

PNNL scientists to test strobe lights for impact on fish

A study began in June to test an underwater strobe light system scientists hope will deter resident fish species from entering the turbines at Grand Coulee Dam. Researchers from Pacific Northwest National Laboratory, the Confederated Tribes of the Colville Reservation, the U.S. Geological Survey and the Bureau of Reclamation are conducting the work.

Entrainment, or fish entering power turbines, at Grand Coulee Dam has a tremendous effect on resident fish populations in Lake Roosevelt, behind the dam. Prior research determined that entrainment at Grand Coulee Dam is significant and that 85 percent of the entrainment occurs at the third power plant, constructed during the 1970s as a power-peaking facility.

An estimated 402,000 fish per year are entrained through the turbines at Grand Coulee Dam. Many die, and those that don't die cannot get back to the lake. Entrainment reduction is being attempted.

The system to be tested consists of a number of distinct components. The Bureau of Reclamation's Denver office loaned the project three powerful strobe lights manufactured by Flash Technology Corp. The lights will be suspended below a barge in front of the dam's third powerhouse. Attached to the light array is an array of multi/split-beam hydroacoustic transducers that track fish movement so scientists at PNNL can observe how fish react to the strobe lights.

Finally, a number of hatchery-reared kokanee salmon and rainbow trout will have sonic tags surgically implanted. These tags will be tracked by sensors near the forebay area and will allow the scientists to better understand how fish react to the lights. The use of strobe lights is thought to deter fish from entering the turbines, but this is the first in-depth study to thoroughly test the system.

"We'll be running the study 24 hours a day, seven days a week for about six weeks," said Bob Johnson of PNNL's Environmental Technology Division, the fisheries biologist leading the field tests. "Other studies have tested the equipment for short periods of time.

"Scientists at PNNL have studied strobe light impacts on fish behavior previously and also used hydroacoustics to track fish behavior near surface bypass collectors at Bonneville Dam on the Columbia River and at Lower Granite Dam on the Snake River," Johnson added. "This project is a natural next step to combine this expertise to address a regional issue."



Strobe lights are being used to try to redirect kokanee salmon and rainbow trout away from Grand Coulee Dam's third powerhouse turbines, where they become trapped. PNNL scientists are combining split-beam sonar and other technologies to track fish to determine if the lights are effective.

Continued on page 13.

PNNL scientists to test strobe lights for impact on fish, cont.

The project aims to keep kokanee salmon and rainbow trout away from the turbines, keeping them in Lake Roosevelt where they will be accessible to subsistence and recreational fishermen. This is important for restoring resident fish populations for recreation in the area. The Bonneville Power Administration is funding the research with more than \$1 million, while the U.S. Geological Survey, Spokane Tribe, Bureau of Reclamation and Washington State Fish and Wildlife all will play integral roles in the strobe light study.

“This is an important study for the tribe, and the entire region,” said Richard LeCaire, the project manager for the Chief Joseph Kokanee Enhancement Project. “The Colville Tribe is committed to enhancing resident fish populations, but also understands the importance of hydropower to the region. This project is an important first step in testing what could be an extremely effective tool for enhancing resident fish stocks without affecting power generation — at Grand Coulee and at other dams as well. We are pleased to be teaming with PNNL scientists in solving this complex technical problem.”