

STRIKING A BALANCE BETWEEN ENERGY AND THE ENVIRONMENT IN THE COLUMBIA RIVER BASIN



## From **Freshwater** to **Open Sea**, and the Impact on Fish

The effects of the Pacific Ocean environment on fish that spawn and rear in the Columbia River Basin is critical to their survival and must be understood better,

experts in ocean science said at a workshop sponsored by the Northwest Power and Conservation Council. The Council convened the science workshop in advance of revising its Columbia River Basin Fish and Wildlife Program, which directs more than \$300 million each year to improving the survival of fish and wildlife affected by hydropower dams.

“Last year’s spring Chinook run was a disappointment,” said Phil Rockefeller, a Washington Council member and chair of

its fish and wildlife committee. “The ocean makes a difference. We’re committed to better understanding the effects of the ocean on salmon survival so that we can better manage salmon in freshwater.”

Salmon, steelhead, lamprey, and sturgeon that spawn in freshwater habitat in the basin spend some or all of their adult lives in the ocean after a transition to salt water in the estuary and plume.

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The Council's program includes research on the interaction between the ocean and freshwater environments, and the Council's Independent Scientific Advisory Board presented a number of recommendations after its review of the program's current strategies.

"There is an interaction between the Columbia River Basin and the ocean," said Kate Meyers, an ISAB member and long-time ocean scientist now retired from the

University of Washington. "The program says we really can't do anything to change the ocean, but the ISAB suggests a fundamental shift in that thinking. In fact, we can change the ocean through hatchery production, hydrosystem actions, controlling pollution — many different ways."

survival in the ocean, appear to be influenced by the operation of Columbia and Snake river dams, said Antonio Baptista, director of the Center for Coastal Margin Observation and Prediction and the Center for Environmental Health at the Oregon Health and Science University.

"The [dams] affect important physical aspects of the plume, estuary, and the connectivity between them," Baptista said.

of Fish and Game, questioned that conclusion. Fish managers have no control over when wild juvenile fish migrate to the ocean, and as for hatchery fish, "the fish tell us when they are ready to go," he said, adding, "We might actually increase mortality if we arbitrarily change the release timing."

Survival in the estuary and ocean depends on the timing of migration from freshwater and the ocean environment,

There is still a lot of  
**MYSTERY,**

but mortality in the ocean is huge and any little improvement you can make will make a huge improvement

**IN ADULT FISH RETURNING TO SPAWN.**

University of Washington. "The program says we really can't do anything to change the ocean, but the ISAB suggests a fundamental shift in that thinking. In fact, we can change the ocean through hatchery production, hydrosystem actions, controlling pollution — many different ways."

The ISAB recommended that the Council revise its ocean strategies to encourage research that would isolate the effects of ocean conditions on anadromous fish survival and growth, determine the limits of actions taken in freshwater given the variability of conditions in the ocean, and predict future ocean conditions with a view to adjusting actions in freshwater.

"Even under pristine habitat conditions, during periods of poor ocean conditions the abundance and productivity of fish populations is going to be low," she said.

Environmental conditions in the estuary and plume, which are critical to later

He said it appears that construction of dams reduced the annual Columbia River spring freshet and therefore the volume of the freshwater plume. Research suggests that large plumes, which result from large volumes of freshwater flowing into the estuary, appear to be correlated with larger smolt-to-adult survival for specific stocks of salmon and steelhead.

Baptista said it might be possible to help salmon take better advantage of today's estuary by, for example, adjusting the timing of juvenile fish releases — from barges that carry fish past Snake and Columbia river dams in the spring, and releases of juvenile fish from hatcheries — to coincide with highest flows.

"We have the potential to make inseason and long-term adjustments to how we manage fish and the ecosystem to affect the success of recovery projects," he said.

But Pete Hassemmer, anadromous fish manager for the Idaho Department

he said. "So the question is: What are the opportunities to influence the timing of when fish hit the estuary? In freshwater, rather than limit opportunities to do things, we should take advantage of maximizing survival so if it's a good ocean we have more fish to take advantage of those conditions, and if it's a bad ocean we can adjust measures in freshwater accordingly."

Regardless of whether conditions are good or bad, fish survival in the ocean, at least for salmon, is low. Brian Burke, a research fisheries biologist at NOAA's Northwest Fisheries Science Center in Seattle, studies habitat preferences and behavior of Pacific salmon during their early ocean residence and the influence of various ocean indicators on salmon survival.

"Ocean survival is low and variable over years," he said. "Survival of Columbia River Basin salmon though the hydropower system is 50-60 percent,





but survival to the adult stage is about 1 percent.” It’s not clear why.

“We collect a lot in information relative to salmon survival, but it can only tell us so much,” Burke said.

Ocean indicators include water temperatures at the surface and at various depths, the abundance of food organisms — which is a factor of water temperature and the availability of nutrients — and salinity. Researchers don’t rely on any

the previous 10 years. What looked like a disaster at first turned out to be an average run; more complete information from sampling in the ocean might have made the picture clearer, earlier.

But there is good news: “We have a lot more information on important ocean variables than we did even five years ago,” he said.

Still, the ocean is a black-box mystery for scientists, prompting researchers to assess

the growth of organisms that feed on plankton and in turn are food for salmon — declines.

“We need to be thinking not just about temperature, but also about temperature stratification,” Newton said. “It’s going to be tough to predict because it’s associated with wind, and predicting wind more than three days in advance is unreliable.”

Water chemistry is another important issue for future research, particularly

single factor but look at all in aggregate, he said. But even in aggregate, conclusions are difficult because the indicators are not constant throughout the ocean environment, and fish respond to the indicators differently. This complicates the task of predicting annual run sizes for salmon and steelhead, he said. Adding to the complexity is the fact that little is known about the effect of predation by birds on fish in the estuary and plume.

“The estuary, plume, and ocean together are a really dynamic system,” Burke said. “We know the river affects the plume and the plume affects fish, but we don’t have good information yet to use for forecasting. We need to think more about how to use the information we have.”

With more complete information, fish managers could predict annual run sizes more precisely, he said. In 2012, for example, the spring Chinook migration was late by about two weeks, compared to

the future in terms of what is known and what is unknown in order to build on current knowledge through carefully targeted research.

Jan Newton, who teaches in the Department of Biological Oceanography at the University of Washington, said there are three key emerging issues for ocean research: water temperature stratification, lack of dissolved oxygen in sea water, and ocean acidification.

“Elevated water temperatures are documented, with future increases likely,” she said. “This is happening globally.”

Temperature stratification is critically important to the growth of plankton that form the base of the ocean food chain. When powerful winds churn the sea, growing conditions improve for plankton. But when calmer winds prevail, upwelling subsides, warmer water stays near the surface, and plankton growth — and

acidification of the ocean and declining levels of dissolved oxygen in sea water, Newton said.

“Concentrations of dissolved oxygen in the ocean are expected to decrease as the upper ocean warms and becomes stratified,” she said.

Oxygen levels already are decreasing in the North Pacific, and the decline since 2002 has been particularly dramatic, she said. In 2006, scientists actually recorded anoxia — no dissolved oxygen — in areas off the Northwest coast.

“As we’re thinking about this, it’s not just temperature that’s an important factor but also freshwater — the plume will have an effect on oxygen in ocean water,” she said.

Meanwhile, ocean acidification is occurring globally. Newton said the chief cause is believed to be carbon dioxide emissions from human activities — exhaust from vehicles, factories, power



plants, and so on. Off the Washington coast, it appears to be happening much sooner than anticipated.

Increasing acidity makes it more difficult for species that make shells — clams and oysters, for example — to survive, and also has implications for the growth of food for fish, Newton said.

“We don’t know much about the status and trend of acidification in our local marine waters, the importance of local drivers of that acidification, the role of the Columbia River plume, the responses of local marine organisms, or the ecosystem at large,” she said. “But I’m pleased to report that these parameters are being monitored.”

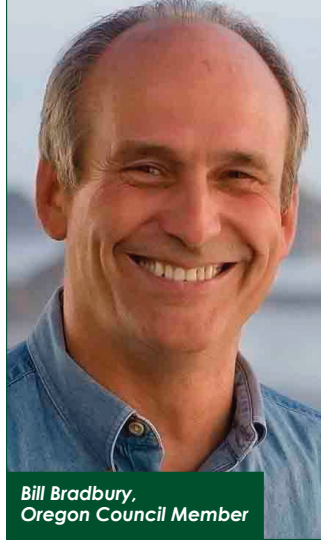
Clearly, there is a lot to learn about the ocean environment, but scientific knowledge continues to improve.

Bill Booth, a member of the Power and Conservation Council from Idaho who has chaired the fish and wildlife committee and the Council in the past, remarked after listening to the workshop presentations that when he was appointed in January 2007, “the debate was still lingering on the importance of the ocean — the prevalent thought was, ‘get juvenile fish downstream as quickly as possible and out to the ocean, and then we’re done.’”

But that’s changed.

“I’m struck by how much ocean science has advanced since I’ve been on the Council, and in the right direction,” Booth said. “Clearly the ocean has a major effect. The debate no longer focuses on the importance of the ocean, it’s now more about how we will use the knowledge we have as a management tool. I’m amazed by the progress that has been made in that knowledge. There is still a lot of mystery, but mortality in the ocean is huge and any little improvement you can make will make a huge improvement in adult fish returning to spawn.” ■

## Notes From the Chair



Bill Bradbury,  
Oregon Council Member

Because salmon travel from streams to the ocean to live out part of their lives,

understanding how that vast, even mysterious, environment affects them is a crucial piece of the restoration puzzle.

A workshop on the latest research was a step in the

right direction this fall, and we cover the issues at stake in what is likely to be a new approach to thinking about the connection between tributary-to-ocean habitat.

It’s not unusual to hear about the Pacific Northwest as a leader in energy efficiency, but do you know how it happened? It’s by design, literally. You could say we’re one of the few, maybe even the only, part of the world that has a system in place to evaluate and verify the energy savings from efficiency measures. It’s called the Regional Technical Forum, and we peer beyond its rather nondescript name to the very important work it does help the region meet its energy goals.

And in an interview with John D. Carr, the executive director of the Industrial Customers of Northwest Utilities, you’ll hear from a leader in the energy industry about the changes he’s observed in the region’s power system, and what he sees ahead of us in the future.

A handwritten signature in black ink that reads "Bill Bradbury". The signature is fluid and cursive, with a long horizontal stroke at the end.

Council Chair Bill Bradbury





# A Northwest Guide to Energy Efficiency

For more than a generation, the Pacific Northwest has been a leader in acquiring energy efficiency. Since 1978, the region has reduced electricity demand by more than 5,000 average megawatts, about half of the region's load growth. That's enough power for Montana and Idaho combined, or more than four cities the size of Seattle.

One of the reasons for this success has been the unique role that the Regional Technical Forum plays in providing a systematic way to validate energy efficiency savings for the region.

Since Congress passed the Northwest Power Act in 1980, energy efficiency has been the priority resource to meet future demand for electricity in the Council's power plans.

There are hundreds of efficiency measures that reduce consumption in different ways. The debate, and sometimes the controversy, arises in determining exactly how much energy a particular measure saves. It's important because the cost is borne by ratepayers and, for investor-owned utilities, shareholders.

The forum uses a set of detailed guidelines for estimating energy savings that are peer-reviewed to ensure there is a clear explanation of how it determined a measure's energy savings. Members include the Bonneville Power Administration, utilities, and energy organizations.

Over time, the forum has developed a reputation for providing unbiased estimates of savings that are used in many ways. Howard Schwartz, energy policy analyst in the Washington state office of the Council, said utilities use its results in developing efficiency plans and programs, and businesses that install efficiency measures use them in developing estimates or proposals. State utility commissions also use the results as benchmarks when evaluating the methodologies and accomplishments of regulated utilities, and the Bonneville Power Administration uses them in its energy-efficiency reporting system for its customer utilities, and also for assessing potential energy-efficiency savings, Schwartz said.

The forum's success has attracted attention from around the country, particularly from California, where there are strict efficiency requirements in state law and the process of identifying measures and verifying savings is contentious.

In 2005, the California Public Utilities Commission was given the authority to identify efficiency measures and verify their savings. The commissioners themselves are policymakers, not technical experts, so the technical work is done by staff. Utilities propose efficiency measures and the staff is responsible for verifying the savings claimed by the utilities. The utilities and staff often argue about claimed savings, lawyers get involved, and

litigation is sometimes necessary to resolve disputes.

Peter Miller, a senior scientist at the Natural Resources Defense Council in San Francisco, joined the forum as a voting member in January after observing the forum at work for several years.

“The Northwest presents a very appealing model in which the technical decisions are made by a broad group of qualified experts in an open, transparent process,” Miller said. “That model has a lot to offer to the

Bonneville, and others both inside and outside the Northwest.”

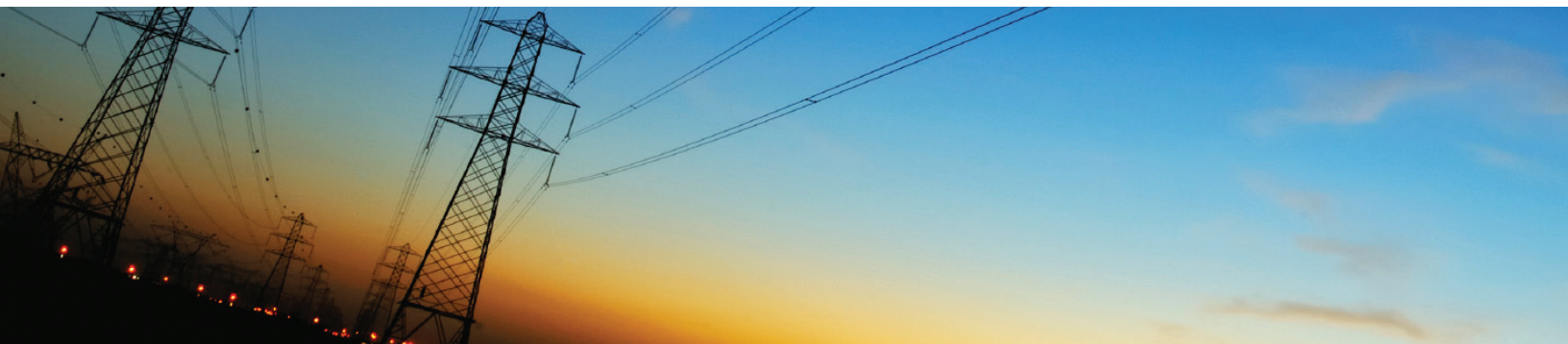
Another important distinction is that unlike state utility commissions, the forum is not a regulatory agency.

“That means we can have an unbiased answer,” Eckman said. “In the regulatory arena you are either a defendant or a plaintiff, and you have an interest in either inflating or deflating the numbers.”

The value of the forum is widely recognized. Jan Borstein, energy analysis

Scott Williams, a senior market analyst at Puget Sound Energy in Bellevue, Washington, and also a new member of the forum, said his impression changed at his first meeting.

“My impression before was that the forum was the designated authority on measures that had deemed savings, but I learned quickly that’s not really the case,” he said. “It’s an advisory group that provides expertise that can be used by utilities and others. My understanding is that going to our [state utilities] commission



rest of the country as energy efficiency becomes more prominent in our energy supply.”

Forum Chair Tom Eckman, the Council’s Conservation Resources Manager, said the forum deliberately chose an open public format to encourage transparency.

“We have an ongoing public review process by a jury of peers, and elsewhere that process is usually done by staff or a consultant in a cubicle with little or no public vetting,” Eckman said. “California’s PUC is in the midst of investigating whether something like the forum might work in its regulatory structure.”

There are other differences, too.

“They update their database every so many years; we’re constantly going through our measures,” Eckman said. “They measure savings using information from hired consultants. Our primary research is done by utilities, the Energy Trust of Oregon,

and planning project manager for the consulting firm EnerNOC, follows the forum meetings from her office in Colorado on behalf of clients in Washington.

“The knowledge of the group is amazing,” she said. “They have years of expertise and a deep understanding of their subject areas. Keeping the data current is essential, and having a process for updating it also is very valuable.”

Rick Knori joined the forum as a member in January representing Lower Valley Energy, a Bonneville customer utility in northwestern Wyoming.

“Effective energy efficiency is important with our ratepayers, both in terms of being a resource for them and as a means to keep our rates low,” Knori said. “The forum, using diverse technical expertise, brings strengths from many different perspectives. I think that’s why it’s able to get things done efficiently and quickly.”

with measures that have been blessed by the forum reduces our risk to almost a certainty that the claimed savings will be honored. That’s a good thing for us.”

Bob Davis, a forum member who works for the energy-efficiency consulting firm Ecotope in Seattle, said the Power Act and its focus on energy efficiency makes the Northwest a unique place.

“While the majority of the Northwest population pays electrical bills to investor-owned utilities, there are many, many more public utilities, and Bonneville and the forum are primary determinants in how these utilities deliver and oversee efficiency programs,” Davis said. “Energy codes have changed dramatically in the last 30 years, and much of this change has been driven by the [Council’s power] plan and the Act. Today there are many people in our region who realize the value of defensible energy savings and protocols in the context of delivering efficiency to the region.” ■





John D. Carr

## Northwest Q & A: *John D. Carr*

John D. Carr is the executive director of the Industrial Customers of Northwest Utilities based in Portland, Oregon. Carr has 30 years of experience in the energy industry working in public policy, energy markets, corporate strategy, contract negotiation, sales, and political affairs.

He was previously the president of the Carr Group, which provided business solutions to electric executives and managers with a focus on energy policy and strategic planning.

From 1997-2005, Carr worked at PacifiCorp, beginning in industrial sales and eventually as vice president of major projects. He was executive director of Direct Service Industries, Inc., from 1988-1997. He successfully led the effort for the DSI members to become the first end-use consumers in the United States to receive open access to the wholesale energy market, and he managed the DSI's efforts to shape Northwest energy policy in Washington D.C. Mr. Carr holds master of science degrees in mathematics and economics.

**Q.** Tell us a little about ICNU. Who are your members and what are their interests and expectations regarding their access to electricity?

The Industrial Customers of Northwest Utilities was founded in 1981, and it is a non-profit organization of industrial companies in the Northwest. We have a large and diverse membership base to draw on in developing and influencing energy policies in Oregon and Washington.

Our mission is to be the leading advocate for Northwest industry on issues related to the use and affordability of electric energy. The ICNU supports sustainable and strong economic growth within the region, and we accomplish this by representing our members'



interests before regulatory agencies and policymakers at the utility, state, regional, and federal levels. Our actions are based on the fundamental belief that a healthy, growing industrial base promotes a rich and vibrant Northwest economy.

of service. This is the key to having a strong, healthy, and growing industrial base in the Pacific Northwest and a strong economy.



**Q.** You've been an active participant in Northwest energy system policymaking for much of your career and have viewed it from several different perspectives. Having witnessed the evolution of the system, what has surprised you the most? What changes have been the most, and least, beneficial?

My biggest surprise over the years has been the change in the public and political perception of the Pacific Northwest's power system. When I entered the energy business in the 1970s, the region's energy supply, with its integrated hydro, thermal, and high-voltage transmission system, was viewed as one of the premier systems in the world. It was low-cost, flexible, extremely reliable, and very environmentally clean. These benefits attracted many large industrial companies to build facilities here, bringing thousands of well-paying jobs to the region.

And, in today's world of global warming concerns, the Pacific Northwest's power system continues to be one of the premier systems in the world. But, who would know reading the newspapers or listening to the evening news? I recommend we return to recognizing the regional advantages we have, taking actions to keep power rates low with high reliability

**Q.** The Council's Sixth Power Plan identified 1,100 to 1,400 average megawatts of energy efficiency as a cost-effective resource for the region's electric utilities to acquire during 2010-2014. A sizeable portion of this energy efficiency is available at industrial facilities. What are some of the key factors that your members look at when making decisions about investing in energy efficiency savings for their operations?

The industry sector remains committed to using energy as effectively and efficiently as practical. Industrial margins tend to be low, especially in this poor economic environment. There is a constant quest to use every industrial input as efficiently and productively as possible. Industry will be a leading contributor to the region using electricity efficiently and wisely.

**Q.** If you had a crystal ball, what would it say about the future of the Northwest energy system over the next 20 to 30 years?

As for predicting the future, I'm reminded that weather forecasters claim economists were invented to make them look good. In that vein, I always approach forecasting with a huge gulp of humility. So here goes. Forecast I – We're just beginning to see the impacts of bringing large amounts of new intermittent generating resources (primarily wind) into the regional power system. Our planning and operation has traditionally been that of an energy-constrained system. No more. We're rapidly moving into a capacity-constrained system. As a region, we're only beginning to understand what that means. At the very least, we're going to see significant growth in demand-side programs and incentives for load shifting. I anticipate that industry will play a positive role in this process.

Forecast II – As issues surrounding global warming heat up (pun intended), the Pacific Northwest will become more and more attractive. The dense forests on the west side of the Cascades are large carbon sinks, the underlying electric power system is low-cost and relatively environmentally benign, there is abundant water, mild temperatures, and some of the most beautiful wilderness settings anywhere. If we can successfully keep power costs down, we have all the makings for a strong economy built on a vibrant and growing industrial base. ■





# On Many Fronts, a Fight to Restore Sockeye

The sockeye salmon is a beautiful fish.

Bullet sleek with silvery sides, dark blue backs and bright red flesh, “bluebacks” or “redfish” are native from the Columbia River north to Alaska. They’re smaller than their Chinook and coho cousins and have a life cycle unique among salmon. Sockeye spawn along the shores of lakes, or in tributaries of lakes, rearing for up to two years before going to the ocean for one to three years before returning to spawn.

They’re highly regarded by sport and commercial fishers, and they’re declining throughout their range. Or are they thriving?

The 2012 sockeye run in the Columbia River set a modern-day record — 515,673 fish counted at Bonneville

Dam, almost 400 percent above the most recent 10-year average. Yet just 10 years earlier, the 2002 count at Bonneville was 49,610 fish. For 2013, the Oregon and Washington fish and wildlife departments predict a run of 180,500 at the river’s mouth.

It’s estimated that lakes in the Columbia River Basin once supported eight unique sockeye populations, with annual runs of around 4 million fish. Today, three major populations remain, identified by the lakes where they spawn: Okanagan Lake in British Columbia, Lake Wenatchee in Washington, and Redfish Lake in Idaho. Okanagan sockeye are the most numerous, followed by the Wenatchee stock. Snake River sockeye, an endangered species, are the smallest component but appear to be rebuilding slowly. The causes for their decline

are common to all salmon species: overfishing, habitat losses, disease, predation, and the dams that affect their migration.

For Okanagan Lake sockeye, irrigation dams that blocked access to spawning habitat were a major cause of their decline. The Okanagan Nation Alliance, a tribal organization based in British Columbia, has been working to restore salmon to those habitats through an ongoing, experimental reintroduction of sockeye fry into Skaha Lake, which is an impoundment of the river behind Okanagan Falls Dam.

Since 2008, the number of Okanagan sockeye returning to spawn, counted at Wells Dam, has risen from 22,273 in 2007 to a high of 326,107 in 2012. Dr. Kim Hyatt, an expert on Okanagan





sockeye with the Canadian federal fisheries agency, Fisheries and Oceans Canada, points to three probable causes for this resurgence. The first is increasing production of hatchery fish, which will increase when an \$8 million hatchery is completed near Penticton, British Columbia in 2014. The hatchery is funded through conservation agreements among the Chelan and Grant PUDs in Washington, and state, provincial, federal, and tribal agencies. The second is a new (since 2004) water-management regime in the Canadian portion of the Okanagan

River that protects sockeye eggs and fry by maintaining river flows and lake elevations to “ensure success for fall spawning by adults, winter incubation of eggs, and spring migration of fry and smolts,” said Hyatt. And third, Fisheries and Oceans Canada increased the escapement objective, the number of adult fish that escape harvest and return to spawn.

Lake Wenatchee, which is a very clear lake, doesn't produce enough of the nutrients from aquatic plants that juvenile

## Council Decisions

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### January 2013

The Council approved the Independent Economic Analysis Board's study on the economic risk associated with an infestation of zebra and quagga mussels in the Columbia River Basin. The report is an update of the board's 2010 report.

### February 2013

The Council endorsed several recommendations from the Wildlife Crediting Forum/Wildlife Focus Workgroup, including one to reconvene the Wildlife Advisory Committee.

### March 2013

The Council formally adopted the midterm assessment of its Sixth Power Plan. The report, which received broad public review and comment, covers the region's progress in implementing the 2010 power plan, the changes in the energy field, and key topics for the Seventh Power Plan.



fish need, said Dr. Jeffrey Fryer, a fisheries scientist and sockeye expert with the Columbia River Inter-Tribal Fish Commission. Lake Wenatchee sockeye production may also be limited by rain-on-snow events that can wipe out egg nests, or redds; predation by bull trout and pikeminnows in the lake; and competition for food between wild sockeye smolts and hatchery-reared smolts (the hatchery program began in 1988 and was discontinued in 2012 in favor of allowing fish to spawn naturally).

Returns of sockeye to Lake Wenatchee have been highly variable since 1999, when counting began at Tumwater Dam on the Wenatchee River. The median annual return is about 20,000 from 1999–2012, with a low of 1,172 in 1999 and a peak of nearly 70,000 in 2012.

The ocean environment also has a huge impact, said Josh Murauskas, senior fisheries biologist for the Chelan County Public Utility District. Good feeding conditions in the ocean yield higher survival than poor feeding conditions.

Completion of Sunbeam Dam on the Salmon River in 1910 blocked salmon from returning to Redfish Lake in central Idaho, which historically supported sockeye. The dam was partially breached in 1934, but this and a variety of other factors, have contributed to the decline over time.

Snake River sockeye were listed as endangered under the federal Endangered Species Act in 1991. Prior to the listing, the Idaho Department of Fish and Game began a program

releasing fertilized eggs and fish into the habitat, preventing their extinction.

In June 2012, the Northwest Power and Conservation Council recommended construction of an additional hatchery to boost production of the endangered species. The \$13.5 million hatchery, funded by the Bonneville Power Administration, will be built near the southeastern Idaho city of Springfield and will be capable of producing up to 1 million juvenile sockeye annually for release in Salmon River headwater locations in the Stanley Basin of central Idaho. The state's long-term goal is to rebuild the population to at least 2,500 adult sockeye spawning annually in the wild.

Despite their annual variability, Columbia River Basin sockeye runs appear to be generally improving. The increase brings economic development opportunities through enhanced fisheries, and cultural benefits for tribes.

Virgil Lewis, a member of the Yakama Nation and chair of the tribes' fish and wildlife committee, captured the sense of optimism for the future of sockeye in a column in the *Seattle Times* in December 2012. The Yakama Nation is working to restore sockeye to the Cle Elum River and Cle Elum Lake.

"Sockeye were once a primary food that sustained Yakama families throughout the winter," Lewis wrote. "In the future, we hope the Yakama, as well as sports fishermen, will have the opportunity to again catch sockeye in these Eastern Washington waters. ■"

## New Montana Council Members

Pat Smith and Jennifer Anders were appointed to the Council in January by Governor Steve Bullock. At the Council's March meeting, Anders was elected vice chair for the remainder of 2013. She replaces former Montana Vice Chair Bruce Measure.

Smith has practiced Indian law in Montana for 30 years, including as an in-house attorney for the Confederated Salish and Kootenai Tribes from 1984 to 1994. His private practice

in Missoula focused on state-tribal agreements, natural resource law, water rights, and economic development issues. He has a bachelor's degree in history and political science, and a law degree, from the University of Montana.

Jennifer Anders worked closely with Governor Bullock during his 2009–2012 tenure as Montana's attorney general, tackling a number of high profile issues including energy

development, water quality, climate change, public land management, and interstate water compact allocations. She has spent her entire professional career in public service, working for four separate attorneys general in both the civil and criminal arena. Anders has a law degree from the University of Montana and an undergraduate degree from the University of California, Santa Barbara.



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