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3. WATER: Elwha River a living laboratory for dam removal, restoration

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The issuance this month of a critical Washington state water quality permit means that the National Park Service is on track to begin removing the Elwha and Glines Canyon dams beginning in 2009. The project, considered the largest and most important dam removal operation in the United States, is being closely watched internationally as well.

"This is a major stepping stone toward dam removal," said Rob Masonis, senior director for American Rivers Northwest office in Seattle. "We need to clear several regulatory hurdles and this was a major permit."

On March 7, the Washington Department of Ecology issued a Section 401 water quality certification for the project, declaring that dam removal will not violate state water quality standards and other regulations, in keeping with the federal Clean Water Act. A large concern was the effect of releasing approximately 13 billion cubic feet of sediment that has built up behind Glines Canyon Dam in Lake Mills and 5 billion cubic feet of sediment trapped behind Elwha Dam at Lake Aldwell.



Without the permit, NPS could not proceed with hiring contractors or even applying for other necessary permits.

The two dams were constructed in the early 20th century, approximately four miles in from where the Elwha enters the Strait of Juan de Fuca near Port Angeles on the Olympic Peninsula.

They effectively choked off what was once one of the world's most prolific Chinook salmon runs and left a 70-mile run of the upper river in near pristine condition. Much of the upper river lies within designated wilderness areas inside the Olympic National Park.

Glines Canyon Dam is a 210-foot high concrete dam, finished in 1927, while the 105-foot-tall Elwha Dam was built in 1913. Both provided hydroelectricity for a nearby timber mill, although that power can now be supplied from other sources.

Local communities, including members of the Elwha Klallam Native American tribe, anticipate an economic boon tied to the \$200 million removal project and eventual restoration of salmon fisheries beyond the small tribal hatchery near the mouth of the river.

According to Masonis, there will be an estimated \$35-million-per-year addition to local economies, lasting as long as 100 years from improved commercial fishing, recreation and tourism.

In the short-term the project will create as many as 1,650 construction jobs and nearly \$100 million in local spending for goods and services. About half that money will likely remain in the community.



This series illustrates the current view of Lake Mills behind Glines Canyon Dam (top) and what the area is expected to look like 20 years after dam removal (bottom). Photo courtesy of American Rivers.

Commenting on the permit issuance, Gov. Christine Gregoire (D) said in a statement, "This project is incredibly significant to our salmon and our shoreline and beaches in the Port Angeles area. The Elwha once hosted a famous run of Chinook salmon. These fish were huge, some weighing over 100 pounds, and they have been all but eliminated by these two dams."

Getting their feet wet in science

While Port Angeles is counting on an economic boon, one part of the states academic community is already benefiting from the dam removal project. In 2005, Western Washington University and Peninsula College received a \$1 million National Science Foundation grant for a four-year program of cooperative studies on the Elwha River.

Bill Eaton, academic vice president of Peninsula College, told *Land Letter* that the grants allow 16 undergraduate and graduate students each summer to work with federal agency scientists, tribal members and college faculty on a broad range of scientific research programs. The four areas of research cover documenting microbial ecology, vegetation, fisheries and small mammals and amphibians along the river.

Eaton focuses on nutrients in the river system. "Salmon had been blocked from coming up past four miles, so there's been no nutrient input from the salmon in the upper watershed for 90 years," he explained. "Now the dams are coming down. It's an amazing experiment, an opportunity to find out the differences that will make throughout the ecosystem."

Bradley Smith, dean of WWU's Huxley College of Environment, along with Eaton, serves as a principal investigator for the NSF project. He called it a unique opportunity to document the current state of the river and the effects of removing two very big dams. In fact, the Glines Canyon Dam is considered the largest dam in the world slated for removal. "When they take those out, there will be a lot of international interest," Smith said.

Eaton said the project has given a boost to enrollment at the two schools and allows many faculty members to weave Elwha-related topics in their teaching and research.

Students are already putting together papers on their work, giving them a taste of academic achievement even as undergraduates. The journal *Northwest Science* will be devoting an entire issue to the topic of Elwha restoration studies later this year, Eaton said. In early May, NPS will host a daylong series of presentations from faculty and students on their work.



Glines Canyon Dam, a 210-foot high concrete barrier, represents the most significant dam removal project in the United States, which will begin in 2009, opening a 70-mile stretch of the Elwha River in the Olympic National Park. Photo courtesy of American Rivers.

Big projects ahead

In the Northwest, the projects are especially important because of the anticipated removal of several other dams over the next few years. Amy Kober, communications director for American Rivers NW, listed some of these projects:

- Summer 2007 -- Marmot Dam, Sandy River in Oregon
- Summer 2008 -- Little Sandy Dam, Sandy River, Oregon
- 2008 -- Condit Dam, White Salmon River in Washington
- 2009 -- deconstruction begins on Elwha Dam and Glines Canyon Dam
- 2009 -- Savage Rapids Dam, Rogue River, Oregon
- 2010 -- Powerdale Dam, Hood River, Oregon

River activists are also pressing for removal of the Klamath Dam in southern Oregon and four hydroelectric dams on the lower Snake River in Idaho.

"What we're seeing is a new era with respect to dams in the Northwest," said Masonis. "Removing dams can an incredibly powerful revival for the rivers and fish. We'll be seeing some of the largest and most harmful dams coming out on Northwest rivers."