



Dworshak Nutrient Supplementation

U.S. ARMY CORPS OF ENGINEERS

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Corps of Engineers and Idaho Fish and Game add nutrients to improve Dworshak Reservoir ecosystem

The construction of Dworshak Dam in 1972 blocked fish migration on the North Fork of the Clearwater River as it converted a river habitat to a reservoir. Since construction, a nutrient-poor reservoir environment has developed. The ratio of nitrogen to phosphorus became increasingly out of balance. The Dworshak Nutrient Supplementation Pilot Project is an ecosystem improvement program intended to improve the reservoir's ecosystem health.



Project modeled after nutrient supplementation projects in similar deep lakes

The pilot project was initiated in 2007 and modeled after nutrient projects that have improved ecosystem health and kokanee fisheries in several British Columbia lakes similar to Dworshak Reservoir. Reservoir nutrient programs have been the subject of scientific studies. At Dworshak, low concentrations of nitrogen fertilizer are added to the reservoir in spring, summer and fall. Adding fertilizer nutrients has a positive impact on the aquatic species food chain. It reverses the steady decline in nutrients and improves the nutrient-poor reservoir environment.

Environmental Stewardship and Partnership

The Nutrient Supplementation Pilot Project is consistent with the U.S. Army Corps of Engineers' (Corps) efforts as a good environmental steward. Idaho Fish and Game (IDFG) partnered with the Corps' Walla Walla District on the project designed to improve the reservoir ecosystem, which in turn enhances Idaho sport fishing opportunities.

The Corps provides fertilizer, labor and application equipment. The Corps also consults with a limnologist (a person who studies inland water systems) who "prescribes" fertilizer applications and adjustments. This consultant is a leading expert in these types of nutrient projects. IDFG provides the water quality and fish sampling and monitoring, sends water quality samples to the lab for testing and analysis, and monitors the kokanee fishery. IDFG also takes physical measurements such as water clarity and water temperatures at various depths. IDFG field and lab results are sent to the Corps-funded limnologist for interpretation and calculation of fertilizer application adjustments. IDFG uses kokanee salmon as an indicator species for its research because kokanee feed on zooplankton, one of the food chain organisms targeted for improvement.

Meeting public needs and environmental compliance

Public input generated the idea for this project. Idaho Fish and Game and the Corps openly communicated about the project in a series of public meetings starting before the project began operations. Appropriate actions were taken to acquire applicable permits and address requirements of other natural resources agencies. Several agencies were consulted by the Corps prior to starting the pilot project.

- The Idaho Department of Environmental Quality issued a Consent Order in 2007 that set strict water quality standards that had to be met in order to allow nutrient addition in the reservoir. The Consent Order was extended in 2008, and new Consent Orders were issued in 2009 and 2010. These standards were met during the first four years of treatment.
- The Corps applied for a National Pollutant Discharge Elimination System (NPDES) permit from the U.S. Environmental Protection Agency (EPA) on April 16, 2007, prior to the start of the pilot program. In 2010, the EPA determined that a NPDES permit was required for the project, and nutrient applications were promptly and voluntarily discontinued to allow resolution of this permit application. EPA subsequently issued a NPDES

permit to the Corps effective October 15, 2011, after its environmental review and consideration of public comments.

- In early 2012, the Corps invited public comments on an Environmental Assessment (EA) and draft Finding of No Significant Impact (FONSI) as part of its National Environmental Policy Act (NEPA) compliance.
- Under initial informal consultation pursuant to Section 7 of the Endangered Species Act (ESA), the U.S. Fish and Wildlife Service (USFWS) concurred with the Corps Biological Assessment that the project is not likely to adversely affect Bull Trout, Bald Eagle, or gray wolves.
- Also under Endangered Species Act (ESA) Section 7 initial consultation, NOAA's National Marine Fisheries Service (NMFS) concurred the project doesn't adversely affect fish habitat.

Scientific results are encouraging

Results during the first four years (2007-2010) of the project were encouraging. Adding nutrients initially influenced the bottom of the aquatic food chain, followed by changes at higher levels in the food chain. Monitoring results have revealed several benefits from the program including increases in beneficial algae and abundance of higher-quality food for aquatic life.

More specifically, monitoring efforts showed improvement in beneficial forms of edible phytoplankton (algae) that in turn can be eaten by zooplankton (larger microscopic organisms). As the project continued, an increase in zooplankton abundance was observed. This is important since zooplankton is the primary food source for kokanee and other aquatic organisms.

Signs of ecosystem improvement

Idaho Fish and Game reports seeing modest increases in fish size, primarily in weight (the fish are heavier for their size). This is a good sign of ecosystem improvement. However, in a large reservoir like Dworshak, it takes several years for nutrients to work their way up the food chain. Consequently, this positive response in the fish population is just beginning to be observed. With continued fertilization, more improvements are expected in the food chain and ecosystem.

How has the project affected blue-green algae in the reservoir?

Blue-green algae blooms can be hazardous to human health, but there is no evidence that recent nutrient additions at Dworshak have caused blue-green blooms. Blue-green algae have predominated in the Dworshak Reservoir because they compete better under low-nitrogen conditions. Nutrient (nitrogen) addition is expected to promote growth of other species of beneficial algae and reduce blue-green algae. Over time, this could work to delay the onset of blue-green blooms and lessen their severity – a benefit to public health. The occurrence of blue-green algae in areas of the reservoir with no nitrogen addition is another indication that the nutrient supplementation program is not the cause of the blue-green blooms.

Nutrient supplementation not linked to Dworshak Fish Hatchery diseases

Public concerns have been expressed that nutrient addition in the reservoir caused disease outbreaks at the Corps' Dworshak National Fish Hatchery (operated by USFWS), but not at the nearby Clearwater Hatchery, operated by IDFG. Scientific evaluations have not linked any hatchery disease outbreak to the addition of nitrogen to the reservoir. A 2010 agreement allowed for additional water to be supplied directly from Dworshak Reservoir to the Dworshak National Fish Hatchery. This is the same source of water for the Clearwater Hatchery. Using water directly from Dworshak Reservoir in 2010 substantially reduced disease outbreaks at Dworshak National Fish Hatchery, providing further evidence that nutrient addition to the reservoir is not the cause of disease at the hatchery.

Public safety is a high priority

Dworshak Reservoir water is safe for public use. The presence of blue-green algae does not necessarily mean it's toxic. Testing is required to determine possible toxicity. The Corps promptly responds to reports of algae blooms and has tests conducted. Drinking water is not affected by this pilot project.

Updated May 3, 2012 - 1800