



## Northwest Q& A: *Continued from page 5*

Division Engineer as a member. The Canadian government appointed the Crown Corporation, BC Hydro & Power Authority, as the Canadian Entity. Under the terms of the treaty, Canada must operate 15.5 million acre-feet of storage in the three Canadian treaty projects for power and flood control benefits in both countries; while the U.S. returns to Canada in electrical energy and capacity one half of the estimated annual average downstream U.S. power benefits (referred to as the Canadian entitlement).

The Canadian entitlement is delivered to BC Hydro by BPA, so the cost is ultimately born by ratepayers. The power associated with the Canadian entitlement is produced at both federal and non-federal dams in the U.S. The non-federal dams involved are owned by three public power utilities. The Canadian entitlement is valued at approximately \$250 million to \$350 million per year and the revenue from

the sale of that power flows directly into the BC government's general fund. The entitlement is required to be calculated based on the most effective use of the water for power generation in the United States. However, actual U.S. hydropower operations are significantly constrained by fish and wildlife obligations that were not anticipated at the time the treaty was negotiated and are today not considered in the treaty entitlement calculation.

In addition to the Canadian entitlement, the U.S. also paid Canada \$64 million for the use of 8.45 million acre feet of storage in the three Canadian treaty projects to be used for flood control in the U.S. This amount was based on flood damages prevented in the U.S., assuming the control of floods to 600,000 cubic feet per second at The Dalles, Oregon, and reflected one-half of the estimated downstream U.S. flood protection benefits until 2024, which is 60 years after treaty ratification. These payments were made with appropriated

federal funds when the dams were completed.

Whether the treaty continues or is terminated, requirements for flood control provided by the treaty projects will automatically change in 2024 to a process referred to as "called upon." The called upon procedure would give the U.S. the right to request flood control assistance, and Canada is obligated to provide it, but only to the extent needed after the U.S. has completely exhausted all of its own flood control capability, which is referred to as "effective use." The U.S. must pay Canada for its operating costs and economic losses from providing the called upon operation. However, the amount of storage required, the methods to determine costs, and the operating procedures that would be deployed are not clearly spelled out in the treaty. Studies of post 2024 flood control alternatives and scenarios that are now referred to as "flood risk management studies" are currently being conducted

“Because the review has such enormous implications for people throughout the Pacific Northwest, it’s paramount that all interests are represented in the process.”

by the U.S. Army Corps of Engineers.

**Q.** What is the 2014/2024 Columbia River Treaty Review?

**A.** As an analytic starting point for a region-wide treaty review, the U.S. and Canadian Entities conducted a joint study to measure changes and effects under various scenarios, including the treaty continuing or being terminated with the automatic change in flood control operations, as well as a scenario in which flood control operations remain as they are today and the treaty continues. Similar to current treaty operating plans, these studies considered only power and flood control objectives. A subsequent study was performed by the U.S. Entity in which U.S. biological opinion legal operating requirements were overlaid on the U.S.-Canadian studies for a more accurate and realistic view of U.S. operations. Ultimately, the two studies combined will serve as an excellent, neutral foundation for the broader and more intensive regional review now underway.

The U.S. Entity has developed a team of regional sovereigns to work and consult with in developing a regional recommendation regarding the appropriate future of the treaty. Representatives of the four states, 15 tribal governments, and the Northwest federal caucus are at the core of this process. Interest groups and utility companies, including some that own affected dams, will also be invited to work with this core team beginning in March 2011. Technical teams will be organized to work cooperatively with Corps of Engineers and BPA treaty technical experts to develop new analyses to assess the merits of different

future treaty scenarios.

As part of this process, the U.S. Entity has committed to directly consult with tribal interests through the federal government’s tribal trust responsibility. In addition, BPA and the Corps of Engineers, through the Columbia Basin Fish Accords, have agreed with certain tribes to coordinate on the review to ensure that tribal rights and concerns are brought to the U.S. Entity for consideration.

**Q.** The treaty addresses only flood control and hydropower generation. Is the review considering how other river uses, such as irrigation, water supply, or ESA-required flows for salmon and steelhead migration, can best be met in the future; whether that future continues under the existing treaty or under a terminated, modified or new treaty? If so, how?

**A.** Yes, it is. The world is a different place than it was in 1964. Power and flood control are not the only relevant issues when determining how to best manage the resources of the Columbia River for the common good. The U.S. Entity’s overarching challenge in the review will be to adequately consider the ecosystem, environmental, irrigation, navigation, and other issues that were not addressed in the original treaty, and balance those interests with the continuing need for flood control and power benefits. Bonneville and the Corps of Engineers already have substantial expertise and demonstrated competency in balancing such interests in the Pacific Northwest through implementing various statutory obligations aimed at balancing power, ecological, safety, and other interests. We have made it clear that our

goal is to gain a regional consensus, if possible, regarding post 2024 Columbia River treaty operations.

It is the U.S. Entity’s intention to submit a recommendation to the State Department in September of 2013; one year before either nation can transmit its intention to terminate the treaty, in order to provide federal authorities sufficient time to deliberate and review that recommendation.

**Q.** While there are myriad issues to address and resolve in the review, what are several of the most important in your opinion?

**A.** Going forward, the policy and analytical challenges are substantial. Since the treaty’s signing, far reaching fish and wildlife statutory protections have been enacted that bear on BPA’s and the Corps of Engineer’s responsibilities for managing the Columbia River. Fourteen fish and wildlife species have been listed and the current biological opinion explicitly notes the need to address river flows resulting from treaty operations. Also critical are the changes to flood control that automatically occur in 2024, and the need to assure that the amount of the Canadian entitlement aligns with the real benefits. These changes, or any other modifications to the treaty storage operations, will involve challenges and the need for cooperation between the Northwest states, tribes, and federal agencies, as well as between power, irrigation, fish and wildlife, recreation, and other concerns. The U.S. Entity intends for this review to be transparent, open, collaborative, and inclusive among the sovereigns, tribal, state, and stakeholder interests. ■

# Understanding Shifting Ocean Conditions to Improve Predictions of Juvenile Salmon Survival



Scientists prepare to trawl for juvenile salmon off the Oregon coast.

**U**SING 16 INDICATORS of weather and ocean conditions in the Pacific Ocean, scientists at the National Oceanic and Atmospheric Administration are improving their ability to understand why Columbia River salmon runs are abundant in some years and scarce in others.

The scientists have been studying the indicators, which include sea-surface temperatures, upwelling of ocean nutrients, the abundance of zooplankton species like copepods and krill, and actual counts of juvenile salmon trawl surveys, for 13 years. The indicators are aiding predictions of how well juvenile salmon will survive in their important first few months in the ocean, and therefore how the fish may fare as they mature to adults and eventually return to spawn.

“These indicators, taken as a whole, represent an ‘ecosystem approach’ to providing management advice” to fish and wildlife agencies, the scientists wrote in a memo to the Northwest Power and

Conservation Council. NOAA scientists John Ferguson of Seattle and Bill Peterson of Newport, Oregon, discussed the most recent results of their work at a Council meeting in December.

“We feel like we’ve got it figured out,” Peterson told the Council. Ferguson said the indicators and analysis should help salmon managers improve their prediction of future runs sizes and make better decisions about how many fish to allow for harvest.

In the north Pacific Ocean, changes in water temperature and current direction

are driven by a climate phenomenon known as the Pacific Decadal Oscillation. The PDO has two phases, warm and cold, resulting from the direction winter winds. Major changes in Northeast Pacific marine ecosystems correlate with phase changes in the PDO. Warm eras have seen enhanced coastal ocean biological productivity in Alaska and decreased productivity off the West Coast, while cool PDO eras have seen the opposite—better conditions off the West Coast and poorer conditions in Alaska. Cool periods correspond with increased salmon and steelhead returns to the Columbia River Basin.

The negative, or cold-water PDO phase brings fatty, cold-water copepods from the coastal Gulf of Alaska to the coasts of Oregon and Washington—rich food for juvenile salmon. The warm-water PDO phase, on the other hand, brings smaller, less-fatty copepods from Southern California to the northern coast—a poorer food supply.

From 1925-1998, the PDO shifted phase every 20-30 years, Peterson said. “However, we’ve had two shifts of four years’ duration recently: 1999-2002 and 2003-2006, and another shift in late 2007,” he said. It isn’t clear why the PDO phase has changed so quickly in recent years, but the sudden changes may hint at future volatility that could make ocean productivity even more difficult to predict.

Ferguson said the indicators and analysis should help salmon managers improve their prediction of future runs sizes and make better decisions about how many fish to allow for harvest.