National Pollutant Discharge Elimination System (NDPES) permits and issue water quality certification decisions.

Based upon its review of the above-referenced permit and associated fact sheet, DEQ certifies that if the permittee complies with the terms and conditions imposed by the permit along with the conditions set forth in this water quality certification, then there is reasonable assurance the discharge will comply with the applicable requirements of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, including the Idaho Water Quality Standards (WQS) (IDAPA 58.01.02) and other appropriate water quality requirements of State law.

This certification does not constitute authorization of the permitted activities by any other state or federal agency or private person or entity. This certification does not excuse the permit holder from the obligation to obtain any other necessary approvals, authorizations or permits.

CONDITIONS THAT ARE NECESSARY TO ASSURE COMPLIANCE WITH WATER QUALITY STANDARDS OR OTHER APPROPRIATE WATER QUALITY REQUIREMENTS OF STATE LAW

1. The permittee shall submit to DEQ two copies of the Dworshak Reservoir Nutrient Enhancement Project Progress Report and Data Summary. At a minimum, this document shall include the following:
    - Description of the application activities;
    - Description of the environmental conditions (climate and hydrology);
    - Description of the monitoring methods and results (similar to the requirements in Part I.C.5 of the NDPES permit); and
    - Discussion of the results.

2. Within thirty days of receipt of the Dworshak Reservoir Nutrient Enhancement Project Progress Report and Data Summary, DEQ will respond with any questions, comments or requests for further information. If further information is

required by DEQ, the permittee shall submit such information to DEQ within thirty days of DEQ's request.

3. If at any time during the period of nutrient enhancement activities agency notification is required, the permittee shall notify the Department of Environmental Quality Lewiston Regional Office at (208) 799-4370 or email John.Cardwell@deq.idaho.gov.

4. Any equipment operated adjacent to waters of the State shall be maintained in a good state of repair in order to prevent an unauthorized release of pollutants into waters of the State. If an above ground spill or overfill of petroleum results in a release that exceeds 25 gallons or causes a sheen on nearby surface water, the responsible person must make an effort to contain the spill and notify the Emergency Response System at 1-800-632-8000.

5. The permittee shall be responsible for obtaining the required agreements necessary to implement the nutrient enhancement activities.

MIXING ZONES

Pursuant to IDAPA 58.01.02.060.01.f, DEQ authorizes a mixing zone for nitrogen that is limited to ten percent (10%) of the epilimnion of Dworshak Reservoir.

ANTIDEGRADATION

The antidegradation provision in Idaho's WQS provides that existing uses and the water quality necessary to protect the existing uses shall be maintained and protected (IDAPA 58.01.02.051.01). In addition, where water quality exceeds levels necessary to support uses (high quality water), that quality shall be maintained and protected unless DEQ finds, after intergovernmental coordination and public participation, that allowing lower water quality is necessary to accommodate important social or economic development in the area in which the waters are located (IDAPA 58.01.02.051.02).

The draft NPDES permit authorizes the U.S. Corps of Engineers to discharge nutrients into the Dworshak Reservoir. The intent of the project is to restore a balanced aquatic community and improve water quality within Dworshak Reservoir. The effluent limitations and requirements of the draft permit will ensure the state's numeric and narrative criteria will be met. The numeric and narrative criteria are set at levels which protect and maintain applicable designated and existing uses. Therefore, in accordance with IDAPA 58.01.02.051.01, the limits in the draft permit protect and maintain designated and existing uses in Dworshak Reservoir.

Furthermore, the limits in the draft permit are set at levels that will not result in degradation of the reservoir's water quality. In fact, implementation of the project is expected to enhance the aquatic life communities in the reservoir. As such, DEQ has concluded that the permit limitations and requirements will ensure the quality of Dworshak Reservoir is maintained, and the analysis necessary to lower water quality set forth in IDAPA 58.01.02.051.02 is not triggered.

OTHER CONDITIONS

This certification is conditioned upon the requirement that any material modification of the permit or the permitted activities, including without limitation, any modifications of the permit to reflect new or modified TMDLs, wasteload allocations, site specific criteria, variances, or other new information, shall first be provided to DEQ for review to determine compliance with Idaho WQS and to provide additional certification pursuant to §401.

RIGHT TO APPEAL FINAL CERTIFICATION

The final Section 401 Water Quality Certification may be appealed by submitting a petition to initiate a contested case, pursuant to Idaho Code § 39-107(5), and the Rules of Administrative Procedure Before the Board of Environmental Quality, IDAPA 58.01.23, within 35 days of the date of the final certification.

Questions regarding the actions taken in this certification should be directed to John Cardwell, Surface Water Manager at (208) 799-4370 or John.Cardwell@deq.idaho.gov.

DRAFT

Clayton Steele
Regional Administrator
Lewiston Regional Office

DRAFT ANTIDEGRADATION REVIEW

NPDES Permit # ID-00

Dworshak Reservoir Nutrient Enhancement Pilot Project

Idaho Department of Environmental Quality
March 4, 2011

Antidegradation Policy

The Idaho Water Quality Standards (WQS) contain an antidegradation policy providing three levels of protection to water bodies in Idaho. The first level of protection (Tier 1 protection) applies to all water bodies and assures that existing uses of a water body will be maintained. The second level of protection (Tier 2 protection) applies to those water bodies that are considered high quality and assures that no lowering of water quality will be allowed unless it is deemed to be necessary to accommodate important economic or social development. The third level of protection (Tier 3 protection) applies to water bodies that have been designated outstanding resource waters and requires activities to not cause a lowering of water quality.

Idaho has not designated any outstanding resource water bodies. In addition, Idaho is in the process of adopting antidegradation implementation procedures in its WQS. Until antidegradation implementation rules and guidance are developed, DEQ is taking a pollutant-by-pollutant approach to antidegradation implementation. Any water body that is impaired will not be considered high quality for the pollutant causing the impairment. The water body will however be considered high quality for any pollutants not causing an impairment.

Description of the Activity

This Corps of Engineers (Corps) proposes to discharge liquid 32-0-0 urea-ammonium nitrate fertilizer to the epilimnion (upper 33 feet) of Dworshak Reservoir from a barge that is fitted with a delivery tank. The approximate volume of lake water that is expected to receive some level of nitrogen enhancement is 137 billion gallons. The EPA National Pollutant Discharge Elimination System (NPDES) permit allows a maximum of 3,100 gallons of 32:0:0 urea ammonium nitrate to be added to the reservoir epilimnion on a weekly basis from April 1st to September 30th of each year of the pilot project.

The intent of the project is to restore a balanced aquatic community and improve water quality within Dworshak Reservoir. As the reservoir has aged (the dam was completed in 1973), the biological productivity of the reservoir has declined, which has resulted in a decline in the health of the kokanee population. Kokanee feed on zooplankton populations, and the zooplankton populations are typically depleted by mid-summer. As a result of the lack of food, many of the one-year-old kokanee spawn rather than waiting another year before spawning (which is typical in situations where food is not limited). Because kokanee die after spawning, many members of the population are not contributing to the fishery. It is expected that this nutrient enhancement project will lead to increased zooplankton populations within the reservoir through the summer, which will enhance the fishery.

Pollutants of Concern
The project involves the addition of nutrients to Dworshak Reservoir; thus, nutrients are the pollutants of concern for this discharge. Because the Corps will discharge liquid 32-0-0 urea-ammonium nitrate fertilizer, nitrogen is the specific nutrient of concern.

Receiving Water Body Level of Protection
The facility discharges to Dworshak Reservoir, assessment unit ID17060308CL002_06. According to the federally approved 2008 Integrated Report, this assessment unit is considered a high quality water and is subject to the provisions of IDAPA 58.01.02.051.02 for all parameters of concern.

Protection and Maintenance of Existing Uses (Tier 1 Protection)
Dworshak Reservoir is designated for the following beneficial uses: cold water aquatic life; salmonid spawning; primary contact recreation; domestic, industrial, agricultural water supply; wildlife habitat; and aesthetics. Dworshak Reservoir is also a special resource water. There is no other information indicating the presence of existing beneficial uses beyond those uses already designated. In order to protect and maintain designated and existing beneficial uses, a permitted discharge must comply with the WQS, which contain narrative and numeric criteria. The numeric and narrative criteria are set at levels for the protection of existing and designated beneficial uses.

The effluent limitations and associated requirements contained in the Dworshak NPDES permit and §401 certification are set at levels to comply with the narrative water quality standard for nutrients. The narrative nutrient criterion states, "Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses" (IDAPA 58.01.02.200.06). Nutrient enhancement activities in Dworshak Reservoir have been ongoing for the past 4 years. During this period, there has not been documentation of visible slime growth or other nuisance aquatic growths impairing beneficial uses resulting from implementation of the nutrient enhancement project. The permit authorizes approximately 20% more nitrogen than has been previously discharged. The nitrogen is being added to the upper 33 feet of the reservoir (epilimnion), or approximately 137 billion gallons of lake water. Because the dilution ratio of water to fertilizer is at least 16,000,000:1, DEQ does not expect the addition of nutrients at the levels authorized by the permit to result in a violation of the narrative nutrient criterion. Furthermore, the permit requires the discharge to stop if chlorophyll *a* levels exceed 3.0 µg/L or if the sechii depth is less than 3.0 meters. These target values are equivalent to the median values observed during a baseline water quality monitoring effort conducted between 1993 and 1996. Therefore, these target values represent pre-treatment conditions of Dworshak Reservoir. Because Dworshak Reservoir is fully supporting its aquatic life and recreation beneficial uses, these target values (representative of baseline conditions) comply with the narrative criterion for nutrients. If these target values are exceeded, then there is concern for the algae population to potentially become a nuisance, which is why the permit requires cessation of the discharge when these target values are exceeded.

Because the nutrients are taken up by the biological community, changes in the nitrite + nitrate concentration in the water column is not expected. Data collected from 2004 to 2010 have shown no increase in nitrite + nitrate concentrations within Dworshak Reservoir, possibly due to the project increasing the uptake efficiency of the system. A comprehensive monitoring plan (TerraGraphics, 2008) has been used to assess changes in water quality and productivity within the system. A complete summary of this information can be found in the annual progress reports (Stockner and Brandt, 2008; Brandt and Scofield, 2009; and Scofield, et al. 2010). Based on this information, DEQ has determined the permitted activity will protect and maintain existing and designated beneficial uses in Dworshak Reservoir.

Protection of High Quality Waters (Tier 2 Protection)

The permit authorizes the Corp to discharge nutrients to Dworshak Reservoir, which is considered high quality for nutrients. As such, the quality of the reservoir must be maintained and protected, unless it is deemed appropriate and necessary to allow a lowering of water quality.

Based on a review of historical limnological data, it was determined that Dworshak reservoir was experiencing a nutrient imbalance. The system was experiencing nitrogen limitation, which was promoting the production of an inedible blue green algae community and limiting edible algal, thereby short circuiting the food web or green algae carbon pathway of the reservoir. Bio-available nitrogen has been added to Dworshak Reservoir in the epilimnion layer from April 2007 to July 2010. Baseline water quality monitoring was conducted for approximately 3 years prior to implementation of the pilot project. Comparing data collected during the pilot project to the baseline water quality data does not indicate there is an increase in the nitrite + nitrate concentrations within the reservoir. In fact, there appears to be a decrease in the nitrite + nitrate concentrations since the pilot project was initiated. This could be due to an increase in the uptake efficiency of the system (Scofield, et al. 2010). The NPDES permit authorizes a 20% increase in the amount of nitrogen added to the system. A simple mass-balance of this addition with the entire volume of the lake indicates there could be an increase in the nitrite-nitrate concentration; however, such an increase is not expected to be measurably different from background concentrations. Furthermore, it is likely that the nitrogen will be utilized by the algal community, reducing the water column concentrations of nitrogen.

By adding nitrogen, the goal of the project is to improve the carbon flow within the reservoir, which should result in an increase in the phytoplankton community, promoting a strong zooplankton community that will become an abundant forage base for kokanee, rainbow trout, and small mouth bass fry. Secondary goals of this project are to decrease blue-green algae abundance and improve late season water clarity. Kokanee will be the primary species benefiting from this project; however, it will also benefit other resident fish throughout the entire ecosystem. An improved kokanee population provides forage for the reservoir's bull trout and small mouth bass. Also, having 300,000 adult kokanee migrate up tributary streams and die each fall will add nutrients to these stream systems,

thereby enhancing the biological integrity of the waters located above Dworshak Reservoir.

Based on these considerations, DEQ has concluded that this discharge will not result in a lowering of water quality in the Dworshak Reservoir. As such, the proposed permit is expected to maintain the existing water quality in the reservoir, and it is expected that the project will enhance the beneficial uses of the reservoir.

References

IDAPA 58.01.02. Water Quality Standards and Wastewater Treatment Requirements.

Brandt and Scofield, 2009. Dworshak Reservoir Nutrient Enhancement Project: 2009 Progress Report and Data Summary. Prepared by TG Eco-Logic, LLC, 10905 E. Montgomery Drive, Suite 3, Spokane, WA 99206, and John G. Stockner, Eco-Logic Ltd, West Vancouver, B.C. V7V2J4. Prepared for the U.S. Army Corps of Engineers, Walla Walla District, WA, and the Idaho Department of Fish and Game, Lewiston, ID.

Scofield, et al. 2010. Draft: Dworshak Reservoir Nutrient Enhancement Project: 2010 Progress Report and Data Summary. Prepared by TG Eco-Logic, LLC, 10905 E. Montgomery Drive, Suite 3, Spokane, WA 99206; Darren Brandt, Advanced Eco-Solutions Inc., 1324 North Liberty Lake Road, #124, Liberty Lake, WA, and John G. Stockner, Eco-Logic Ltd, West Vancouver, B.C. V7V2J4. Prepared for the U.S. Army Corps of Engineers, Walla Walla District, WA, and the Idaho Department of Fish and Game, Lewiston, ID.

Stockner and Brandt, 2008. Dworshak Reservoir Nutrient Enhancement Project: 2008 Progress Report and Data Summary. Prepared by Terra Graphics Environmental Engineering, Inc., 10905 Montgomery Drive, Suite 3, Spokane, WA 99206. Prepared for the U.S. Army Corps of Engineers, Walla Walla District, WA, and the Idaho Department of Fish and Game, Lewiston, ID.

TerraGraphics, 2008. Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) for Dworshak Reservoir Nutrient Enhancement Project. Prepared by TerraGraphics Environmental Engineering, Inc., 108 W. Idaho Avenue, Kellogg, ID 83837 and Idaho Department of Fish and Game, Lewiston ID; for the U.S. Army Corps of Engineers, Walla Walla District and the U.S. Environmental Protection Agency, Region X, Seattle, WA.

Appendix D: Antidegradation Review by the Idaho Department of Environmental Quality