US Army Corps
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DWORSHAK RESERVOIR LONG-TERM NUTRIENT SUPPLEMENTATION PROGRAM

DWORSHAK DAM AND RESERVOIR
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ENVIRONMENTAL ASSESSMENT

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Dworshak Long-term Nutrient Supplementation Program
Environmental Assessment

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SECTION 1. INTRODUCTION

The U.S. Army Corps of Engineers, Walla Walla District (Corps) is proposing to implement a long-term nutrient supplementation program at the Dworshak Dam and Reservoir Project (Figure 1-1) on the North Fork of the Clearwater River near Ahsahka, Idaho. The Corps manages the reservoir and surrounding lands for multiple purposes including recreation and fish and wildlife habitat/mitigation. This nutrient supplementation program would address biological productivity in the reservoir and assist with the management of certain undesirable blue-green algae that adversely affect reservoir fisheries and interfere with public use of the reservoir.

This environmental assessment (EA) addresses potential environmental effects associated with the proposed action and any reasonable alternatives. As required by the National Environmental Policy Act (NEPA) of 1969 and subsequent implementing regulations promulgated by the Council on Environmental Quality, this assessment is being prepared to determine whether the proposed action constitutes a " major Federal action significantly affecting the quality of the human environment…" and whether an environmental impact statement is required.

Figure 1-1. Dworshak Dam

1.1 Background

The Dworshak Dam and Reservoir Project (Project) was authorized in the 1962 Flood Control Act (P.L. 87-874). The dam was completed in 1972 and started producing power in 1973. The 717 foot tall structure is a concrete gravity hydroelectric dam located at River Mile (RM) 1.9 on the North Fork Clearwater River about four miles northwest of Orofino, Idaho and 47 miles east of Lewiston, Idaho (Figure 1-2). All Dworshak Project lands are within Clearwater County Idaho, and about 6,300 acres of the southern portion of the Project is within the boundaries of the Nez Perce Tribe Indian Reservation. The reservoir drains an area of 2,440 square miles and has a maximum operating pool at 1,600 feet above mean sea level (msl).

Figure 1-2. Location of Dworshak Dam and reservoir

The Project covers about 46,000 acres. At normal full pool, the surface area of Dworshak Reservoir is about 17,090 acres, with about 29,318 acres of Project lands surrounding the reservoir and managed for public recreation, wildlife habitat, and wildlife mitigation. The reservoir itself is 54 miles long, one mile wide (maximum) and approximately 650 feet deep (maximum). The two major tributaries are Elk Creek and Little North Fork Clearwater River.

1.2 Authority

Dworshak Project is a multi-purpose water resource project with five congressionally authorized purposes: Navigation, Flood Control, Hydropower, Fish and Wildlife, and Recreation. Various Federal laws and regulations guide how natural resources are to be managed on Corps projects. The Flood Control Act of 1944 (P.L. 78-534) established recreation as a project purpose.

1.3 Previous Nutrient Supplementation Studies

The Corps has previously studied adding nutrients to Dworshak Reservoir to alter the food web. The Corps started a 5-year pilot study in 2007 in conjunction with the Idaho Department of Fish and Game (IDFG) to assess the feasibility of increasing the biological productivity of Dworshak Reservoir and abundance of edible phytoplankton[1] by adding inorganic liquid fertilizer[2]. The two primary goals of the study were to improve the carbon flow in the reservoir to increase the forage base for the kokanee[3] population and to decrease the blue-green algae abundance. The Corps and IDFG agreed to suspend the nutrient supplementation pilot study in July 2010 when the Environmental Protection Agency (EPA) changed its original determination that presumed beneficial actions such as nutrient supplementation did not require a National Pollutant Discharge Elimination System (NPDES) permit. The EPA subsequently issued a NPDES permit in October 2011.

The Corps and IDFG restarted the pilot study in 2012 as the results of the truncated pilot study had shown promise, but were inconclusive as to whether this type of supplementation program was feasible or effective on a long term basis. Also, any accumulated benefits generated from the supplementation efforts appeared to be lost when fertilizer application ceased in 2010. The continued pilot study ran from spring 2012 to fall 2016. Data collected through monitoring during this period indicated the effects of the nutrient supplementation were positive compared with data collected from the reservoir before the addition of the nitrogen. A summary report prepared after the 2015 growing season indicated the amount of edible phytoplankton, zooplankton biomass, primary productivity, and kokanee size increased while the amount of toxin-forming blue-green algae decreased (Brandt, 2016).

1.4 Purpose and Need

The purpose of the proposed long-term nutrient supplementation program is to enhance the biological productivity of Dworshak reservoir, primarily to improve the kokanee fishery, and to decrease the growth of undesirable blue-green algae. Any alternatives considered must not adversely affect water quality in the reservoir or operations of the two fish hatcheries downstream of the dam. The alternatives must also comply with applicable laws including the Endangered Species Act (ESA) and the current Biological Opinion for the operation for the Federal Columbia River Power System (FCRPS).

The biological productivity enhancement is needed because of the low nutrient concentrations in the reservoir and the effects this has on the food web, including the

[1] Plankton are tiny aquatic organisms that form the base of the food web. They can be plant-like (phytoplankton) or animal-like (zooplankton).
[2] The Corps applied only nitrogen for every year except 2007 when the Corps added nitrogen and phosphorus.
[3] Kokanee are landlocked sockeye salmon that spend their entire life in freshwater and do not migrate to the ocean.

fish populations, primarily kokanee. The enhancement would also address the periodic increases in certain blue-green algae species that can release toxins into the reservoir which may adversely affect the health of visitors, their pets, or other animals that drink the water.

In the years immediately following the completion of Dworshak Dam, nutrients were plentiful within the reservoir because of the decomposition of organic matter on the thousands of acres that were inundated. The result was high biological productivity. However, this was a temporary situation and over time, Dworshak Reservoir productivity declined as a result of a loss of marine derived nutrients, nutrients being tied up in reservoir bottom sediments (Stockner and Brandt, 2006), and the low amount of nutrients flowing into the reservoir from the North Fork Clearwater River and its tributaries.

In 1972, kokanee salmon were introduced into the reservoir. This species feeds primarily on plankton but also eats insects, bottom organisms, and larval fish. Spawning normally occurs along inlet streams of lakes or along lake shorelines. Both lake shoreline and inlet stream spawning kokanee were introduced into the reservoir. However, only inlet stream spawning kokanee survived. Since its introduction, kokanee has become the primary fishery at Dworshak Reservoir. Because plankton is the main food source for kokanee, the amount of nutrients available in the reservoir becomes a critical factor in sustaining and growing this fishery as well as others. The decline in reservoir nutrients/productivity produced a corresponding decline in both the number and size of kokanee. In addition to effects on the kokanee fishery, current reservoir nutrient conditions have also affected phytoplankton species. The lack of sufficient nitrogen levels in the reservoir, especially towards late summer and fall, create conditions which promote the growth of inedible blue-green phytoplankton/algae. The blooms from two species of blue-green algae known to be present in the reservoir, *Anabaena species* (sp) and *Microsystis sp*, can present a public health risk (e.g. rash, illness) because of the anatoxin and microsytin toxin they may produce.

The objectives of the nutrient supplementation program are to:

- provide a balanced nutrient loading for Dworshak Reservoir throughout the spring and summer
- improve the carbon flow within the reservoir, which may result in a change in the phytoplankton community that promotes an increase in more beneficial phytoplankton (which is consumed by zooplankton, a forage base for kokanee, rainbow trout, and smallmouth bass fry) and a reduction in the amount of inedible blue-green algae
- improve water quality by decreasing blue-green algae abundance, promote desirable phytoplankton and zooplankton, and improve late season water clarity
- improve the overall health and size structure of the kokanee population in the reservoir (Environmental Protection Agency (EPA), 2011).

SECTION 2. ALTERNATIVES

2.1 Alternative Development

The Corps considered five alternatives for enhancing the biological productivity of Dworshak Reservoir. These alternatives included different types of action including changing the reservoir operation and adding nutrients. These alternatives are described below.

As required by the NEPA, the Corps included an existing condition or "no action" alternative. The "no action" alternative serves as a baseline against which the effects of the proposed action and other identified alternatives are measured.

2.1.1 Alternative 1 - No Action

Under the No Action alternative, the Corps would operate the reservoir as it currently does to meet the authorized project purposes. The Corps would not implement any actions to enhance the biological productivity of the reservoir such as adjusting reservoir operations or adding nutrients to the reservoir.

2.1.2 Alternative 2 – Discontinue Reservoir Drawdown in Summer

Under Alternative 2, the Corps would cease its current practice of drawing down Dworshak reservoir during the summer to improve passage conditions in the Snake River for Endangered Species Act-listed fish. The Corps has been drawing down the reservoir to augment flows in the lower Snake River in compliance with the National Marine Fisheries Service (NMFS) Biological Opinion for operation of the Federal Columbia River Power System (FCRPS), of which Dworshak Dam is a part. Generally, the Corps draws down the reservoir up to two feet per day starting on July 5 and continues the drawdown until the reservoir is 80 feet below normal full pool, usually between August 30 and September 15. If the Corps did not release the water, the reservoir level would remain at full pool during the growing season. This would allow riparian and wetland vegetation to grow along the shoreline and add nitrogen to the reservoir. This alternative would not comply with the Endangered Species Act as the Corps would not be following the Biological Opinion. Because the area of shoreline vegetation would be relatively small compared with the size of the reservoir, this alternative would have a minimal effect in addressing the lack of nitrogen in the reservoir.

2.1.3 Alternative 3 – Mix Reservoir Sediments

Under Alternative 3 the Corps would use an aerator or bubbler system to facilitate mixing of sediment and any associated nutrients from the bottom of the reservoir with the upper layers of the reservoir, thereby making nutrients available to phytoplankton. This alternative would require a large amount of compressed air, which would require a large power source to implement. Given the large size of the reservoir

and its remote location, the mechanical and power system needed for this alternative is not practical. An aerator system would also likely have an adverse effect on water quality in the reservoir.

2.1.4 Alternative 4 – Distribute Fish Carcasses

Under Alternative 4 the Corps would distribute fish carcasses around the reservoir to mimic the pre- Dworshak Dam conditions when adult steelhead returned to the North Fork Clearwater to spawn and die. Their spawned out carcasses provided a source of nutrients including trace nutrients derived from the ocean. However, use of the raw carcasses may introduce fish disease, in particular IHN (infectious hematopoietic necrosis) to the reservoir. This is undesirable, especially as the reservoir is the water source for two fish hatcheries below the dam on the North Fork Clearwater. The Corps could consider using fish carcasses that have been ground up, baked, and formed into pellets as the baking process kills the IHN. However, given the large size of the reservoir and the relatively high cost of these processed carcasses, the use of pellets alone would not be practical.

2.1.5 Alternative 5 – Continue Applying Liquid Fertilizer - Proposed Action

Under Alternative 5 the Corps would continue to apply inorganic liquid fertilizer (nitrogen) to Dworshak Reservoir as performed under the two pilot studies. The Corps would continue to monitor the effects of the program on water quality and biological productivity in the reservoir. Based on the results of the monitoring, the Corps would use adaptive management to make adjustments to the program as needed. Adjustments could include adding additional nutrients such as phosphorous, increasing or decreasing the amount of nutrients added, or possibly adding baked fish pellets to provide trace elements. Under the proposed action, the Corps would resume adding liquid fertilizer to the reservoir starting in spring 2017. The Corps would continue to comply with the requirements of the NPDES permit as EPA has administratively extended the permit for an indefinite time period.

Fertilizer would be delivered to the dam in a commercial tanker truck and offloaded into storage tanks. The storage tanks would be double contained and located in a secured area that is closed to the public. A distribution tank, loaded on a truck and containing a sufficient quantity of fertilizer for two applications (i.e. one application going up the reservoir and one application on the return trip), would be driven onto a barge that would be used for dispersing the fertilizer. At least two people would be present during both the loading of the truck/tank onto the barge and also when it is unloaded from the barge.

Fertilizer would be applied once per week by the Corps from April 1 through September 30 each year, however, the specific application start and end dates within the designated time frame would change from year to year and depend primarily on water temperature. Generally, application would start around the last week of April and end the last week of September. The Corps has divided the reservoir into three

application zones (Figure 2-1). Application rates would differ for each application zone (Corps, 2007).

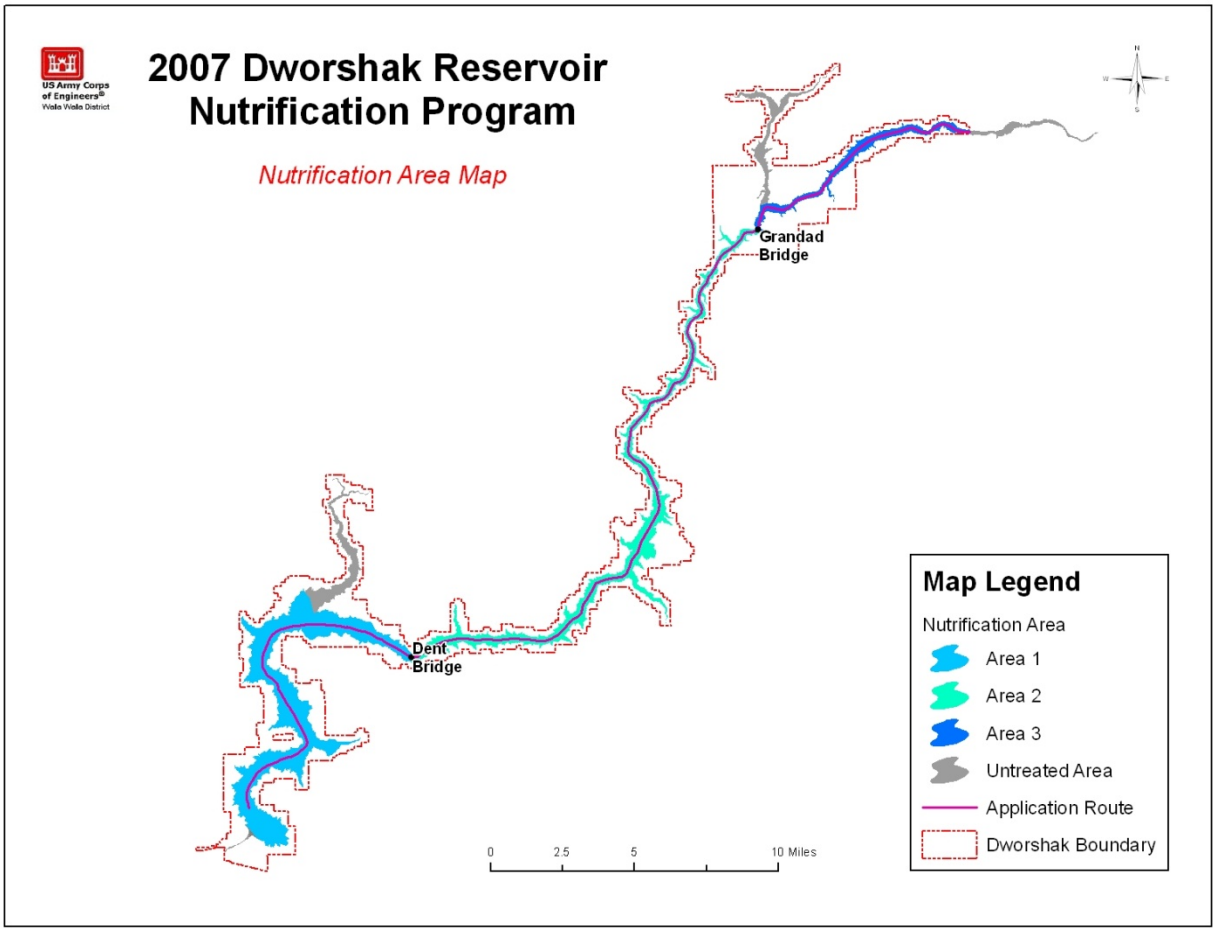

Figure 2-1. Dworshak Reservoir Nutrient Supplementation Application Zones

The fertilizer would be applied to the reservoir via a self-propelled barge that would typically run between five and eight mph in order to discharge up to 3,100 gallons of nitrate in application zones 1, 2, and 3. The reservoir contains approximately 93 billion gallons of water at full pool (1,600 feet msl), so this application rate equates to about 1 teaspoon of nitrogen fertilizer per 39,000 gallons of water. A bulk fertilizer tank would be loaded onto the barge and secured (Figure 2-2). The liquid fertilizer would be pumped from the tank through a spreader bar as the barge travels through the reservoir.

Figure 2-2. Dworshak Reservoir Liquid Fertilizer Application Barge

The volume of fertilizer released would be based on barge speed and controlled with commercial, computerized fertilizer application equipment, linked with a Global Positioning System (GPS). The fertilizer would be injected just below the water surface and mixed by the barge's wake and prop wash. The application process would take one day per week. After the first day of application going up the reservoir, the barge would be moored near Grandad Bridge. The following week, the crew would repeat the application process in reverse (i.e. going down the reservoir), unload the empty tank, and park the barge at the end of trip (EPA, 2011; Corps, 2007).

The weekly application rate for the liquid fertilizer would vary based on the volume of the reservoir at the time of the application. Each week, the pool level would be checked and the appropriate amount of fertilizer for the calculated volume of water would be applied. As the season progresses, the quantity of applied fertilizer would increase because as the water warms, the plankton in the reservoir consume increased quantities of nutrients. The plankton should utilize and bind the added nutrients within about 12 hours or less of the weekly treatment. An estimate of quantities of fertilizer which might be needed for each weekly treatment was calculated by using reservoir volumes from 2004. The estimates showed the volume of fertilizer necessary per application ranging from about 1,100 to 2,260 gallons (Stockner and Brandt, 2006).

These estimated quantities were also anticipated to be close to the amounts of fertilizer that would actually be used for each application.

The Corps would continue to monitor the long-term supplementation program using the same locations and methods as it did for monitoring the pilot studies. Sampling to support the monitoring would take place monthly starting in March and ending in November. Physical, chemical, and biological sampling would occur at the same seven locations listed in Table 2-1, including one site on the North Fork Clearwater River below the dam (Figure 2-3). Currently established monitoring sites would be used for comparison with historic data.

Table 2-1. Monitoring Stations and Location Descriptions

Site Name	Description
NFC	In North Fork Clearwater River (NFC) near boat ramp approximately 1.25 miles (2 km) below Dworshak Dam.
RK-2	At Corps of Engineers water quality station along the log boom surrounding the forebay.
EC-6	At the no wake buoy in Elk Creek (EC) arm.
RK-31	At the Corps of Engineers water quality buoy downstream of Cranberry Creek.
RK-56	At the Corps of Engineers water quality buoy between Silver and Gold Creeks.
LNF-3	At the approximate location of the former Corps of Engineers water quality buoy near the mouth of Gleason Creek.
RK-72	At the Corps of Engineers water quality buoy between Benton and Anderson Creeks.

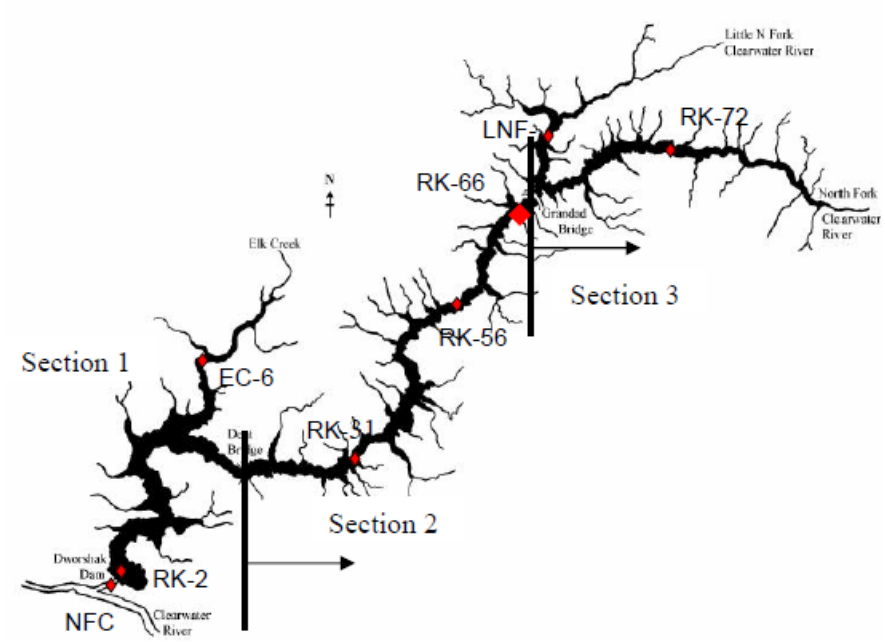

Figure 2-3. Monitoring station locations

Physical characteristics the Corps would monitor include:

- Volume of the epilimnion[4] based on reservoir water level and profile
- Dissolved oxygen
- Light penetration
- Light absorption
- Temperature profile
- Thermocline depth[5]
- Total dissolved solids.

Chemical parameters would include:

- Total nitrogen applied per lake section in pounds/week
- Total ammonia per lake section in pounds/week
- Nitrate + nitrite per lake section in pounds/week
- Dissolved organic carbon
- Dilution ratio, monthly average and the weekly maximum

The biological monitoring would include identification and amount of:

- Chlorophyll-*a*

[4] The epilimnion is the surface layer of water in a lake.
[5] The thermocline is the depth at which the reservoir thermally stratifies into a layer of warmer water above a layer of colder water.

- Picoplankton
- Phytoplankton (includes blue-green algae)
- Zooplankton

2.2 Screening of Alternatives

The Corps identified screening criteria to determine which alternative to consider further. These criteria are:

- Must not have adverse effects on the fish hatcheries on the North Fork Clearwater River downstream of Dworshak Dam
- Must not adversely affect water quality in the reservoir
- Must comply with current NMFS Biological Opinion for the FCRPS.

Table 2-2 lists the screening criteria and indicates if the alternative met the criteria.

Table 2-2. Screening of Alternatives

Alternative	No adverse effects on downstream hatcheries	No adverse effect on water quality	Complies with NMFS Biological Opinion	Retain for further evaluation
1.No Action	yes	yes	yes	yes
2.Discontinue drawdown	yes	yes	no	no
3. Mix the reservoir	yes	no	yes	no
4. Distribute fish carcasses or pellets	no	yes	yes	no
5.Continue adding fertilizer	yes	yes	yes	yes

The no action alternative does not meet the purpose and need as it does not address the need to enhance productivity in the reservoir, but was carried forward as required by NEPA to set the baseline from which to compare all other alternatives. Alternative 2 would not comply with the NMFS Biological Opinion and was not carried forward. Alternative 3 would adversely affect water quality in the reservoir and was not carried forward. Alternative 4 has the potential to introduce disease into the downstream fish hatcheries and was not carried forward. Alternative 5 was the only alternative that met the criteria and was therefore carried forward for evaluation.

The Corps, after consideration of potential environmental effects (Section 3); compliance with other applicable environmental laws/regulations (Section 4) and any required coordination, consultation and public involvement (Section 5) has, subject to additional public comment on this EA, identified Alternative 5, Continue Application of Liquid Fertilizer, as its preferred alternative.

SECTION 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 Introduction

This section describes the environmental resource areas the Corps determined are relevant to the two alternatives being considered and evaluates the effects of the alternatives on those resources. The Corps considered, but did not identify, any potential effects to air quality, climate change, cultural resources, hazardous/toxic materials, socio-economics, vegetation, wetlands, or wildlife.

3.2 Water Quality

3.2.1 Affected Environment

Dworshak Reservoir is on the North Fork Clearwater River (NFCR). Elk Creek and the Little North Fork are the two major tributaries that drain into the reservoir. The majority of annual runoff for the NFCR is derived from a combination of winter rains and spring snowmelt. The streamflow pattern in the NFCR is characterized by low flows from late July through February, increasing flows during March, high flows from April through May or June, and receding flows in late June and July. The magnitude of flows generated by spring runoffs vary with the amount of snow accumulated, temperatures, and the amount of rainfall received in the area.

Dworshak reservoir is a deep, cold-water water body characterized by low watershed nutrient contributions and a lack of point sources that lead to oligotrophic (low nutrients and productivity) conditions along the thalweg and mesotrophic (medium concentrations of nutrients and productivity) states in some of the inlet areas.

The thermal characteristics of the 53-mile reservoir can be divided into two reaches. The deeper, lower 20 miles are monomictic (mixing occurs once a year), and the middle and upper reaches are dimictic (mixing occurs twice a year). Thermal stratification, or temperature layering, of the reservoir generally begins in late April, and by mid-May a distinct thermocline has developed and remains into November. Depth to the thermocline increases as the summer progresses from about 15 feet in May to July, about 20 to 25 feet in August, and about 25 to 30 feet in September. During July and August, the average temperature of the epilimnion (surface layer of water) typically ranges from 70ºF to 75ºF. Waters deeper than 100 feet generally remain below 45ºF the year around.

Water depth, distance upstream, biological activity, and season of the year are variables affecting dissolved oxygen levels in the reservoir. Dissolved oxygen concentrations are generally high year round in the epilimnion (percent saturation typically ranges from slightly less than 100% to 120%) and are lowest in the hypolimnion during the summer and fall. Concentrations of less than 5 mg/L have been

documented in the lower depths of the water column at sample stations above RM 19 (River Kilometer or RK 31) as well as in the Elk Creek arm due to organic matter input. The water column in the forebay is well oxygenated while values less than 2 mg/L have been measured near the sediment-water interface above RM 41 (RK 72) due to organic matter input.

Light attenuation in the reservoir is governed by suspended particles such as silts, clays, mica, algae, zooplankton, and detritus in the water column. Wave action and slumping of exposed shoreline material is a continuing source of turbidity in the reservoir, especially in the near-shore zone. The trend through Dworshak Reservoir is for generally high turbidity with minimum Secchi disc readings[6] occurring in the summer-fall period. Annual Secchi disc averages typically range from 3 to 5 m, and seasonally low values are usually recorded in inlet areas, such Elk Creek.

Conductivity is a measure of the amount of ions in solution. Average reservoir values are relatively low, ranging from about 25 to 35 µS/cm and correlates with the nutrient- status of the reservoir.

3.2.2 Environmental Effects

3.2.2.1 Alternative 1 – No Action

Under Alternative 1, the physical, chemical, and biological parameters used to describe water quality would revert to conditions similar to those documented in the 1990's and during the recent non-fertilization periods for the foreseeable future. In the long-term**,** the eutrophication process (i.e., the natural aging of the water body that results in higher nutrient concentrations and productivity due to the input of nutrients and sedimentation) in the reservoir will continue, albeit at a rate that may appear slow compared to a human lifetime. Additionally, as long as the operation of the reservoir includes an annual 80-ft drawdown, a littoral zone with the potential to add nutrients, biological productivity, and fish habitat to the system will not develop.

Field and laboratory methods may have changed over time, and inter-annual variability cannot be assessed without a long-term dataset, but useful comparisons can be made between some of the data collected in the mid-1990's and the information described in recent reports to evaluate future conditions under No Action (Table 3-1). For example, the average Secchi disc depth for the non-fertilized periods reported by Wilson and Corsi (2016) was 4.2 m while the seasonal averages for 1995 and 1996 were less, at 3.0 and 3.6 m, respectively. However, there is considerable overlap in the 95% confidence intervals which implies that most of the differences are not significant.

[6] Measurement of water transparency performed by lowering a black and white disk into water and recording the depth at which the disk is no longer visible.

Table 3-1. Comparison of historic and recent non-fertilization years water quality data

Parameter	**Historic Data (1995-1996)**	**Non-fertilization Years (2004-2006)**	**Non-fertilization Year (2011)**
Secchi disc depth	3.0- 3.6m	4.2 m	N/A
Total phosphorus	0.009 – 0.012 mg/L	0.014 – 0.020 mg/L	0.005 - 0.011 mg/L
Nitrate-nitrogen plus nitrite-nitrogen	0.011-0.015 mg/L	0.010-0.024	0.005 mg/L
Chlorophyll-*a*	2.94-4.3 µg/L	2.28 µg/L	N/A
Carbon uptake	448 mg/m^2/day - 359 mg/m^2/day	N/A	343 mg/m^2/day
Total phytoplankton biovolume	0.63 mm^3/L	0.45 mm^3/L	N/A
Blue-green algae biovolume (% of total biovolume)	18.5%	22%	N/A

A limited amount of pre-fertilization total phosphorus data from the epilimnion is available for comparison. Wilson and Corsi (2016) report that the non-fertilization averages from 2004 to 2006 range from 0.014 to 0.020 mg/L, while the 2011 average was 0.011 mg/L. These values could have been less since the authors indicate that the detection limit was artificially adjusted up to 0.01 mg/L. Brandt (2016) indicates that mean 2011 total phosphorus concentration was about 0.005 mg/L, and he did not evaluate pre-2007 data due to the higher reporting limits. Corresponding 1995 and 1996 averages were calculated as 0.009 and 0.012 mg/L, respectively, which is very similar to the 2011 average determined by Wilson and Corsi (2016).

Regarding nitrate-nitrogen plus nitrite-nitrogen (NO_3-N + $N0_2$-N), results presented by Wilson and Corsi (2016) were also adjusted upward to 0.01 mg/L due to detection limit issues. Their data, however, indicates that non-fertilization averages for the epilimnion ranged from 0.010 to 0.024 mg/L. Brandt (2016) presents a lower average of approximately 0.005 mg/L for 2011. Corresponding June through October 1995 and 1996 averages were 0.011 and 0.015 mg/L, respectively, although the median values were lower and ranged from 0.005 to 0.010 mg/L.

Wilson and Corsi (2016) report a non-fertilization average chlorophyll *a* concentration of 2.28 µg/L which is less than the 1995 and 1996 averages of 2.94 and 4.30 µg/L, respectively. The different results obtained in the 1990's and after 2004 may reflect differences in the analytical method as well as the phytoplankton composition.

Primary productivity evaluations measure the rate of carbon uptake by phytoplankton. Brandt (2016) began these assessments in 2011 when the results from RK-31 showed an average uptake rate of 343 mg/m^2/day. This value compares

favorably with the 1994 and 1995 rates of 448 mg/m^2/day and 359 mg/m^2/day, respectively that were determined for the same location.

Total phytoplankton biovolume, as well as percent composition, are also important when considering water quality trends under the No Action alternative. The median total phytoplankton biovolume for 1995 was 0.63 mm^3/L which is comparable with the non-fertilized average of 0.45 mm^3/L reported by Wilson and Corsi (2016). Perhaps more telling than total biovolume is the percent contribution attributed to blue-green algae. Blue-green algae are ubiquitous in fresh-water systems and are able to flourish in nutrient-rich as well as nutrient-poor systems due to some of their unique characteristics. They tend to be more prominent in the late-summer and early-fall period, and based on the 1995 data they were primarily present during August and September when *Anabaena sp*. accounted for approximately 18.5% of the total biovolume. This value is consistent with the non-fertilization average of 22% reported by Wilson and Corsi (2016). As such, in the absence of the fertilization program, and other factors remaining the same, it is likely that blue-green algal blooms would occur periodically, primarily during late summer and early fall and last from a few days to over a week. These blooms could be more noticeable along a shoreline where the algae accumulate due to wind action.

3.2.2.2 Alternative 5 – Continue Applying Liquid Fertilizer - Proposed Action

Continuation of the nutrient supplementation program under Alternative 5 is not expected to have either a detrimental or a significant impact on water quality. Metrics such as the Secchi disc depth, nitrogen and phosphorus concentrations, and chlorophyll-*a* should remain within the guidelines prescribed by the EPA. The primary benefits of the nutrient supplementation program would be an increase in primary productivity, a reduction in the percentage of the algal population that is composed of the blue-greens, an increase in the edible forms of algae, and an increase in zooplankton biomass. However, it is worth noting that the total phytoplankton biovolume was less during the second fertilization period. Similarly, the percent edible component was less between 2012 to 2015 fertilization period relative to the 2007 to 2010 interval, with the 2015 percentage lower than during the non-fertilized years. Overall, the percent of *Anabaena sp.* was less during the fertilization years, but the data shows that 2015 fertilization year was about the same as the non-fertilized 2005. Some of these shifts may be due to inter-annual variability, but it is also possible that over time the biological community will adapt and another ion or micronutrient will become the limiting growth factor.

Water quality data collected between 2007 – 2010 and 2012 – 2015 was used to evaluate likely water quality conditions if fertilization continues**.** Table 3-2 compares this pilot study data with the historic data. The average Secchi disc depth for the fertilized periods as reported by Wilson and Corsi (2016) was 4.1 m. Total phosphorus concentrations in the epilimnion ranged from less than 0.004 mg/L in 2014 to approximately 0.011 mg/L in 2007 (Brandt, 2016). The 95% confidence intervals for several years overlap, but Brandt (2016) determined that the 2015 results were similar

to those from 2014, but significantly less than the data from the 2007 – 2010 and 2012 – 2013. Nitrate-N plus nitrite-N concentrations also displayed inter-annual variability when fertilization occurred, ranging from an average of 0.002 mg/L in 2015 to approximately 0.011 mg/L in 2008. Brandt (2016) states that the 2015 results were significantly less than those for the other years when fertilization occurred. Chlorophyll-*a* concentrations also displayed considerable inter-annual variation during the fertilization periods. Wilson and Corsi (2016) report a fertilization mean of 1.95 µg/L, with a minimum mean of 1.20 µg/L in 2013 and a maximum of 2.78 µg/L in 2007. The three-year (2013-2015) average primary productivity rate measured at RK-31 was 718 $mg/m^2/day$.

Table 3-2. Comparison of historic and fertilization years water quality data

Parameter	**Historic Data (1995-1996)**	**Fertilization Years Data (2007-2010 and 2012-2015)**
Secchi disc depth	3.0- 3.6m	4.1m
Total phosphorus	0.009 – 0.012 mg/L	0.004 - 0.011 mg/L
Nitrate-nitrogen plus nitrite-nitrogen	0.011-0.015 mg/L	0.002 - 0.011 mg/L
Chlorophyll-*a*	2.94-4.3 µg/L	1.20 - 2.78 µg/L
Carbon uptake	448 $mg/m^2/day$ - 359 $mg/m^2/day$	718 $mg/m^2/day$
Total phytoplankton biovolume	0.63 mm^3/L	0.410 mm^3/L
Blue-green algae biovolume (% of total biovolume)	18.5%	6%

Changes to the phytoplankton community are also important when considering fertilization effects. The average total phytoplankton biovolume for both fertilization periods combined was 0.410 mm^3/L (Wilson and Corsi, 2016). Additionally, it appears that the mean for the 2007 – 2010 period was greater than 0.4 mm^3/L, while the average for the 2012 – 2015 period was less than 0.4 mm^3/L. The percent contribution of total phytoplankton biovolume attributed to blue-green algae for the combined fertilization periods averaged 6% while the while the mean percent of the algae considered edible increased to 55%

The water quality of the North Fork Clearwater does not appear to be detrimentally affected by reservoir fertilization. The average chlorophyll *a* results from the downstream station were less than 1 µg/L (Wilson and Corsi, 2016), which is below the values determined for the reservoir. Downstream total phosphorus concentrations from the 2013 – 2015 fertilization period averaged 0.005 to 0.006 mg/L, and are within the ranges of data obtained in both the epilimnion and hypolimnion at RK 2. The NO_2-N + NO_3-N results from the station below the dam are generally higher than the ones

obtained from the forebay. Riverine averages ranged from 0.029 to 0.051 mg/L for the 2013 – 2015 period, while the forebay hypolimnetic averages ranged from 0.014 to 0.022 mg/L. Part of the reason for this disparity could be due to sample depth. The water samples collected to represent the hypolimnion during the fertilization project were retrieved from a depth of 25 m. Since the depth of the reservoir can approach 200 m in the forebay at full pool, this sample depth may not be truly representative. However, the recent NO_2-N + NO_3-N concentrations from the North Fork Clearwater (NFC) River are within the range of values determined between 1994 and 1996.

The recent data collected from the outlet also supports previous conclusions. TerraGraphics (2010) noted that adverse changes in the water quality of the North Fork Clearwater River are not likely to occur as a result of reservoir fertilization at this time. Along similar lines, EPA states within its NPDES permit that it has no evidence to show that nutrient supplementation is the principle cause of the blue-green algae blooms which develop in the reservoir or has caused adverse changes in the water quality of the NFC or the public drinking water that is drawn from the North Fork Clearwater River (EPA, September 2011).

3.3 Fisheries

3.3.1 Affected Environment

Thirteen fish species were documented as occurring in Dworshak Reservoir in 2013 (Hand, personal communication, 2013) (Table 3-3). Largemouth bass (*Micropterus salmoides*) are also present in the reservoir, but in lower numbers than smallmouth bass. Primary sport species include kokanee, rainbow trout, smallmouth bass and cutthroat trout. Smallmouth bass reproduce in the reservoir, but the steep shorelines and extreme fluctuations in pool level can adversely affect their reproductive success. Cutthroat and rainbow trout spawn in the tributaries in the spring. Bull trout and kokanee spawn in the late summer and fall in the reservoir tributaries (Maiolie, 1988). Kokanee, like other salmon, die after spawning. Decomposing carcasses recycle some nutrients within the reservoir.

Table 3-3 Fish species found at Dworshak Project

Common Name	**Scientific Name**
Bridgelip sucker	*Catostomus columbianus*
Largescale sucker	*Catostomus macrocheilus*
Sculpin	*Cottus* spp.
Smallmouth bass	*Micropterus dolomieu*
Kokanee	*Oncorhynchus nerka*
Black crappie	*Pomoxis nigromaculatus*
Northern pike minnow	*Ptychocheilus oregonensis*
Longnose dace	*Rhinichthys cataractae*
Speckled dace	*Rhinichthys osculus*
Redside shiner	*Richardsonius balteatus*
Cutthroat trout	*Onocorhynchus clarki*
Rainbow trout	*Onocorhynchus mykiss*
Bull trout	*Salvelinus confluentus*
Source: Per. Comm. Hand, Robert, 2013.	

Kokanee are landlocked sockeye salmon. Kokanee were first stocked into Dworshak Reservoir in 1972 (Horton 1981). Kokanee reach maturity primarily at age-2, although age-1 and age-3 spawners are occasionally found. Adults range in size from 7.8 to 15.8 inches in total length depending on the density of fish in the reservoir, but generally average 11.8 inches during spawning (Maiolie and Elam 1995).

In 2015 IDFG estimated there were around 1.7 million of the older (two and three year old) kokanee in Dworshak Reservoir during July. In a typical year, there are around 200,000 fish of this age. With the high number of fish, one might expect that fish catch rates were high. However, with so many fish in the reservoir, they grew slowly. This meant that early in the year, most of the fish weren't large enough for anglers to catch resulting in poor fishing success. Fortunately for anglers, the plankton these fish feed on was very productive allowing kokanee to grow well. By late June, IDFG reported high catch rates of kokanee greater than eight inches in length (Wilson 2016). With normal survival, IDFG expected over 450,000 two and three year old kokanee in 2016. This is more than normal, but much lower than the number in 2015. However, around 100,000 of these fish will be three year old fish, which would be the highest ever seen. These fish will be just a bit larger than the two year old fish that anglers typically catch (Wilson and Corsi, 2016).

The smallmouth bass fishery in Dworshak Reservoir is very popular; one of the favorite fishing destinations in Idaho. Four to five pound fish are routinely caught. The state record (9.72 pounds) was caught there in 2006. A 9.5 pound fish was caught and released in 2016.

The westslope cutthroat trout (*O. clarkii henshawi*) is listed as a sensitive species in Idaho. Since the late 1800s, distribution and abundance of westslope cutthroat trout

has declined throughout its former range (Liknes and Graham, 1988). The decline of cutthroat trout has been attributed to overfishing, genetic introgression, competition with nonnative species (especially stocked rainbow trout), and habitat destruction. Westslope cutthroat trout occur in the reservoir and spawn in most tributaries (StreamNet, 2014). Bull trout are found in the highest elevation tributaries of the North Fork Clearwater River and throughout Dworshak Reservoir.

3.3.2 Environmental Effects

3.3.2.1 Alternative 1 – No Action

Under Alternative 1, the Corps anticipates the reservoir productivity would continue to decline or at best, reach a state of equilibrium but at a level of productivity lower than when the reservoir was initially formed. Nutrient (nitrogen) levels in the reservoir would be expected to decrease to the levels that existed prior to the start of the two pilot studies. The reservoir would continue to exhibit low productivity. Fisheries in the reservoir, primarily the kokanee fishery, would be expected to decline to the level that existed prior to the pilot supplementation studies. Blue-green algae populations would continue their pattern of increasing in the late summer and fall, then decreasing in the winter and spring.

The reservoir's kokanee population fluctuates annually. Years with good spawning conditions can lead to very high numbers of young fish. However, these fish need food in the form of zooplankton. When nutrient levels in the reservoir are low, zooplankton populations can decline quickly, which can lead to smaller kokanee. Smaller kokanee may not survive to adulthood. After a few years, the number of spawners would decline. Populations of other fish species also vary, but are not monitored as closely as kokanee. When reservoir productivity is low, it is likely that some of the fish species would decline.

3.3.2.2 Alternative 5 – Continue Applying Liquid Fertilizer - Proposed Action

Under Alternative 5, reservoir productivity would likely remain similar to the condition under the pilot studies. Kokanee populations could still fluctuate, but they are likely to have adequate zooplankton to feed on and grow to a catchable size. When kokanee populations are high, they provide abundant food for pisciverous fish such as smallmouth and largemouth bass, and bull trout. The smallmouth bass fishery is expected to continue to be highly popular.

Under Alternative 5, kokanee may be expected slightly larger and heavier for a given weight when compared to pre-application fish. This is based on a 2010 summary of the pilot study (TerraGraphics 2010).

3.4 Threatened and Endangered Species

3.4.1 Affected Environment

Seven species listed under the Endangered Species Act (ESA) may occur in the Project area. These include Canada lynx (*Lynx canadensis*), bull trout, fall Chinook salmon (*Oncorhynchus tshawytscha*), Snake River Basin steelhead (*O. mykiss*), Spalding's catchfly (*Silene spaldingii*), North American wolverine (*Gulo gulo luscus*), and whitebark pine (*Pinus albicaulis*). Information on these species is presented below.

Canada Lynx: Canada lynx are listed as Threatened under the ESA. Critical habitat is designated above 4,000 feet in elevation. In the United States, lynx inhabit conifer and conifer-hardwood habitats that support their primary prey, snowshoe hares. Historically, these cats ranged from Alaska across Canada and into many of the northern U.S. states. Today, they are believed to occur in California, Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Mexico, Oregon, Utah, Washington, Wisconsin and Wyoming. The IDFG, using 12 remote camera stations and live traps, conducted surveys for furbearers and carnivores throughout Dworshak in 2000 and 2001. No lynx were observed within the study area. However, lynx have been documented in two locations north of Breakfast Creek, one on the Floodwood Road in 1997 and once at Stocking Meadows Ridge in 1998 (Corps, 2006). Lynx are typically found above 3,750 feet in elevation. The highest elevation within the Dworshak boundary is 3,520 feet. Therefore, no lynx or lynx habitat are expected within the Project boundary.

Bull Trout: Bull trout are listed as Threatened under the ESA. Dworshak Reservoir has an isolated subpopulation of migratory bull trout. This subpopulation spends most of the winter, spring, and early summer months in the reservoir. Adults may leave the reservoir as early as May to migrate to their spawning tributaries. They spawn in August and September in larger tributaries of the reservoir and remain in the tributaries for extended periods of time after spawning or migrate to the reservoir immediately depending on the abundance of prey in the specific tributary. Bull trout generally spend the entire winter in the reservoir before they again begin their upstream migration. The highest concentrations of wintering bull trout have been documented between Cranberry Creek and Elkberry Creek. Dworshak Reservoir and several tributaries are designated as critical habitat for bull trout.

Fall Chinook Salmon: Fall Chinook salmon are listed as Threatened under the ESA. Dworshak Dam was built on the North Fork of the Clearwater River in 1972. The dam permanently prevented upstream fish passage of all migratory species, including fall Chinook salmon. Consequently, these fish no longer occur upstream of Dworshak Dam. Fall Chinook salmon do occur in the main stem of the Clearwater River and in the North Fork Clearwater River below Dworshak Dam. Both of these reaches are designated as critical habitat for fall Chinook.

Snake River Basin Steelhead: Snake River Basin steelhead are listed as Threatened under the ESA. Steelhead are anadromous and since the completion of Dworshak Dam

in 1972 have been blocked from accessing habitat upstream from the dam. As a result, these fish do not occur in Dworshak Reservoir or any of its tributaries. Snake River Basin steelhead do occur in the main stem of the Clearwater River and in the North Fork Clearwater River below Dworshak Dam. The Clearwater River and the North Fork of the Clearwater River are also designated as critical habitat for Snake River Basin steelhead.

Spalding's Catchfly: Spalding's catchfly are listed as Threatened under the ESA. Critical habitat has not been designated. This flowering plant can be found in Idaho, Montana, Oregon, and Washington. The species is endemic to the Palouse region of south-east Washington and adjacent Oregon and Idaho, and is disjunct in northwestern Montana and British Columbia, Canada. This plant is threatened by a variety of factors including habitat destruction and fragmentation resulting from agricultural and urban development, grazing and trampling by domestic livestock and native herbivores, herbicide treatment, and competition from nonnative plant species.

North American Wolverine: Wolverine was proposed for listing as Threatened under the ESA. Wolverines naturally have low population numbers and a wide distribution. Wolverines range throughout mountainous terrain in Idaho, Oregon, Montana, and Washington. The primary threat to the wolverine is from habitat and range loss due to climate warming. Wolverines inhabit habitats with near-arctic conditions wherever they occur. In the contiguous United States, wolverine habitat is restricted to high-elevation areas in the West. Wolverines are dependent on deep persistent snow cover for successful denning, and they concentrate their year-round activities in areas that maintain deep snow into spring and cool temperatures throughout summer. Wolverines in the contiguous United States exist as small and semi-isolated subpopulations in a larger metapopulation that requires regular dispersal of wolverines between habitat patches to maintain itself.

Whitebark Pine: Whitebark pine is a Candidate species for listing and therefore does not receive official protection under the ESA. Whitebark pine is an evergreen tree species, found in subalpine environments, that has been eliminated from much of its range by mountain pine beetle and white pine blister rust. The seeds (pine nuts) from this tree are a very nutritious food source for many animals including grizzly bears. In north Idaho it is a component of subalpine fir communities and dominates the highest peaks and ridges over 6,000 feet. The highest elevation within the Dworshak boundary is 3,520 feet. Therefore, whitebark pine is not present within the Project area.

3.4.2 Environmental Effects

3.4.2.1 Alternative 1 – No Action

Under Alternative 1, the Corps anticipates that reservoir productivity would decline or at best, reach a state of equilibrium, but at a level of productivity lower than when the reservoir was initially formed. Reduced productivity would affect reservoir fisheries, including kokanee, by reducing the amount of food and thereby reducing the size and number of fish. There could be minimal effect on bull trout if kokanee and other small fish numbers fell. However, any effect would be very difficult to measure due to the size of the reservoir and natural variability in fish populations.

Alternative 1 would have no effect on Canada lynx or their critical habitat, Spalding's catchfly, North American wolverine, or whitebark pine. There would also be no effect on Snake River fall Chinook or steelhead.

3.4.2.2 Alternative 5 – Continue Applying Liquid Fertilizer - Proposed Action

Under Alternative 5, the Corp anticipates that bull trout, which prey on kokanee, would benefit. Indirect effects may include increases in populations of other fish and macro-invertebrates or other aquatic vertebrates (EPA, 2011). In addition, tributaries of Dworshak Reservoir which provide critical habitat for bull trout would not be negatively affected by this project. Downstream effects from nutrient supplementation on water quality and Snake River fall Chinook and steelhead should be negligible and most likely immeasurable. There would be no effects on any other ESA-listed species. Table 3-4 summarizes the Corps' determination of effect of the proposed action on ESA-listed species.

Table 3-4. Endangered Species Effect Determinations for Alternative 5

Species	**ESA Designation**	**Species Determination**	**Critical Habitat Determination**
1. SR Fall Chinook	Threatened	NLAA	NLAA
2. SR Basin Steelhead	Threatened	NLAA	NLAA
3. Columbia Basin Bull Trout	Threatened	NLAA	NLAA
4. Canada Lynx	Threatened	No effect	No effect
5. Spalding's Catchfly	Threatened	No Effect	NA
6. North American Wolverine	Proposed Threatened	No Effect	NA
7. Whitebark Pine	Candidate	No Effect	NA

Note: NLAA = Not Likely to Adversely Affect; NA=Not applicable

In addition to the determinations listed in Table 3-4, there would be "no adverse effects" on Essential Fish Habitat.

3.5 Recreation

3.5.1 Affected Environment

The Dworshak Project provides recreation opportunities for over 150,000 visitors annually with most of the recreation occurring in the lower section of the reservoir. The reservoir provides opportunities for several types of recreation including water-based recreation such as fishing, boating, and swimming. Fishing for kokanee, smallmouth bass, and rainbow trout is the major recreation activity of visitors to the reservoir. Boating is a primary activity for most visitors with much of it related to fishing. Swimming is also a popular activity. The reservoir has two designated swim areas and seven destination docks on the reservoir that provide swimming opportunities away from boat traffic. Water quality in the reservoir is usually good and is safe for swimming. However, in some years blue-green algal blooms develop in late summer and fall at various locations in the reservoir and may release toxins that can cause skin irritation and illness in swimmers. These blooms generally last for a few days to about a week.

3.5.2 Environmental Effects

3.5.2.1 Alternative 1 – No Action

Under Alternative 1, recreational opportunities or use at the reservoir would not change. Visitors would still participate in water-based recreation such as fishing, boating, and swimming. Because the Corps would not be adding nutrients to the reservoir, the size and numbers of fish may decrease to what existed prior to the pilot studies. This would not be expected to have a significant effect on the use of the reservoir for recreational fishing or boating related to fishing. The number of blue-green algal blooms may return to the number and frequency that occurred before the pilot studies, but the blooms would be relatively short-lived and would not have a significant effect on the opportunity for swimming.

3.5.2.2 Alternative 5 – Continue Applying Liquid Fertilizer - Proposed Action

Under Alternative 5, recreational opportunities at Dworshak Reservoir would not change. However, the number of visitors participating in fishing or boating may increase if the number and/or size of kokanee, smallmouth bass, or rainbow trout increase because of the nutrient supplementation. Swimmers may experience fewer blue-green algal blooms as the additional nutrients are expected to help keep blue-green algae populations low.

3.6 Cumulative Effects

Cumulative effects are defined as “the impact on the environment which results from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.” Analysis of cumulative effects focuses on issues that are relevant

to the decision to be made and are “truly meaningful” (CEQ 1997), (i.e., important issues of national, regional, or local significance). The Corps reviewed comments received on the pilot studies, other related environmental compliance efforts, and input from technical staff to determine which resources should be included in this analysis. The Corps considered potential cumulative effects for the affected environment, but identified only one resource in the region, aquatic resources, as being relevant to the decision and truly meaningful.

The Corps identified both a temporal and a geographic scope for this cumulative effects analysis. The Corps identified the period of 1970 through 2027 as the temporal scope. This time period encompasses the changes in aquatic resources from the construction of Dworshak Project to about 10 years into the future. The Corps used a geographic scope of the North Fork Clearwater River from Dworshak Dam to just above the upstream extent of the reservoir.

Past Conditions

Changes to the aquatic resources of the NFCR have primarily been affected by the construction and operation of Dworshak Dam. Prior to the construction of the dam, the NFCR was a free-flowing river with good water quality. The river was nutrient-poor because of the underlying geology, soils, and land use, but supported several cold water fish species and a quality trout fishery. Steelhead, an anadromous fish species, returned to the river each year to spawn, bringing nutrients to the watershed from the ocean. The construction of the dam changed about 50 miles of the river to a reservoir and blocked upstream migration of all anadromous fish. As previously described in Section 1.4, aquatic resources within the reservoir initially experienced plentiful nutrients from the decomposition of organic material that was flooded. However, the amount of nutrients declined after the initial decomposition and because anadromous fish no longer had access to the watershed upstream of the dam. The water in the reservoir eventually returned to a nutrient-poor state, but water quality remained good. Several fish species such as kokanee and smallmouth bass were stocked in the reservoir to provide sport fishing opportunities. These fish completed their entire life cycle within the reservoir or tributary streams and contributed to the cycling of nutrients. Starting in the 1990’s, summer drawdowns of the reservoir to aid fish passage in the lower Snake River prevented riparian and wetland vegetation from establishing along the shoreline and potentially providing some nutrients. In the late summer, inedible blue-green algae blooms would sometimes form in the reservoir.

Current Conditions

The two nutrient supplementation pilot studies have added nitrogen during the growing season in nine of the last 10 years, resulting in an increase in biological productivity and kokanee biomass, and a decrease in the amount of blue-green algae. However, the beneficial effects do not appear to carry over to the following growing season once fertilizer application ceases. Summer drawdown of the reservoir continues to inhibit shoreline vegetation establishment. Vegetation management actions on

Corps-managed lands surrounding the reservoir and logging activities in the watershed may result in small amounts of organic material being carried into the reservoir and providing nutrients.

Future Conditions

With the end of the nutrient supplementation pilot studies, the Corps anticipates the reservoir will return to its normal nutrient-poor state. The summer drawdowns and vegetation management would be expected to continue, along with their respective limited effect on nutrient levels in the reservoir. The Corps is unaware of any reasonably foreseeable actions in the watershed that would affect the amount of nutrients or aquatic resources in the reservoir. By continuing the nutrient supplementation program on a long-term basis, the Corps would expect productivity and kokanee biomass to increase as it did during the pilot studies. The Corps would also expect a reduction in the amount of blue-green algae. Over time, the monitoring may indicate the need for nutrients other than or in addition to nitrogen.

The potential incremental effect to aquatic resources resulting from the proposed action, when added to other past, present, and reasonably foreseeable future actions, is not expected to be significant. By continuing to add nutrients to the reservoir each year, the Corps would be increasing biological productivity in the reservoir and reducing the amount of blue-green algae.

SECTION 4 – COMPLIANCE WITH APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

4.1 Treaties and Native American Tribes

Treaties between the United States and regional mid-Columbia/lower Snake River tribes document agreements reached between the federal government and the tribes. In exchange for Native American tribes ceding much of their ancestral land, the government established reservation lands and guaranteed that it would respect the treaty rights, including fishing and hunting rights. These treaties, as well as statutes, regulations, and national policy statements originating from the executive branch of the federal government provide direction to federal agencies on how to formulate relations with Native American tribes and people.

Treaties with the Nez Perce Tribe (e.g., Treaty with the Nez Percés of June 11, 1855, 12 Stat. 957 (1859); Treaty with the Nez Percés of June 9, 1863, 14 Stats., 647 (1867); Treaty with the Nez Percés of August 13, 1868, 15 Stats. 693 (1869)) explicitly reserved unto the Nez Perce certain rights, including the exclusive right to take fish in streams running through or bordering reservations, the right to take fish at all usual and accustomed places in common with citizens of the territory, the right of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, pasturing their horses and cattle upon open and unclaimed lands, use of watering places, and the protection of timber.

Under the Dawes Act of 1887 (PL 49-119) and the subsequent allotment Agreement with the Nez Perce Indians in Idaho (May 1, 1893, 28 Stats., 327-331)), certain reservation lands were allotted to individual tribal members and the Tribe as a whole, and the remainder of the reservation land was conveyed to the United States. Dworshak Project is comprised of federal land managed by the U.S. Army Corps of Engineers, approximately 6,000 acres of which are located within the boundaries of the Nez Perce Tribe Indian Reservation. Nez Perce tribal members retain treaty rights on all Corps managed land at Dworshak Project, unless necessarily restricted by operational/safety considerations.

Implementation of the proposed long-term nutrient supplementation program is not expected to have any significant effect on important treaty rights/resources.

4.2 Federal Laws

4.2.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires Federal agencies to use a systematic interdisciplinary approach to evaluate the environmental effects of a proposed Federal action prior to implementing that action. This is usually accomplished through preparation of a statement, either an Environmental Impact Statement (EIS) if the action is a major federal action significantly affecting the human environment, or an

Environmental Assessment (EA) if the Federal agency has not yet determined the significance of the effects.

This EA considers the environmental effects of implementing a long-term nutrient supplementation program. The long-term program includes an adaptive management component of making changes to the program in response to program monitoring. If the Corps proposes changes that have not adequately been addressed in this EA, the Corps would prepare a supplemental EA if necessary.

This EA has been prepared and is being circulated to agencies and the public for review and comment pursuant to requirements of NEPA. No effects significantly affecting the quality of the human environment have been identified at this time for implementing a long-term nutrient supplementation program. If no such effects are identified during the public review process, compliance with NEPA would be achieved upon the signing of a Finding of No Significant Impact (FONSI). However, if such effects are identified during the public review, an EIS would be required. Compliance with NEPA would then be achieved upon completion of an EIS and the signing of a Record of Decision.

4.2.2 Endangered Species Act of 1973, As Amended

The ESA established a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat upon which they depend. Section 7(a) of the ESA requires federal agencies to consult with USFWS and NMFS, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats.

For the first reservoir nutrient supplementation pilot study, the Corps prepared a biological assessment (BA) in 2006 in accordance with the ESA that addressed only the nutrient application program initiated in 2007. The Corps received concurrence from both the USFWS and NMFS on its “not likely to adversely affect” determinations for fish and wildlife species listed under the ESA and their designated critical habitats. The Corps also received concurrence from NMFS on its determination that the nutrient supplementation project would not adversely affect Essential Fish Habitat.

Another BA was prepared for the proposed 2012-2016 nutrient supplementation pilot study, However, unlike the initial pilot study BA, the second BA not only addressed the execution of the Corps nutrient supplementation project at Dworshak Reservoir, but also the issuance of the NPDES permit to the Corps by EPA. The additional coverage of the NPDES permit was needed because of EPA’s determination in 2010 that such a permit was required for the Corps nutrient application program. The Federal action for ESA consultation was the issuance of EPA’s NPDES permit and the subsequent implementation of the pilot study by the Corps. The NPDES permit had to be issued before the nutrient application could occur. For this reason, the EPA became the lead agency for consulting with the USFWS and NMFS. NMFS concurred with EPA’s and

the Corps determinations on June 6, 2011. The USFWS concurred with EPA and the Corps ESA determinations on June 7, 2011. Copies of these letters are in Appendix A.

The Corps notified the USFWS and NMFS it was proposing to indefinitely continue the annual nutrient supplementation program, consistent with the 2006 and 2011 consultations. The Corps stated it did not anticipate any adverse effects to listed species in the future from the program. In their e-mail responses dated January 19, 2017 and January 23, 2017, respectively, USFWS and NMFS concurred continuation of the program would not have any effects to listed fish or critical habitat not considered in the two consultations and their previous concurrence with the Corps determination of affect to ESA-listed species remained in effect.

4.2.3 Clean Air Act, As Amended

The Clean Air Act was established to "protect and enhance the quality of the nation's air resources so as to promote public health and welfare and the productive capacity of its population." The Act authorized the EPA to establish the National Ambient Air Quality Standards to protect public health and the environmental. The Act establishes emission standards for stationary sources, volatile organic compound emissions, hazardous air pollutants, and vehicles and other mobile sources. The Act also requires the state to develop implementation plans applicable to particular industrial sources.

Operation of a barge and other equipment for liquid fertilizer application would have a de minimus effect on air quality. The project area would still meet attainment standards and would be in compliance with the Clean Air Act. Pursuant to Section 309 of the Act, this environmental assessment would be provided to the Environmental Protection Agency (EPA) for review and comment.

4.2.4 Clean Water Act

The Clean Water Act is the primary legislative vehicle to federal water pollution control programs and the basic structure for regulating discharges of pollutants into waters of the United States. The Act was established to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The Act sets goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment.

The project involves the discharge of an effluent into waters of the U.S. and requires a NPDES permit from EPA under Section 402 of the Clean Water Act and Water Quality Certification from IDEQ under Section 401 of the Act. EPA issued a NPDES permit to the Corps on September 6, 2011 for the pilot study. Prior to issuing the permit, the EPA obtained Section 401 Water Quality Certification from IDEQ on July 26, 2011. The Corps applied for a new NPDES permit in February 2016 as the pilot study NPDES permit was to expire on September 30, 2016. EPA administratively

extended the permit until it grants or denies the Corps' request for a new permit. The water quality certification continues to be valid for as long as the NPDES permit is extended. The Corps does not need a new NPDES permit or water quality certification for the proposed long-term nutrient supplementation program while the Corps continues to operate the program consistent with the permit. Should the Corps propose to make adjustments to the program based on the results of the monitoring, the Corps would need to contact EPA to determine if a new permit was needed.

4.2.5 National Historic Preservation Act (NHPA), As Amended

Section 106 of the NHPA requires federal agencies to evaluate the effects of federal undertakings on historic properties and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking.

The Corps performed a cultural resources assessment for the nutrient supplementation pilot study in 2011 and made a determination of "No Potential to Affect Historic Properties" (Appendix B). The Corps confirmed this determination would also apply to an indefinite continuation of the supplementation program. No further action is required.

4.3 Executive Orders

4.3.1. Executive Order 11988, Flood Plain Management, May 24, 1977

The project area is not located within the 100-year flood plain.

4.3.2 Executive Order 11990, Protection of Wetlands, May 24, 1977

No wetlands would be affected by the proposed action.

4.3.3 Executive Order 12898, Environmental Justice, February 11, 1994

The proposed federal action would not adversely or disproportionately affect minority or low income populations.

4.3.4 Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, November 6, 2000

The Corps notified the Nez Perce Tribe of the proposed action in a letter dated January 24, 2017, and offered Government to Government consultation. The Corps has not received a request for consultation at the time this EA was made available for public review.

SECTION 5 – COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

This EA is being distributed for public and agency review and comment and is also available through the Walla Walla District Corps of Engineers website at www.nww.usace.army.mil/Missions/Environmental-Compliance/. The distribution list includes the following:

Federal Agencies
Environmental Protection Agency
National Marine Fisheries Service
U.S. Fish and Wildlife Service
U.S. Forest Service

Idaho State Agencies
Idaho Department of Environmental Quality
Idaho Department of Fish and Game
Idaho Department of Lands
Idaho Department of Water Resources
Idaho State Historic Preservation Office

Local Governments
City of Orofino
Clearwater County

Tribes
Nez Perce Tribe

Local Groups
Dworshak Reservoir Association
Twin Rivers Back Country Horsemen

Other
Dworshak State Park
Orofino Chamber of Commerce

This EA is being made available to the public and local, state, and federal agencies for a 30-day review and comment period.

SECTION 6 - REFERENCES

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APPENDIX A

Endangered Species Act Concurrence Letters

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to NMFS Numbers:
2006/05137; 2011/02141 (EPA); 2011/02142 (COE)

June 2, 2011

6
2011

Michael J. Lidgard
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

Lt. Col. David A. Caldwell
U.S. Army Corps of Engineers
Walla Walla District Office
201 N. Third Avenue
Walla Walla, Washington 99362

RE: Endangered Species Act section 7 Informal Consultation for the issuance of an NPDES permit and project implementation for the Dworshak Reservoir Nutrient Enhancement Pilot Project (One Project), Permit # ID-0028444, HUC 17060308, North Fork Clearwater River; Clearwater County, Idaho

Dear Mr. Lidgard and Lt. Col. Caldwell:

This letter responds to the U.S. Environmental Protection Agency's (EPA) May 25, 2011, letter requesting Endangered Species Act (ESA) consultation and Magnuson-Stevens Fishery Conservation and Management Act (MSA) on the issuance of a National Pollutant Discharge Elimination System (NPDES) permit and project implementation for the Dworshak Reservoir Nutrient Enhancement Pilot Project. With the letter, the EPA attached a biological assessment (BA) and a fact sheet outlining the basis for the permit conditions. These documents explain the potential impacts of the pilot study enhancement project on Snake River Basin steelhead, Snake River fall Chinook salmon, designated critical habitat, and essential fish habitat (EFH) under National Marine Fisheries Service (NMFS) review. In their BA, the EPA made a "not likely to adversely affect" (NLAA) determination for the ESA-listed species and critical habitat. The project has been reviewed by NMFS, as provided under section 7(a)(2) of the ESA and its implementing regulations, 50 CFR Part 402, and section 305(b)(2) of the MSA and its implementing regulations, 50 CFR Part 600.

This consultation covers the EPA for issuance of the NPDES permit and the U.S. Army Corps of Engineers (COE) for project implementation for this program for a 5-year period beginning with the date of the issuance of the permit. The enhancement project was also the subject of a 2006

consultation (2006/05137) with the COE in which NMFS concurred with an NLAA determination for ESA-listed Snake River Basin steelhead and fall Chinook salmon. According to the 2006 COE's BA, the purpose of the Dworshak nutrient enhancement program was to conduct a study on the feasibility of increasing the biological productivity of Dworshak Reservoir by adding inorganic, liquid fertilizer, with the underlying action to improve the kokanee fishery of Dworshak Reservoir. The COE attached a report titled *Dworshak Reservoir: Rationale for Nutrient Supplementation for Fisheries Enhancement* compiled by TerraGraphics Environmental Engineering that outlined the implementation procedures and protective guidelines, along with a monitoring program designed to determine the effectiveness of the nutrient enhancement program. The COE applied both ammonium polyphosphate and urea-ammonium nitrate fertilizers to Dworshak Reservoir in 2007, but changed the application in 2008 through 2010 to urea-ammonium nitrate only when monitoring showed that additional phosphorous in the reservoir was not necessary.

Endangered Species Act

Snake River fall Chinook salmon and Snake River Basin steelhead are likely to occur within the action area. The action is within designated critical habitat in the North Fork Clearwater River (North Fork) below Dworshak Dam for both Snake River fall Chinook salmon and steelhead. Although spring/summer Chinook salmon are found within the Clearwater River drainage, they are not listed under the ESA. Therefore, pursuant to NMFS' ESA responsibilities and authorities, NMFS evaluated the effects of the project on ESA-listed species and their designated critical habitat (see Table 1).

Table 1. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
Snake River fall-run	T 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Steelhead (*O. mykiss*)			
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Note: Listing status: 'T' means listed as threatened under the ESA.

The EPA proposes to issue an NPDES permit to the COE for a nutrient supplementation pilot project in which liquid nitrogen fertilizer will be discharged to Dworshak Reservoir. The EPA issued a public notice concerning issuance of an NPDES permit with a public comment period that ended on March 24, 2011. The NPDES permit will not be issued until the certification requirements of section 401 of the Clean Water Act have been met with the Idaho Department of Environmental Quality (IDEQ).

The action area considered in this document consists of Dworshak Reservoir and the North Fork 1.9 miles below Dworshak Dam to its confluence with the mainstem Clearwater River. The mainstem Clearwater River is not considered part of the action area because appreciable changes in river nutrients and water quality are not expected due to dilution by the larger volume of water in the mainstem, along with the low concentrations of nutrients that may be added from the North Fork.

Dworshak Reservoir has been divided into three treatment sections, with the prescribed amount of fertilizer in each zone adjusted for the area, volume, and elevation of each section's pelagic (open water) zone as described in the 2006 BA and enhancement report. Prescribed application rates are based on published studies of similar reservoir fertilization results. The fertilizer application rates for each zone of the reservoir are intended to provide no more fertilizer than the biological community can assimilate.

The EPA, through the COE, will implement the following conservation measures to reduce the potential of adverse effects of the proposed project on anadromous fish and/or their habitat:

1. The permit requires the COE to refuel the barge at Big Eddy Marina, or an off-reservoir fuel facility where spill kits and absorbent mats will be available and will be capable of absorbing 125% of any potential fuel or petroleum spill.

2. Application equipment (truck, generators, etc.) will be inspected for leaks, cleaned, and repaired prior to loading on the barge.

3. A spill prevention and control plan will be developed and discussed with equipment operating personnel prior to fertilizer application. The plan will provide detailed descriptions on how to prevent a spill or ensure effective and timely containment of any chemical spill. The plan will include spill control, containment, and clean-up procedures.

4. In the event of over application or a spill of nutrient fertilizer, all application activities will cease immediately. The spill will be dispersed as quickly as possible using any reasonable means available, such as mixing the fertilizer with the barge wake and propellers.

5. The volume of liquid fertilizer transported on the barge will not exceed the total quantity of the weekly application by more than 10%.

6. The application of the fertilizer will be computer controlled and linked to a global positioning satellite (GPS).

7. The permit requires the COE to apply fertilizer so that it is rapidly mixed with the receiving water. The fertilizer will be distributed through a spreader bar to distribute it over a wider area and will be mixed by propeller wash.

8. The permit requires periodic monitoring at multiple locations to analyze the effects of the added nutrients (See permit at I.C, Surface Water Monitoring). If monitoring shows significant negative effects, the program would be modified or halted. The permit requires that the COE cease nutrient additions until obtaining approval from EPA and the IDEQ to resume if the annual median chlorophyll a concentration in the reservoir exceeds 3.0 µg/L or if the annual median Secchi disk reading is less than 3.0 meters.

9. The permit requires the COE to take reasonable steps to prevent tampering or vandalism resulting in an uncontrolled discharge of fertilizer to surface waters.

10. The COE will adhere to IDEQ consent order best management practices. All other restrictions as applicable through the previous COE consultation (2006/05137) will also apply.

Species Determination:

Adult Snake River fall Chinook salmon and Snake River Basin steelhead are found in the North Fork in the vicinity of the action area. The potential pathways for adverse effects to salmonids from the proposed action are through decreased water quality and mortality. Adverse effects to ESA-listed salmon and steelhead from the proposed action will be insignificant or discountable for the following reasons:

1. Dworshak Dam eliminated access for anadromous fish to all but the lower 1.9 miles of the North Fork; any anadromous salmonids above Dworshak Dam in the reservoir and its tributaries are not covered by the ESA. Due to the separation of ESA-listed fish and the project area, the risk of adverse effects will be discountable.

2. The project conservation measures incorporated within the proposed action should be sufficient to ensure that a potential spill of either fertilizer or petroleum products within the reservoir should not cause direct mortality to anadromous fish downstream of the reservoir. Any effects would be limited by these measures to insignificant levels.

3. In 2008 and 2009, the Dworshak National Fish Hatchery experienced increased incidence of infectious hematopoietic necrosis (IHN) and subsequent high mortalities of juvenile hatchery steelhead; those same years coincided with years of nutrient supplementation in the reservoir. The incidence of the IHN disease and mortality in 2010, however, seems to have been reduced by the hatchery obtaining more of its water supply directly from the reservoir, which does not have IHN. The North Fork does have IHN. Because the IHN levels have varied independently of the nutrient program, the risk of increased IHN is discountable.

Based on the best available information and successful implementation of measures described in the BA, NMFS has determined the subject action would have no more than a negligible potential to adversely affect ESA-listed Snake River fall Chinook salmon and Snake River Basin steelhead. NMFS concurs with the EPA's finding that the subject action is "not likely to adversely affect" listed Snake River fall Chinook salmon and Snake River Basin steelhead.

Critical Habitat Determination

NMFS reviews the status of designated critical habitat affected by the proposed action by examining the condition and trends of primary constituent elements (PCEs) throughout the designated area. The PCEs consist of the physical and biological features identified as essential to the conservation of the ESA-listed species (Table 2). The PCEs required for Snake River fall Chinook salmon and Snake River Basin steelhead include sites essential to support one or more life stages of the ESA-listed species (sites for spawning, rearing, and migration) and contain physical or biological features essential to salmon and steelhead conservation.

Table 2. Types of sites and essential physical and biological features designated as PCEs, and the species life stage each PCE supports.

Site	Essential Physical and Biological Features	ESA-listed Species Life Stage
Snake River Basin Steelhead[a]		
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity & floodplain connectivity to form and maintain physical habitat conditions	Juvenile growth and mobility
	Water quality and forage[b]	Juvenile development
	Natural cover[c]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, and natural cover[c]	Juvenile and adult mobility and survival
Snake River Fall Chinook Salmon		
Spawning and Juvenile Rearing	Spawning gravel, water quality and quantity, cover/shelter, food, riparian vegetation, and space	Juvenile and adult.
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food[d], riparian vegetation, space, safe passage	Juvenile and adult.

a. Additional PCEs pertaining to estuarine, nearshore, and offshore marine areas have also been described for Snake River Basin steelhead. These PCEs will not be affected by the proposed action and have therefore not been described in this letter of concurrence.
b. Forage includes aquatic invertebrate and fish species that support growth and maturation.
c. Natural cover includes shade, large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
d. Food applies to juvenile migration only.

The action has the potential to negatively affect PCEs and fish habitat within the action area by decreasing water quality and altering the substrate, natural cover, and forage/food. However, adverse effects to ESA-listed salmon and steelhead habitat from the proposed action will be insignificant or discountable for the following reasons:

1. The greatest potential for negative water quality effects from nutrient enhancement includes those effects related to fertilizer or petroleum product spills in Dworshak Reservoir. However, these effects should be insignificant due to the EPA's conservation measures that reduce both the likelihood and the amount of spill. Similar fertilization projects in the northwest United States and British Columbia resulted in an increased fishery with little degradation to water quality or clarity.

2. NMFS expects that levels of undesirable blue-green algae in the reservoir during the summer will decrease with the fertilizer treatments and improve the food web structure. Nutrient uptake in Dworshak Reservoir is expected to occur within 12 hours of fertilizer distribution. The risk of adverse effects via this mechanism is discountable.

3. The proposed NPDES permit reflects the changes made in 2008 to a nitrogen fertilizer only. No phosphorous fertilizers are proposed for use. The risk of adverse effects via this mechanism is discountable.

4. Significant changes in water temperatures within Dworshak Reservoir are not expected due to the size and depth of the reservoir. The reservoir is used to manipulate water temperatures in the North Fork through strategic water releases. The risk of adverse effects via this mechanism is discountable.

5. NMFS expects no change to the current oxygen levels in the North Fork below Dworshak Dam since the multi-level spillway replenishes dissolved oxygen, and the amount of algal and microbial biomass expected to spill over the reservoir is unlikely to have an appreciable effect on the biological oxygen demand downstream. Any effects would be insignificant.

Based on the best available information and successful implementation of conservation measures described in the BA, NMFS concurs with the EPA's finding that the proposed project is "not likely to adversely affect" designated critical habitat for Snake River fall Chinook salmon and Snake River Basin steelhead.

Magnuson-Stevens Fishery Conservation and Management Act

Federal agencies are required, under 305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NMFS regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect EFH. The MSA defines EFH as "those

waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." If an action would adversely affect EFH, NMFS is required to provide the Federal action agency with EFH conservation recommendations (MSA 305(b)(4)(A)). This consultation is based, in part, on information provided by the EPA and COE and descriptions of EFH for Pacific salmon contained in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (August 1999) developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce (September 27, 2000).

The proposed action and action area are described in the BA and this letter. The action area includes habitat which has been designated as EFH for various life stages of Chinook salmon and coho salmon. Because the habitat requirements (i.e., EFH) for Chinook and coho salmon in the action area are similar to those of the ESA-listed species and because the conservation measures included as part of the proposed action are adequate to address ESA concerns, they are also adequate to avoid, minimize, or otherwise offset potential adverse effects to designated EFH. Therefore, conservation recommendations pursuant to MSA (305(b)(4)(A)) are not necessary.

This concludes informal ESA consultation on this action in accordance with 50 CFR 402.14 (b)(1), and MSA consultation in accordance with 50 CFR 600.920 (e)(3). The EPA and/or the COE must reinitiate consultation on this action if new information becomes available, or if circumstances occur that may affect ESA-listed species, designated critical habitat, or EFH in a manner, or to an extent, not previously considered. This letter of concurrence meets the applicable Information Quality Act standards for utility, integrity, and objectivity.

Mr. Dale Brege at (208) 983-4060 is the NMFS contact for this consultation.

Sincerely,

for

William W. Stelle, Jr.
Regional Administrator

cc: R. Holder – USFWS
E. Schriever – IDFG
J. DuPont – IDFG
M. Lopez – Nez Perce Tribe
F. Higginbotham – COE
B. Nickel – EPA

United States Department of the Interior
Fish and Wildlife Service
Idaho Fish And Wildlife Office
1387 S. Vinnell Way, Room 368
Boise, Idaho 83709
Telephone (208) 378-5243
http://www.fws.gov/idaho

JUN 07 2011

Michael J. Lidgard
Manager, NPDES Permits Unit
U.S. Environmental Protection Agency
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

Subject: NPDES Permit for the Dworshak Reservoir Nutrient Supplementation Project—Clearwater County, Idaho—Concurrence
CONS-100a 14420-2011-I-0179

Dear Mr. Lidgard:

This letter transmits the Fish and Wildlife Service's (Service) concurrence on the effects of the proposed issuance of a National Pollution Discharge Elimination System Permit for the Army Corps of Engineers (Corps) Dworshak Reservoir Nutrient Supplementation project to species listed under the Endangered Species Act (Act) of 1973, as amended. In a letter dated May 25, 2011, and received by the Service on May 27, the Environmental Protection Agency (EPA) requested concurrence with the determination, documented in your Biological Assessment (Assessment), that the issuance of the permit for the Corp's nutrient supplementation project is not likely to adversely affect bull trout (*Salvelinus confluentus*) and its critical habitat. Our letter addresses both the issuance of the National Pollutant Discharge Elimination System (NPDES) permit by the EPA and implementation of the Dworshak Reservoir Nutrient Supplementation project by the Corps and voids our previous 2006 letter to the Corps discussed below.

To address declining biological productivity in Dworshak Reservoir, especially in regards to kokanee salmon (*Oncorhynchus nerka*), the Corps began a 5 year pilot nutrient supplementation project in 2007. We provided a letter to the Corps on September 12, 2006 (2006-I-1014) concurring with their determination that the project was not likely to adversely affect the bull trout, the bald eagle (*Haliaeetus leucocephalus*) and the gray wolf (*Canis lupus*). Please note that the Service delisted the bald eagle and the gray wolf subsequent to our 2006 letter.

The Corps began fertilizer applications in 2007 and continued applications in subsequent years until May 2010 when the EPA determined that the project required an NPDES permit. The issuance of the NPDES permit will allow the Corps, in coordination with the Idaho Department of Fish and Game and the Nez Perce Tribe, to continue the project for

five years beginning in 2011 or 2012, depending on whether the permit is issued in time for fertilizer applications in 2011.

The Corps will apply liquid nitrogen fertilizer (ammonium nitrate, 11 pounds per gallon concentration) once per week. The NPDES permit would allow nutrient application from April 1st through September 30th each year, however, specific application start and end dates will change from year to year and depend primarily on water temperature. Generally, application would start around the last week of April and end the last week of September. A barge carrying a fertilizer truck will be used for applying the fertilizer. Barge speed can be adjusted, and the nozzles will automatically adjust the discharge rate according to barge speed. Application rate varies with lake level and season.

A 2010 summary memorandum[1] indicates that the project has not resulted in any adverse impacts to water quality in the Reservoir and that there has been an increase in edible phytoplankton and subsequent increase in zooplankton biomass. These are stated goals of the project.

The project incorporates Impact Minimization Measures and NPDES permit limitations and monitoring to reduce resource impacts. Refer to the Assessment for a complete project description.

Service concurrence that the project is not likely to adversely affect bull trout is based on the following rationales:

- Nutrient supplementation is expected to benefit bull trout because increased phytoplankton productivity in the Reservoir should benefit kokanee salmon productivity. As bull trout are piscivorous, increases in kokanee productivity equates to a more abundant bull trout food source.

- Other effects, besides the beneficial effect described above, are expected to be insignificant because of the Impact Minimization Measures and NPDES permit limitations and monitoring incorporated into the project. These protection measures include restricting the amount of fertilizer transported by barge to no more than 10 percent above the amount needed for a week, checking equipment daily for leaks, refueling at Big Eddy Marina or an off reservoir location where spill kits and absorbent mats are available, and immediately ceasing fertilizer applications in the event of a spill or over application. Monitoring will provide feedback on the effectiveness of the project. If monitoring indicates significant negative effects to bull trout are occurring, the project will be modified or halted.

- The Service designated Dworshak Reservoir and the North Fork Clearwater River below the Reservoir as bull trout critical habitat. The effects of the project on the Primary Constituent Elements are expected to be insignificant and/or

[1] Brandt, D. 2010. Summary of Dworshak Nutrient Enhancement Project. Memorandum to John Bailey, U.S. Army Corps of Engineers, Walla Walla Washington. Terragraphics, Spokane, Washington. August 2, 2010.

discountable. The project will maintain the functionality of the critical habitat in providing feeding, migrating, and overwintering habitat for bull trout.

This concludes informal consultation on the proposed project under section 7 of the Act. If the proposal addressed in this letter is modified, environmental conditions change, or additional information becomes available regarding potential effects on listed species, you should verify that your conclusions are still valid.

Thank you for your continued interest in the conservation of threatened and endangered species. Please contact Clay Fletcher at (208) 378-5256 if you have questions concerning these comments.

Sincerely,

FOR Brian T. Kelly, State Supervisor
Idaho Fish and Wildlife Office

cc: IDFG, Region II, Lewiston (Hennekey)
NOAA Fisheries, Grangeville (Brege)
COE, Walla Walla (Caldwell)

APPENDIX B

Cultural Resources Effects Determination

National Historic Preservation Act, Section 106
Clearance Memoranda

for

The Dworshak Nutrient Study

U.S. Army Corps of Engineers
Walla Walla District
Environmental Compliance Section

April 15, 2011

CENWW-PM-PD-ECS April 15, 2011

MEMORANDUM FOR Environmental Compliance Section, Walla Walla District, U.S. Army Corps of Engineers

SUBJECT: National Register of Historic Places, Section 106 Finding of No Potential to Affect for the Dworshak Nutrient Study

1. SUMMARY: The Walla Walla District Cultural Resources Management (CRM) Team has completed the National Historic Preservation Act (NHPA) Section 106 Review, in accordance with its implementing regulation 36 Code of Federal Regulations (CFR) Part 800, for the proposed federal undertaking. The Dworshak Nutrient Study will assess the effects of increasing the Dworshak Reservoir's organic productivity by adding inorganic nutrients. The objective would be to accelerate fish growth for stocking schedules and generally benefit fish populations to create a higher quality fishery. The liquid fertilizer treatments would be applied from tank on a barge each week over a two day period. The barge wake and prop wash would mix the fertilizer in the epilimnion. The nutrient applications may occur over the entire reservoir.

2. DETERMINATION: The Walla Walla District, U.S. Army Corps of Engineers is reviewing the annual requirements of the Nutrient Supplement Plan. The undertaking does not involve ground disturbances or chemical effects to sediment. We have determined the current scope of activities does not have the potential to affect historic properties. However, if the requirements of the plan change an additional review of the federal action may require additional review under 36 CFR Part 800.

3. ADMINISTRATIVE RECORD: The Walla Walla District has completed the necessary review for this project and has no further obligations under Section 106 of the NHPA and 36 CFR Part 800. A copy of this review is filed at the Walla Walla District.

4. For further information or questions regarding this action, please contact Mary E. Keith, at (509) 527-7278 or mary.e.keith@usace.army.mil.

Mary E. Keith
Archeologist

Peer Reviewer