

# The State of the Columbia River Basin

Draft Fiscal Year 2009  
ANNUAL REPORT  
To Congress and  
Citizens of the Pacific Northwest  
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Committee on Energy and Natural Resources  
United States Senate*

*Committee on Energy and Commerce  
United States House of Representatives*

*and*

*Committee on Natural Resources  
United States House of Representatives*

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*The Northwest Power and Conservation Council was established pursuant to the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Public Law 96-501) by the states of Idaho, Montana, Oregon, and Washington. The Act authorized the Council to serve as a comprehensive planning agency for energy policy and fish and wildlife policy in the Columbia River Basin and to inform the public about energy and fish and wildlife issues and involve the public in decision-making.*

*This annual report has been developed pursuant to Section 4(h)(12)(A) of the Northwest Power Act. The Council's bylaws, which include its organizational structure, practices, and procedures, are available to the public at the Council's website as Document 2003-19.*

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December 2009

To Congress and the Citizens of the Pacific Northwest:

This document is the draft annual report of the Northwest Power and Conservation Council to Congress as required by the Northwest Power Act, the federal law that authorized the states of Idaho, Montana, Oregon, and Washington to create the Council. The report provides an overview of fish, wildlife, and energy issues with an emphasis on the Columbia River Basin, and a synopsis of the major activities of the Council during the fiscal year ending September 30, 2009. The report also includes information about the Council's budget and administration.

Twenty-nine years after Congress passed the Power Act, the Council continues to provide Northwest citizens with a fish and wildlife program based on the best available scientific information and a power plan that assures the Northwest an adequate, efficient, economical, and reliable electricity supply. The Council encourages broad public participation in its planning activities, offering citizens an opportunity to participate in decisionmaking about future sources of electricity and fish and wildlife protection in the Columbia River Basin.

I am pleased to submit this draft report for Fiscal Year 2009.

Sincerely,

W. Bill Booth  
Chair

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## **The State of the Columbia River Basin 2009**

In the Pacific Northwest, wind power development continued at a rapid pace, energy-efficiency achievements set a new annual record, and the Northwest Power and Conservation Council revised its Columbia River Basin Fish and Wildlife Program and Northwest Power Plan with renewed commitments to habitat improvements and energy efficiency. The Bonneville Power Administration set a new record for transmitting wind power and also signed new contracts with its customers that implement tiered rates, placing more responsibility on customers to meet their own load growth. Meanwhile, most salmon and steelhead runs returned in strong numbers, particularly several runs in the Snake River Basin.

Climate-change concerns are attracting national attention and driving policy decisions at both the regional and national levels. The revised Northwest Power Plan, which the Council unveiled in draft, treated climate change as one of its key issues. The plan proposes to meet nearly all of the region's load growth over the next 20 years through improved energy efficiency. The plan also relies on renewable power, primarily from wind. These zero-emissions resources are important additions to the power supply because they reduce dependence on power plants that burn fossil fuel and emit carbon dioxide.

By the end of Fiscal 2009, the installed capacity of wind power in the Northwest stood at more than 3,300 megawatts, and more than 700 additional megawatts of wind-power capacity was under construction. The Council's draft Sixth Northwest Power Plan predicts that renewable resources developed to meet renewable portfolio standards in Oregon, Washington, and Montana should contribute 1,800 average megawatts of energy, or 5,600 megawatts of installed capacity, most of it wind power. Clearly, wind power is becoming an increasingly important power resource in the region. In August, Bonneville reported that its transmission system achieved a new milestone, carrying more than 2,000 megawatts of wind power for more than an hour.

Energy efficiency also is booming in the Northwest. The Council reported that the region set a new record for acquiring energy efficiency in 2008, following on the then-record achievement in 2007. The annual total in 2008, as reported by the region's utilities and Bonneville, was 234 average megawatts. That is the highest annual achievement since regional record-keeping and efficiency investments began 30 years ago.

Expressed as generation, 234 average megawatts is equal to the output of an average-size natural gas-fired power plant and is enough electricity for about 148,000 Northwest homes. Energy efficiency is inexpensive, as well as emissions-free, two important attributes as the economy recovers and policymakers seek to improve air quality by reducing carbon emissions. The average cost of efficiency improvements to utilities in 2008 was \$20 per megawatt-hour, or about one-fifth the cost of power from a new generating plant, either natural gas or wind. Most of the savings--about 140 average megawatts or 59 percent of the total--occurred in homes, and most of those savings came from replacing incandescent light bulbs with compact fluorescent lights. Commercial buildings were the second-largest area of efficiency gains, 49 average megawatts or 21 percent of the total. Lighting improvements were a significant share of

the total in that sector, too. Industrial efficiencies accounted for 35 average megawatts or 15 percent of the total.

Salmon and steelhead returns to the Columbia River Basin in 2009 varied among species and stocks; some were abundant and others were not. At the time this draft annual report was prepared for public comment, in the fall of 2009, spring and summer runs--spring and summer Chinook, and sockeye--had returned to spawn, and the fall fish--coho and fall Chinook--still were returning. The coho run was predicted to be very high--twice the 10-year average, at least. The total Chinook run counted at Bonneville Dam, the first dam inland from the Pacific Ocean on the Columbia River and thus the first place fish can be counted, was about 92 percent of the 10-year average, but the run of fall Chinook in the Snake River was strong. The number of jacks, sexually immature fish that return a year or two earlier than adult fish, was huge, more than four times the 10-year average. The number of jacks long has been considered a harbinger of the size of next year's adult runs, but the higher-than-average jack count in 2008 did not materialize into a larger-than-average adult run in 2009.

At Lower Granite Dam, the last mainstem dam on the Snake River where fish returning to the Snake and its tributaries are counted, the total Chinook run was about 130 percent of the 10-year average, and the jack count, like that at Bonneville Dam, was huge, more than six times the 10-year average. The Idaho Department of Fish and Game opened salmon fishing seasons in the spring and summer, including the first Chinook fishery on the Salmon River in the city of Salmon, Idaho, near the river's headwaters, in 30 years.

## *Energy Overview*

### **The Sixth Power Plan**

This fall, the Council released its draft Sixth Power Plan for public comment. The Act requires the Council to prepare the power plan to assure the region an adequate, efficient, economical, and reliable electricity supply and to make energy efficiency the highest-priority resource in the plan to meet demand. The Council intends to approve the new plan in January 2010 or sooner.

The plan was developed in a very different energy environment from even a few years ago, and that environment continues to evolve, creating uncertainty about future costs and energy sources. Demand has declined because of the economy, fuel prices are lower after years of rapid increases, and the costs of new resources have stabilized or declined. Still, these trends may last only through the current economic downturn. The most significant change in the past few years has been broadening concern about climate change, galvanizing many states to pass laws aimed at reducing carbon emissions, including the states of Montana, Oregon, and Washington, which now have renewable portfolio standards in place.

To address this new uncertainty, the plan includes analysis of a range of possible carbon-cost scenarios to understand what we would need to do to lower emissions, and the costs and trade-offs associated with those reductions. The Council found that lower emissions occur when

carbon prices exceed \$40 per ton. But to significantly reduce emissions, the region would have to rely less on coal plants, which emit 85 percent of the carbon from the power system.

Wind power, a variable resource requiring additional energy to integrate it into the power system, will continue to be the leading resource to meet renewable portfolio standards. And while the hydroelectric system still provides the generation needed to keep the system in balance, this, too, is changing. Increasing peaks in energy use, especially in the summer, along with constraints on the operation of the hydrosystem to meet fish protection requirements, and the growing amount of wind generation on the system, all contribute to the heightened importance of including capacity and flexibility needs, along with annual energy needs, into resource planning. It is no longer enough to plan for the region's yearly energy requirements. Being able to quickly increase or decrease generation on a minute-to-minute basis is also critical now.

But by far the biggest message of the power plan is that improved energy efficiency has the potential to meet most of the region's future load growth--as much as 85 percent--in the next 20 years. Achieving the efficiency targets the Council believes is possible means avoiding costly investments in riskier new generation, while also reducing carbon emissions. The record level of efficiency is due to technological advances and new opportunities in electricity distribution, consumer electronics, and lighting innovations. It expands the region's history of success in improving efficiency and it continues our tradition of commitment to clean and affordable energy. Over time, while consumers will pay to acquire energy efficiency, the Council expects it to be an even better value as the costs and risks of other resources increase.

## **Current Resource Mix**

The trend in electricity generation in the Pacific Northwest has been toward greater diversity. In 1960, nearly all of the region's electricity came from hydroelectric dams. Today, a number of other resources, such as coal, nuclear, natural gas, biofuel, and wind, contribute to our energy needs. Energy efficiency also plays an important role as the fourth largest resource behind hydropower, coal, and natural gas.

Hydroelectric power is by far the most important resource in the Pacific Northwest, providing about two-thirds of the region's generating capacity and about three-quarters of our electricity. Capacity is the ability to produce energy during peak demand hours, and energy refers to electricity used to meet average annual demand over a typical year.

The current hydroelectric system has a capacity of about 33,000 megawatts, but operates at about 50 percent annual capacity because of water supply and limited storage. The system provides up to 24,000 megawatts of sustainable peaking capacity, which will meet the six highest load hours of a day over three consecutive days.

## **Power System Adequacy**

In 2005, the Council and Bonneville created the Northwest Resource Adequacy Forum to aid the Council in developing a regional power-supply adequacy standard, and to periodically assess the adequacy of the supply. After nearly three years of coordinated effort, the forum reached

consensus on a proposed resource adequacy standard, which the Council subsequently adopted in April 2008.

The adequacy standard calls for the average annual energy capability to at least equal the average annual demand. It also calls for the system's peaking capability to be able to meet expected peak-hour demand and to have sufficient surplus to cover operating reserves, prolonged generator forced outages, and demand deviations due to extreme temperatures.

According to the Council's 2009 assessment, based only on *existing* resources and including those under construction, the region's power supply may fail to provide sufficient summer peaking capability by 2013. This puts the region in a "yellow alert" situation, triggering a formal explanatory report at a Council meeting that relies on an ongoing review of load and resource data, as well as a review of the methodology used to assess adequacy.

In response, the Council and regional utilities are actively developing resource-acquisition strategies that account for economic risk, carbon-emission policies, and other factors. With the addition of the resources envisioned in the draft Sixth Northwest Power Plan, however, the power supply will remain adequate until about 2029. These resources primarily include energy efficiency, but also wind power and new natural gas-fired power.

## **Wind Power**

The growing amount of wind generation on the power system is a significant issue since it is a variable resource requiring additional capacity to integrate it into the system. Since 1998, with the opening of the 25 megawatt Vansycle Ridge project in northeastern Oregon, commercial wind power has grown to about 4,000 megawatts (maximum output). Most of the wind facilities are concentrated in the Columbia Basin east of the Columbia River Gorge. Nearly 80 percent of the total regional wind capacity is located in the 160 mile corridor from The Dalles, Oregon northeast to Pomeroy, Washington.

The Northwest Wind Integration Forum, which includes many of the region's utility, regulatory, consumer, and environmental organizations, has worked to address the questions surrounding the growth of wind energy. The Council, working with the forum, will explore how the future power system can accommodate a high penetration of wind and other new low-carbon resources. Of particular importance are actions addressing challenges associated with transmission planning and expansion, and the limited market for control-area services.

## **Energy Efficiency Achievements**

The 2008-09 Utility Conservation Achievements Report, compiled by the Council, found that improved efficiency reduced demand for electricity in the Northwest in 2008 by 234 average megawatts--enough to power about 148,000 homes. It is the highest annual accomplishment since recordkeeping began 30 years ago.

Efficiency improvements cost less than building new power plants. In 2008, the average cost of efficiency for the region's electric utilities was just \$20 per megawatt-hour or about one-fifth the



cost of power from a new generating plant fueled by either natural gas or wind. Total spending by the region's electric utilities to achieve the improved efficiency was \$251 million or just 2.2 percent of regional retail electricity revenues.

Most of the savings — about 140 average megawatts or 59 percent of the total — occurred in homes, and most of those savings came from replacing incandescent light bulbs with compact fluorescent lights. Commercial buildings were the second-largest area of efficiency gains, 49 average megawatts or 21 percent of the total. Lighting improvements were a significant share of the total in that sector, too. Industrial efficiencies accounted for 35 average megawatts or 15 percent of the total.

The 2008 achievements bring the region's total efficiency gains (1978-2008) to 3,900 average megawatts (2,400 from electric utility programs, and 1,500 from building codes and standards). This means enough power has been saved over the last 30 years to equal the present-day electricity use of four cities the size of Seattle.

## **Renewable Portfolio Standards and Carbon Reduction Goals**

Since the adoption of the Fifth Power Plan in 2004, a number of state policies are currently in place or are being considered. The 2007 Oregon Legislature set greenhouse gas reduction goals for the state. The mid-term goal is to reduce emissions to 10 percent below 1990 levels by 2020, and long-term, a 75 percent reduction by 2050.

Renewable portfolio standards mandating certain types and amounts of resources have been adopted by Oregon, Montana, and Washington. And regionally, the governors of Oregon, Washington, and Montana have joined five other Western state governors and the premiers of four Canadian provinces to implement policies that address climate change. The overall goal of the WCI is to reduce the region's greenhouse gas emissions to 15 percent below 2005 levels by 2020 by implementing an economy-wide regional cap-and-trade program.

## **Transmission System**

The regional high-voltage transmission system, the electricity highway that connects generating plants to utility distribution systems, needs upgrading. Most of the transmission lines in the Northwest are constrained in the sense that there is little to no excess capacity available to sell, and under certain operating conditions the lines need to be monitored by system operators to ensure that they do not exceed system-operating limits.

In 2004, the last time the Council updated its Northwest Power Plan, there was concern about the lack of progress in addressing growing problems such as transmission bottlenecks. Today, however, it is evident that there has been significant progress during the last five years.

A number of new projects are in the development and study stages, sponsored by utility members of the two regional transmission-planning groups, ColumbiaGrid and Northern Tier Transmission Group, and by independent transmission developers. As well, Bonneville has proposed an innovative approach to financing transmission for wind power plants, and

legislation has been proposed in Congress to increase the federal backstop siting authority that already exists in the Energy Policy Act of 2005 for transmission projects that are supported by regional and interconnection-wide planning efforts.

ColumbiaGrid's 2009 system assessment identifies a number of potential reliability issues over the next five and 10 years ranging from relatively local issues such as service in the Olympic Peninsula to broader issues such as service on the west side of the Cascade Mountains along the Interstate-5 corridor. The Northern Tier Transmission Group also has identified projects to relieve constraints or to bring more wind power into the power supply. By geographic area, these transmission projects include:

- The I-5 corridor from north of Seattle to Portland
- Across the Washington Cascades from the Seattle-Tacoma area to the Tri-Cities area
- John Day Dam to Bonneville Dam
- McNary and John Day dams to southern Idaho
- Across the Oregon Cascades from McNary Dam to the southern Willamette Valley
- Central Montana to southern Idaho
- Eastern Wyoming to southern Nevada

The Council supports and encourages regional transmission planning efforts, recognizing that new transmission investment can help maintain reliable electric service and bring in new renewable resources to meet regional load.

## **Bonneville Power Administration's Role in Power Supply**

Also significant to the long-term stability of the power system, the Bonneville Power Administration concluded a lengthy public process last year when all of its public utility customers signed 20-year contracts. This represents a major step forward in preserving the low cost of the region's hydroelectricity, which Bonneville markets, providing about half of the Northwest's power.

The region began to consider what Bonneville's role should be as a power supplier during the 1990s move toward deregulation, which sparked concerns that the agency would be uncompetitive in the wholesale power market. The long-term contracts acknowledge the limits of the system by encouraging preference customer utilities and federal agencies to meet their own load growth. Equally important, for both Bonneville and its customers, the contracts provide clarity about their respective responsibilities, greater financial certainty, and support Bonneville's commitment to energy efficiency, renewable resources, and fish and wildlife actions.

## ***Fish and Wildlife Overview***

### **The Columbia River Basin Fish and Wildlife Program**

The Council adopted the 2009 Columbia Basin Fish and Wildlife Program after more than a year of work that included extensive public participation.

The program is the nation's largest regional effort to protect and enhance fish and wildlife, directing more than \$200 million per year in Bonneville electricity revenues to projects that range in geographic scope from the estuary of the Columbia to its highest mountain tributaries in the four Northwest states. In addition, significant changes have been made to the operations of the hydroelectric system to accommodate fish migration. The revised program, which is guided by independent science review, integrates federal, state, and tribal actions to protect and enhance fish and wildlife in the Columbia River Basin under the authorities of the Power Act, Endangered Species Act, and tribal treaty rights for protection and harvest of salmon as interpreted by the federal court in Oregon.

One of the outstanding uncertainties continues to be the fate of the federal government's salmon recovery plan. The Obama administration undertook an extensive review of the 2008 biological opinion and most recently filed an adaptive management plan with U.S. District Court Judge James Redden, who is presiding over the lawsuit against the plan. Regardless of the outcome of the lawsuit, the Council's program will continue to implement projects to enhance habitat, improve artificial production, and track our efforts to understand what is working and what is not.

## **Science Policy Forum**

For the past several years now, the Council has brought scientists, fish and wildlife managers, and policymakers together to review the latest science concerning the Columbia River Basin. This forum has been especially effective in highlighting potential issues. One of the issues of greatest concern has been the importance of the role that the lower river--the estuary and plume--has in the survival of all the fish that move through the Columbia River system. The interaction between river flows and the plume habitat, where fish first enter the sea, can affect their abundance, distribution, growth, and survival. The Council's fish and wildlife program supports actions to enhance and protect this critical habitat.

## **Invasive Species**

The increasing threat of non-native, invasive species--from zebra and quagga mussels to tamarisk trees and other aquatic plants and animals--has the potential to change the ecosystem in fundamental ways that we don't fully understand yet. The costs of invasive mussels--both to the West's economy and environment--runs into the multimillions as they clog water intake pipes and distribution systems, starve fish populations, and spawn noxious algae outbreaks. The Council, in keeping with the program's intent to prevent their spread into Columbia Basin waters, has alerted all relevant federal partners of this threat, urging immediate and coordinated action.

## **Climate Change**

The prospect of climate change and its potential impact on the region has caused concern that warmer temperatures will affect runoff regimes, particularly in the lower elevations. While the effects of climate change are not fully understood, the Council will seek the best available

scientific knowledge regarding the effects of climate change and will consider that data in its strategies and implementation measures.

## **Wildlife Mitigation**

Finally, a significant milestone will be reached when the region fully mitigates the wildlife losses associated with the development and operation of the hydroelectric system. The region is close to achieving this, and the Council will be convening a wildlife crediting forum to move toward final agreement on this goal.

## **Power Planning**

### *The Sixth Power Plan*

In September, the Council invited public comment on its draft Sixth Power Plan, which the Council had been developing for more than a year in collaboration with utilities, utility associations, trade associations, and other citizen groups. The power plan advises the Bonneville Power Administration, which is the region's largest electricity supplier with 147 utility customers. Bonneville's administrator is required to make decisions about future electricity supplies that are consistent with the plan. It also serves as a regional blueprint to assist utilities in their own planning within their service territories.

## **Future Regional Electricity Needs**

Regional population is likely to increase from 12.7 million in 2007 to 16.3 million by 2030. The population growth will be focused on older-age categories as the baby boom generation reaches retirement age. While the total regional population is projected to increase by 28 percent, the population over age 65 is expected to nearly double. Such a large shift in the age distribution of the population will change consumption patterns and electricity uses.

The cost of energy (natural gas, oil, electricity) is expected to be significantly higher than during the 1980s and 1990s, and carbon-reduction policies are likely to further raise these costs. While carbon costs increase electricity prices and thereby reduce demand, they also encourage development of new sources of supply and efficiency, expanding the number cost-effective efficiency measures.

Without efficiency improvements, electricity use is expected to grow by about 6,700 average megawatts between 2010-2030, growing at about 337 average megawatts, or 1.4 percent per year. Residential and commercial sector electricity use account for much of the growth in demand. Contributing to the growth in the residential sector is an anticipated increase in air conditioning and consumer electronics. Also, summer-peak electricity use is expected to grow more rapidly than annual energy.

## **Energy Efficiency Could Meet Most of the Region's Load Growth**

The Council's power plan includes a detailed analysis of potential efficiencies in hundreds of applications resulting in a substantial increase in energy efficiency from the Fifth Power Plan's levels. This is due to advancing technology, reduced costs, efficiency estimates in electricity distribution systems, consumer electronics, and street, parking, and exterior building lighting. The estimated potential efficiency improvements total nearly 6,000 average megawatts for measures costing under \$100 per megawatt-hour. Over 4,000 average megawatts are available at a cost of less than \$40 per megawatt-hour. This does not include savings from efficiencies that have already been secured through building codes, appliance efficiency standards, and utility programs. Energy efficiency is even more valuable because avoided costs have doubled since the carbon-cost risk is several times higher than in the Fifth Power Plan.

## **Resource Strategy**

In addition to efficiency improvements, new renewable generation (primarily wind) will be needed to meet renewable portfolio standards in Washington, Oregon, and Montana. Analysis shows that meeting RPS requirements uses most of the lower cost wind potential (5,300 megawatts) in the region. In addition to the wind, some geothermal resources enter the plan, although in a limited amount. Given the risk of some form of carbon pricing in the future, additional renewable generation is cost-effective. Natural gas-fired generation is optioned toward the middle of the planning period. It is attractive for energy and capacity needs and has the ability to displace coal plants in futures with high carbon costs or assumed coal plant closures.

From a regional perspective, the Council's analysis suggests that in the short term -- the first five years of the plan's timeframe -- adding new generation is unnecessary due to slower demand growth, the large energy-efficiency potential, and the required renewable portfolio standards resources. However, the Council recognizes that this is not the case for all utilities in the region. Some will need additional generating plants and transmission lines in the next few years even if they acquire all the cost-effective energy efficiency available to their service territories and meet their renewable portfolio standards.

During the last 10 years of the power plan's timeframe, the resource priorities become less clear. Given current climate change policies and concerns, new coal without carbon sequestration is unlikely, and any significant reduction in carbon will mean operating existing coal plants less often. Alternatives beyond natural gas are typically unproven commercial technologies or alternatives that require significant new transmission investments. Potential long-term generating resources include importing wind generation on new transmission lines, advanced nuclear, gasified coal with carbon sequestration, and developing relatively unproven renewable resources or ones that are currently too expensive. The plan identifies natural gas to meet long-term needs, but the Council recognizes that other alternatives are likely to become available over time.

## **Climate Change Policy**

Nationwide, carbon dioxide accounts for 85 percent of greenhouse gas emissions and about 38 percent of carbon dioxide emissions are emitted from electricity generation. For the Pacific

Northwest, the power generation share is only 23 percent since we rely so heavily on the hydroelectric system. Coal-fired plants produce over 85 percent of carbon emissions from the region's power system, even though they only produce about 20-25 percent of the region's electricity. Analysis by others has shown that substantial and inexpensive reductions can come from more efficient buildings and vehicles. Substituting non- or reduced-carbon electricity generation such as renewable resources and nuclear, or from sequestering carbon, are more expensive options.

Various policy approaches to reduce emissions include: regulatory mandates (renewable portfolio standards or emission standards), emissions cap-and-trade systems, a carbon tax, and efficiency-improvement programs. Northwest state policies to address climate change concerns have focused on renewable portfolio standards and new generation emission limits. National and regional proposals have focused on cap-and-trade systems, although none have been adopted successfully nationally or in the region. Although carbon taxes are easier to implement than cap-and-trade systems, none have been proposed.

The power plan reflects the uncertain costs of potential carbon pricing policies by assuming a possible range of carbon costs between \$0 and \$100 per ton. The average of these increases over time and reaches about \$47 per ton by 2030. These potential costs play an important role in the proposed resource portfolio, with the exception of the energy efficiency resource, which remains a key component regardless of climate-change policies. The key findings from the Council's analysis are:

- Without any carbon control policies, including existing ones, carbon emissions from the Northwest Power System would continue to grow to 5 percent over 2005 levels by 2030.
- Without additional carbon-pricing policies like state renewable portfolio standards and renewable energy financial incentives, current policies would reduce carbon emissions, but not enough to meet current policy goals.
- Assuming forecast carbon prices, the plan's resource strategy has the potential to reduce carbon emissions to below 1990 levels, or 35 percent below 2005 levels adjusted for normal hydro conditions.
- Achieving significant reductions in carbon emissions from the region's power system will increase power system costs and consumers' electric bills.
- Significant reductions of carbon emissions from the power system require reduced reliance on coal. Retiring coal-fired generation and replacing it with conservation, renewable generation, and lower-carbon emission resources could reduce carbon emissions to 35 percent of 1990 levels.
- In order to significantly reduce carbon emissions, carbon prices will need to exceed \$40 per ton.

- Protecting the capability of the existing regional hydroelectric generation through energy efficiency and preserving its generating capability keeps costs and carbon emissions down. In scenarios where the capability of existing resources are reduced, whether hydroelectric or coal, the energy and capacity are largely replaced with gas-fired generation.

## **Capacity, Flexibility, and Wind Integration**

The power system requires matching electricity generation to varying electricity demands on a minute-to-minute basis. This ability to quickly increase or decrease generation is called flexibility. In the Pacific Northwest, resource planners have been able to focus mostly on annual average energy requirements, leaving flexibility problems to system operators. This is because, historically, the hydroelectric system has been able to provide this flexibility. This is changing for several reasons: Growing regional electricity needs are reducing the share of hydroelectricity in total demand, peaks in energy use have grown faster than annual energy needs, the capacity and flexibility of the hydrosystem has been reduced over time for fish operations, and growing amounts of variable wind generation have added to the flexibility requirements of the system.

As a result, planners must now consider resources in terms of their energy, capacity, and flexibility contributions. The rapid growth of wind generation, which does not provide capacity and increases the need for flexibility, means that the region will need to add these capabilities to the power system. Changes can be made to the operation of the power and transmission system to reduce the need for flexibility reserves, and these operational changes can probably be made more quickly, and are less expensive, than adding peaking generation, demand response, or flexibility storage resources just to provide flexibility.

## **The Fish and Wildlife Program and the Power Plan**

The fish and wildlife program is part of the Council's power plan. It is intended to guide Bonneville's efforts to mitigate the adverse effects on fish and wildlife from the construction and operation of the Columbia River hydroelectric system. One of the roles of the power plan is to help assure the reliable implementation of fish and wildlife operations. The power system, guided by the power plan, has done this in the past and will continue to do this in the future. It has done so by acquiring conservation and generating resources to make up for the 1,170 average megawatts of lost hydroelectric generation from actions to aid fish migration, by developing resource adequacy standards, and by implementing strategies to minimize power system emergencies and events that might compromise fish operations.

The future presents a host of uncertain changes that are sure to pose challenges to balancing power system and fish and wildlife needs. These include possible new fish and wildlife requirements, increasing wind generation and other variable renewable resources that require more flexibility in power system operations, conflicts between climate-change policies and fish and wildlife operations, possible changes to the water supply from climate change that might make it more difficult to deliver flows for fish and meet power needs, and possible revisions to Columbia River Treaty operations.

To address current operations and prepare for these additional challenges, the Council has adopted a regional adequacy standard to help ensure that events like the 2000-01 energy crisis, when fish operations were affected, do not happen again. In addition, the Wind Integration Forum is addressing issues to help integrate wind into the power system. Large swings in wind output have sometimes adversely affected hydropower and fish operations. The Sixth Power Plan addresses these issues to improve electricity reliability and help insure reliable fish operations.

### ***Northwest Energy Efficiency Task Force***

The Northwest Energy Efficiency Task Force, a coalition of energy experts from utilities, businesses, citizen groups, and government in the Northwest, issued a report recommending actions to improve energy efficiency in the region. It is an effort that will reduce consumer electricity bills and also help America move toward energy independence.

Steve Wright, administrator of the Bonneville Power Administration, Pat Reiten, CEO of PacifiCorp, and Tom Karier, eastern Washington member of the Northwest Power and Conservation Council co-chaired the group. NEET addresses six areas for future work: Measuring efficiency achievements; emerging efficiency technologies; high-impact initiatives to acquire efficiency; marketing and public awareness about efficiency; job training and education; and governance and policy development.

Some of the future efficiency will be achieved in the marketplace, as energy-efficient appliances such as LED televisions and horizontal-axis clothes washers become increasingly available in stores through regional market transformation efforts and improved appliance standards. And some of the efficiency will be achieved by electric utilities through incentive programs with their customers. NEET also identified areas that need special emphasis, including better regional collaboration among utilities and improved marketing of energy-efficiency programs and energy-saving products.

The NEET participants identified a number of new opportunities to reduce electricity demand in both emerging technologies such as innovations in lighting, consumer electronics, and heating and cooling systems, and in existing technologies that can be operated differently. The participants also recommended expanding a regional forum on energy efficiency, the Regional Technical Forum, to include more participants and provide more opportunities for utilities, state and local governments, energy-efficiency organizations, and others to share information and collaborate on implementing efficiency programs. The Regional Technical Forum is coordinated by the Council.

## **Fish and Wildlife Planning**

### ***2009 Columbia River Basin Fish and Wildlife Program***

Following more than a year of work and extensive public participation, the Council adopted a revision of its Columbia River Basin Fish and Wildlife Program, the nation's largest regional



effort to protect and enhance fish and wildlife. It was the first complete revision of the program since 2004.

The program revision began in November 2007 when the Council called for recommendations from the region's fish and wildlife agencies, Columbia River Basin Indian tribes, and others as required by the Power Act. Using the recommendations as a foundation, the Council and its staff developed a draft program for public comment in 2008. The newly amended program reflects extensive public comments and consultations with fish and wildlife managers on the original recommendations and on the draft program. Key themes include:

- Implementing fish and wildlife projects based on locally developed subbasin management plans and on actions described in federal biological opinions on hydropower operations, hatcheries, and harvest, Endangered Species Act recovery plans, and the 2008 Columbia Basin Fish Accords signed by federal agencies, Indian tribes, and the states of Idaho and Montana
- Independent scientific review of all proposed projects
- Protecting and restoring habitat to rebuild healthy, naturally producing fish and wildlife populations
- Research on the effects of global climate change, toxic substances, and invasive species on fish, wildlife, and habitat

In the 2008 Fish Accords, Bonneville and other federal agencies committed to extensive, 10-year implementation plans based on the Council's program. Projects focus on water management and fish-passage measures, mainstem and off-site mitigation measures, and the subbasin plans. With the additional funding commitments in the 2008 Fish Accords, funding of projects through the Council's program will average more than \$200 million per year beginning in Fiscal Year 2010.

In the revised fish and wildlife program, the Council's focus turns from planning to implementation and performance with these goals:

- Increasing project performance and fiscal accountability by establishing reporting guidelines and using adaptive management to guide decisionmaking
- Conducting periodic exchanges of science and policy information
- Emphasizing a more focused monitoring and evaluation framework, coupled with a commitment to use the information to make better decisions
- Developing quantitative biological objectives for the program
- Increasing salmon and steelhead runs to 5 million fish by 2025 and achieving smolt-to-adult return rates of 2 to 6 percent

- Addressing passage problems for lamprey and sturgeon at the mainstem dams
- Creating a more balanced, ecological approach to fish production
- Maintaining a crediting formula for wildlife losses of two new units of acquired habitat for each lost habitat unit

### ***Wildlife Project Category Review***

In July 2009, the Council reviewed 34 projects funded through the fish and wildlife program, marking the end of the Council's first category review of projects, a practice the Council plans to follow in the future.

The review is a new, more efficient way of doing business for the Council, and includes a *category* review (strategy and topic) for existing projects that are similar in nature and intent, followed by a *geographic* review (by subbasin and province), that may result in solicitations for targeted projects.

The wildlife category review recognizes that most wildlife projects have long-term commitments for operations and maintenance. The review should enable the Council and Bonneville to make long-term funding decisions and establish appropriate review cycles for many of these projects. Projects will be approved for three years of capital funding and five years of expense funding at a time, reducing the frequency and expense of annual project reviews.

The budget for the 34 projects approved by the Council, averaged over five years, totals \$13.9 million per year. The Council also recommended a capital budget for wildlife projects of up to \$60.1 million total for fiscal years 2010-2012. The Council plans project reviews in other categories, including artificial production and research, monitoring, and evaluation.

### ***Columbia Basin Fish Accords Project Reviews***

In April 2008, four Columbia River Basin Indian tribes and the states of Idaho and Montana announced agreements with three federal agencies to fund actions to improve habitat and strengthen fish populations in the Columbia River Basin. The projects will be funded over a 10-year period, fiscal years 2009-2019. Later, the Shoshone-Bannock Tribes and the state of Washington signed similar agreements. The agreements build on federal biological opinions on hydropower dam operations on the Columbia and Snake rivers.

The parties to the agreements are among the litigants over the 2004 Biological Opinion on Hydropower Operations remanded to the federal government by the U.S. District Court of Oregon. The federal government issued a new biological opinion in May 2008, and the projects in the fish accords are intended to help fulfill requirements in the new opinion. In signing the accords, the tribes and states agreed that this additional work for salmon and steelhead is sufficient to meet the Bonneville Power Administration's Endangered Species Act obligations, and they agreed not to challenge the new opinion in court.

In addition to Bonneville, the U.S. Army Corps of Engineers and the Bureau of Reclamation also signed the agreements. Indian tribes signing the agreements included the Umatilla, Warm Springs, Yakama, Shoshone-Bannock, and Colville tribes. The Columbia River Inter-Tribal Fish Commission also signed an accord. The agreements reserve federal funding, mostly from Bonneville, for more than 200 projects ranging from habitat restoration to fish production in hatcheries and project monitoring. These projects build on the foundation already established by the Council's fish and wildlife program. The Council plans to work with Bonneville and others to shape the projects into multi-year implementation plans similar to the implementation plans in the 2008 Biological Opinion.

The 2009 Columbia River Basin Fish and Wildlife Program includes these recommendations and states that all fish accord projects must be implemented under the following conditions:

- All measures must be developed into detailed project proposals subject to review, both by the public and the Independent Scientific Review Panel under Section 4(h)(10)(D) of the Northwest Power Act
- Those responsible for implementing the projects must regularly report their results in a manner sufficient to evaluate success of the projects, facilitating the science/performance review, and contributing to the program's broader monitoring and evaluation framework
- Implementation must follow ongoing adaptive-management practices in which measures are modified or discontinued if not performing or no longer identified as a priority

The program also states that funding commitments to certain measures already made by Bonneville and the other federal agencies must not come at the expense of funding for other program priorities. For the program areas without Bonneville funding commitments, the Council will work with Bonneville and the sponsors of the accord projects to estimate multi-year implementation budgets and secure funding commitments to assure adequate funding.

### ***High-level Indicators to Measure Progress of Fish and Wildlife Projects***

In October 2009, the Council approved three categories of high-level indicators designed to track the progress of the program's fish and wildlife projects: 1) abundance of fish and wildlife; 2) hydrosystem survival and passage; and 3) Council actions. They will assess the biological, implementation, and management components of projects, and the Council will convey this information in its annual reports to Congress and the region's governors.

Two types of indicators are being developed: high level indicators to track a few biological conditions in the basin, and program indicators to provide data about a broader set of activities undertaken as part of the fish and wildlife program.

Since early 2008, the Council conducted an extensive public comment process on an evolving set of proposed indicators. A number of comments were received, some supporting the proposals, others opposing them or recommending changes, and still others recommending additional indicators. In response, the Council revised the original set and conducted a public workshop

with fish and wildlife managers and other experts from state and federal agencies and Indian tribes.

From the workshop discussions, the Council also developed a set of management questions that are linked to the indicators. Council staff will use the questions to guide development of the high-level indicators and program actions.

### ***Hatchery Scientific Review Group Recommendations***

Congress initiated the Columbia River Hatchery Reform Project in 2006 to improve artificial production practices in the basin. The Hatchery Scientific Review Group was established to review all of the basin's hatchery programs and wild stocks with the goal of both protecting listed fish and providing sustainable fisheries.

The HSRG completed its review of lower Columbia River hatcheries--those downstream of Bonneville Dam--in 2007 and reported its findings to the Council in December of that year. The HSRG then began a review of hatcheries in the basin upstream of Bonneville Dam and made its final recommendations in March 2009. The Council plans to consider incorporating the HSRG recommendations into the fish and wildlife program.

The HSRG reached several critical, overarching conclusions in areas where current hatchery and harvest practices need to be reformed:

- Manage hatchery broodstocks (the fish selected to produce more fish) to achieve proper genetic integration with, or segregation from, natural populations to minimize the adverse effects of hatcheries on natural populations
- Promote local adaptation of natural and hatchery populations to maximize their viability, productivity, and diversity
- Minimize adverse ecological interactions between hatchery-origin and natural-origin fish, such as competition or the spread of disease
- Minimize the effects of hatchery facilities (weirs, traps, intake and discharge) on the ecosystem in which they operate
- Maximize the survival of hatchery fish by focusing on numbers of adult fish returning as the key performance measurement rather than the numbers of juvenile fish released
- Use scientific principles and area-wide scientific recommendations to direct management decisions over time

A website, <http://www.hatcheryreform.us>, has been developed to make all of the HSRG's work available to the public and fisheries managers.

## ***Columbia River Estuary Science and Policy Exchange***

In September 2009, the Council hosted a two-day workshop in Astoria, Oregon, that brought together scientists and policymakers to discuss biological research in the Columbia River Estuary and its implications for future policy decisions.

The estuary is a new area of focus for the Council's Columbia River Basin Fish and Wildlife Program and also is recognized for its important habitat in the federal biological opinion on Columbia River hydropower operations. The Council supports strategies that protect, enhance, and restore critical habitat and spawning and rearing grounds in the estuary and lower Columbia River. Hydropower operations upstream change the pattern of water flows and water temperatures in the estuary and, consequently, its characteristics. However, recent scientific evidence suggests that habitat actions in the estuary have the potential to improve survival benefits for most anadromous fish populations.

The purpose of the conference was to discuss that evidence and other information and share ideas about the ongoing habitat restoration work and research, monitoring, and evaluation in the lower Columbia River and estuary. The conference provided a forum to identify emerging scientific issues, including critical uncertainties and potential gaps in current project implementation that will inform future policy, research, and implementation decisions.

## **Public Affairs**

One of the Council's primary tasks is to inform Northwest citizens about regional energy and fish and wildlife issues and encourage their participation. To involve the public, the Council meets monthly at different locations around the Columbia River Basin. All meetings are open to the public, and the public has an opportunity to comment on each agenda item. The Council also conducts periodic public hearings on major Council initiatives, such as revisions of the fish and wildlife program and power plan. The public affairs division also arranges consultations and public hearings separate from regular Council meetings during rulemakings to discuss and explain key issues and gather public comment.

To inform the public, the Council produces a quarterly newsletter, a monthly electronic newsletter, and special informational materials, media briefings, and news releases. The Council also uses its website and other outreach opportunities to inform the public about its activities.

This year, the Council issued its eighth annual report to Northwest governors on expenditures of the Bonneville Power Administration to implement the Council's fish and wildlife program. The report details expenditures from 1978 through the end of Fiscal Year 2009 and also includes information on the status of Columbia River Basin salmon and steelhead runs.

Another highlight of 2009 was an August tour of fish and wildlife project sites in western Montana for congressional staff members. The two-day tour included presentations by Council staff and representatives of Montana Fish, Wildlife & Parks, the Confederated Salish and Kootenai Tribes, and Flathead Electric Cooperative. The group toured fish and wildlife project sites along the Flathead River and in Flathead Lake, and also Flathead Electric's landfill methane power plant.

## **Canadian Relations**

The Columbia River and several of its major tributaries begin in Canada and flow across the international border. Consistent with direction in the Northwest Power Act to treat the entire Columbia River as one system for planning purposes, the Council maintains regular contact with planning entities in British Columbia. The Columbia Basin Trust, a Crown corporation of the province, is the Council's closest counterpart agency in the Canadian portion of the Columbia River Basin. Since 1996, Council members and staff have met at least annually with the Trust. In 2000, the two agencies formalized their relationship and designated the vice-chairs as official liaisons. The Trust and Council exchange visits once or twice a year to discuss Columbia River issues of mutual interest.

The Council and Trust are collaborating on a website to share information about the Columbia River system in Canada and the United States. The International Columbia River Basin Center of Information portal will have information about the Columbia River, including water uses, water resources, history, and water and energy issues and policies. The center is hosted on the website of the Northwest Environmental Data Network. The Trust and Council also began work

on a major conference on international Columbia River fish and wildlife and water policy issues, tentatively scheduled for late 2010.

## **Columbia River Treaty**

In the Sixth Power Plan, the Council will work with Bonneville and others to examine the effects of possible changes to the Columbia River Treaty between the United States and Canada. The treaty has no expiration date. It will continue indefinitely, unless one country requests termination, which is allowed anytime after 2024, 60 years after its ratification, given at least 10 years advance notice (no later than 2014). These dates fall within the study horizon of the power plan. Modifications of the treaty, if there are any, would affect both power and fish and wildlife. In the plan, the Council commits to proactively address the issue.

Bonneville and the U.S. Army Corps of Engineers representing the United States, and B.C. Hydro representing Canada, have begun a review process called the 2014/2024 Columbia River Treaty Review. In April 2009, Bonneville issued a report describing technical studies that will provide fundamental information about post-2024 conditions, both with and without the current treaty, from the limited perspective of power and flood control. These initial studies are not designed to establish future operating strategies, alternatives to the treaty, or government policies, but simply to begin the learning process.

According to the report, these results will be presented in a joint report that will: 1) describe the methodologies and assumptions employed to complete the studies; 2) describe the risks, issues, and limitations encountered; and 3) discuss results, including findings for each of the three studies.

The Council and the Columbia Basin Trust plan to participate in public information forums to educate interested stakeholders on this process.

## **Administration**

The Council has a budget agreement with the Bonneville Power Administration for the rate period Fiscal Year 2010 through Fiscal Year 2012. In that agreement, the Council commits to hold budget increases to an average of 3 percent per year.

The Council's Fiscal Year 2010 revised budget of \$9,683,000 is 2.3 percent higher than the current year 2009 budget of \$9,467,000. The Council's Fiscal Year 2011 budget has a projected increase of 2.6 percent to \$9,934,000. In order to achieve these goals, the Council froze the number of FTEs in the budget while at the same time accepting expanded work and responsibilities in the region.



## **More Information**

For additional information about the Northwest Power and Conservation Council's activities, budget, meetings, comment deadlines, policies or bylaws, call 1-800-452-5161 or visit our website, [www.nwcouncil.org](http://www.nwcouncil.org). Copies of Council publications are available at the website or by calling the Council. All Council publications are free.

## **Comments of the Bonneville Power Administration**

This space is reserved for comments of the Bonneville Power Administration on the annual report.

## **Background of the Northwest Power and Conservation Council**

The Council, known until 2003 as the Northwest Power Planning Council, is an agency of the states of Idaho, Montana, Oregon, and Washington and was created as an interstate compact agency by the legislatures of the four states consistent with the Pacific Northwest Electric Power Planning and Conservation Act of 1980. The Council's first meeting was in April 1981.

The Northwest Power Act gives the Council three distinct responsibilities: 1) to assure the region an adequate, efficient, economical, and reliable electric power supply; 2) to prepare a program to protect, mitigate, and enhance fish and wildlife, and related spawning grounds and habitat, of the Columbia River Basin affected by the development and operation of any hydroelectric project on the Columbia River and its tributaries; and 3) to inform the Pacific Northwest public regarding these issues and involve them in decisionmaking. This annual report is organized around the Council's three key responsibilities.

The Power Act created a special relationship between the Council and the federal agencies that operate dams in the Columbia River Basin and sell the electricity that is generated. The administrator of the Bonneville Power Administration, the federal power marketing agency that sells the output of the Federal Columbia River Power System (a system of 31 federal dams and one non-federal nuclear power plant), is required to make decisions in a manner consistent with the Council's Northwest Power Plan and its Columbia River Basin Fish and Wildlife Program. Other federal agencies with responsibilities for dams (the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, and Federal Energy Regulatory Commission) are required to take the Council's power plan and fish and wildlife program into account at every relevant stage of decisionmaking.

Despite its relationship to federal agencies, the Council is not a federal agency. The Council is an interstate compact. The eight-member Council consists of two members from each state, appointed by their respective governors. The Council headquarters are in Portland.

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