

The State of the Columbia River Basin

**Fiscal Year 2015
ANNUAL REPORT**



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Conservation Council

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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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Energy, Fish, Wildlife: The State of the Columbia River Basin

Fiscal Year 2015 was a year of records in the Columbia River Basin, one of the world's great rivers for hydropower and salmon, and the economic engine of the Pacific Northwest region of the United States.

More salmon and steelhead returned from the ocean in (calendar year) 2014 and were counted at Bonneville Dam, 146 miles inland and the first place where fish can be counted, than in any year since the dam was completed in 1938: 2,574,321 by December 31. The credit for this success lies in many places, including favorable ocean conditions during the three to five years most of those fish spent at sea, improved passage survival at dams, improving habitat conditions in the places where wild fish spawn, careful controls on the number of fish allowed to be harvested, and improving knowledge and practice at fish hatcheries.

But in late 2014 and into 2015, ironically, ocean water off the Northwest coast inexplicably warmed to levels never seen before – bad news for cold-water species like salmon -- and precipitation, particularly mountain snowfall, was so far below normal in the winter of 2014/15 that drought emergencies were declared in parts of Idaho, Oregon, and Washington. The winter was the warmest on record in Washington and the second-warmest in Oregon.

Fortunately, the drought and unusually warm weather did not extend to the upper parts of the Columbia River Basin, even though precipitation was at or below normal in the mountains of southeastern British Columbia, where the river begins. As a result, the impacts on hydropower, which provides nearly half of the region's electricity, were minimal.

For now.

The Columbia River water supply and runoff were low enough in the spring and summer of 2015 to trigger dry-year operating rules under the Federal Columbia River Power System Biological Opinion to protect juvenile salmon and steelhead, including threatened and endangered species, migrating to the ocean, and adult fish returning to spawn. This meant that storage reservoirs were drawn down deeper than normal to provide more water for fish migration. Also, in dry years more juvenile fish are transported around dams in barges than are left in the river to migrate on their own.

The low runoff combined with high temperatures and low rainfall during the summer of 2015 led to disastrous conditions for migrating adult salmon and steelhead. The Columbia River and many of its tributaries were much warmer than usual, and this made for lethal or near-lethal conditions for adult salmon and steelhead, which can't tolerate water warmer than 68 degrees for long. At times and in places throughout the Columbia River Basin summer water temperatures were well above 70 degrees, leading to fish die-offs. At least half of the anticipated 500,000 sockeye salmon expected to return in 2015 are believed to have died in the unusually warm Columbia. Dead sturgeon, apparently also victims of warm water, were found in the Columbia in central Washington.

The near-record low runoff in 2015 did not result from a lack of precipitation but from a lack of snow, particularly in the United States' portion of the Columbia River Basin. Thus, the winter of 2014/15 could be an anomaly, or it could be an example of what the average winter in the Pacific Northwest could be like by the end of the century, if predictions of an increasingly warmer climate prove accurate.

Climate change presents a daunting challenge for regional power planners like the Northwest Power and Conservation Council. Warming trends, if they continue, will alter electricity demand and change precipitation patterns, river flows, and hydroelectric generation, and policies enacted to reduce greenhouse gases will influence future resource choices.

The Council has been accounting for the potential impacts of climate change on the regional power system in its Northwest Power Plan since 1998, the year the Council completed the fourth revision of the plan. The Council revises the plan every five years.

That work continued in 2015 as the Council worked on the seventh revision of the power plan. In the Seventh Plan, as in the Sixth, carbon emissions are the focus. Three coal-fired power plants in Washington, Oregon, and Nevada that serve Northwest consumers will close between 2020 and 2025, well within the 20-year horizon of the plan. The plan shows how the region can account for the lost generation from those plants primarily with zero-carbon resources and also meet new demand for power economically and reliably.

Key provisions of every Council power plan include an electricity demand forecast, electricity and natural gas price forecasts, an assessment of the amount of cost-effective energy efficiency that can be acquired over the life of the plan, and a least-cost generating resources portfolio to meet anticipated demand. The plan guides the Bonneville Power Administration's resource decision-making to meet its customers' electricity load requirements.

The Council's analysis starts with a regional assessment of potential new generating resources from natural gas, wind, and solar power plants. It also includes a detailed analysis of the savings achievable through improvements in energy efficiency, the primary resource in the Northwest Power Act to meet new demand for power. The Council, starting with its Sixth plan, and continuing with more detail in its seventh, assessed the potential for meeting future peaking energy needs with cost-effective demand-response resources – voluntary and temporary changes in consumers' use of electricity when the power system is stressed.

As the Council worked toward producing a draft Seventh Power Plan for public review and comment in the fall of 2015, modeling suggested that new energy efficiency measures could meet all of the anticipated load growth through 2030 under nearly all future conditions. That is, the generating resources currently in place would be sufficient for the next 20 years if none was retired. But because there will be retirements, some new resources will have to be built.

In the near term, demand response is the resource of choice. The Council anticipates that under the vast majority of future conditions, the development of around 700 megawatts of demand response is the most cost-effective resource for meeting the region's winter peaking needs. Most of this would need to be developed in the first five or six years of the new plan, 2016-2020. The lower cost of demand response resources makes them far more economical than constructing new generating plants, as these plants would only be operated a few hours each year during periods of high demand when the region has limited hydropower generation available due to low water conditions.

The Council envisions that under most future conditions, demand response and energy efficiency can meet new demand for power through 2025. Current modeling

finds that by then, with the retirement of the three coal-fired plants in Washington, Oregon, and Nevada mentioned above, building a small amount of new thermal generation, most likely fueled by natural gas, in combination with increasing the use of existing natural gas-fired generation, is the most economical option for replacement of the coal-fired power.

The Council's work in drafting the Seventh Plan in 2014 and 2015 followed completion of the latest revision of the Council's Columbia River Basin Fish and Wildlife Program, in October 2014. Through the program, the Council works to restore healthy ecosystems and healthy populations of wild fish -- including those that go to the ocean, like salmon, and those that don't, like bull trout. The program directs more than \$250 million annually to projects and activities in the basin to protect and restore fish, wildlife, and habitat affected by hydropower dams. This work involves connecting areas of good habitat, removing fish-passage barriers, and improving water quality by reducing toxic substances, as well as hatchery programs, fish-passage improvements at dams, and research. Much of the work designed to boost fish also helps wildlife in the same ecosystems, but many projects in the program are designed solely to benefit wildlife affected by dams.

The 2014 Program identifies seven "emerging priorities" to address in the coming years, with highest priority going to work that preserves the infrastructure and assets of ongoing, long-term projects to ensure they continue to provide benefits to fish and wildlife. Another of the priorities is to investigate reintroduction of anadromous fish above Chief Joseph and Grand Coulee dams. The program established a three-phase approach to investigate the feasibility of reintroduction including juvenile and adult fish passage at the dams.

Hatchery programs funded through the program are intended to help enhance harvest and/or mitigate for lost harvest opportunities while rebuilding fish populations that spawn in the wild. The program integrates hatcheries with habitat improvements, and complements the work of state and federal fish and wildlife agencies and Indian tribes to propagate fish consistent with current and evolving scientific principles of fish management.

The Council's fish and wildlife program and power plan are implemented within an electricity industry that is undergoing a rapid transformation characterized by a steady transition away from fossil fuel-fired power plants to greater reliance on renewable energy and energy efficiency. This transformation has major long-term implications for the power system in the West. The operating environment, long dominated by large power plants linked by high-voltage transmission lines, is changing. Smaller generating plants closer to demand centers, community energy systems that connect electricity users in specific areas, the increasing affordability of rooftop solar power systems, advances in energy-storage technologies, and concurrent, ongoing investments in energy-efficiency, will affect future demand for power. These changes also will affect how much utilities continue to rely on the West-wide grid of high-voltage transmission lines and interconnected power plants. As well, increasing concern about carbon emissions has important implications for the electricity industry in terms of generating and transmission systems, voltage stability, and infrastructure.

Addressing these challenges through collaborative regional power planning with state and federal fish and wildlife agencies, Indian tribes, the Bonneville Power

Administration, environmental and electric utility organizations, and others, consistent with the purposes of the Northwest Power Act, is the work of the Northwest Power and Conservation Council. We are helping to improve the supply of clean, affordable, efficient, and reliable energy in the Pacific Northwest while also protecting and restoring fish and wildlife in the Columbia River Basin, including ESA-listed species.

Council Energy Overview

The Seventh Northwest Power Plan

As required by the Northwest Power Act, having completed the latest revision of the Columbia River Basin Fish and Wildlife Program, in October 2014, the Council set to work revising the Northwest Power Plan in Fiscal Year 2015. Under the law, the power plan incorporates the fish and wildlife program.

The next power plan will be the seventh in the Council's history, as the Act requires the Council to review the plan at least every five years. It's a plan for 20 years, so every five years the Council looks 20 years into the future.

Among the questions the Council addresses in the [Seventh Northwest Power Plan](#) are:

- How much will loads grow or decline over the next 20 years?
- What mix of new low-cost resources will best meet the region's needs, and what is the cost and risk of constructing those resources?
- How much cost-effective energy efficiency is available to meet a portion of the region's load growth?
- What will happen with wholesale electricity prices in the future?

Growing renewable generation, technological advances, and state and federal initiatives to lower carbon emissions all add to this complex planning exercise, which relies on a planning model to evaluate how well a resource would perform under various future conditions. The [regional portfolio model](#) (RPM) analyzes different resource strategies to understand their cost and risk tradeoffs across a large number (800) of potential futures. The Council also uses the RPM to test various policy propositions, such as which resource strategies are likely to have the lowest cost to reduce carbon emissions from the power system.

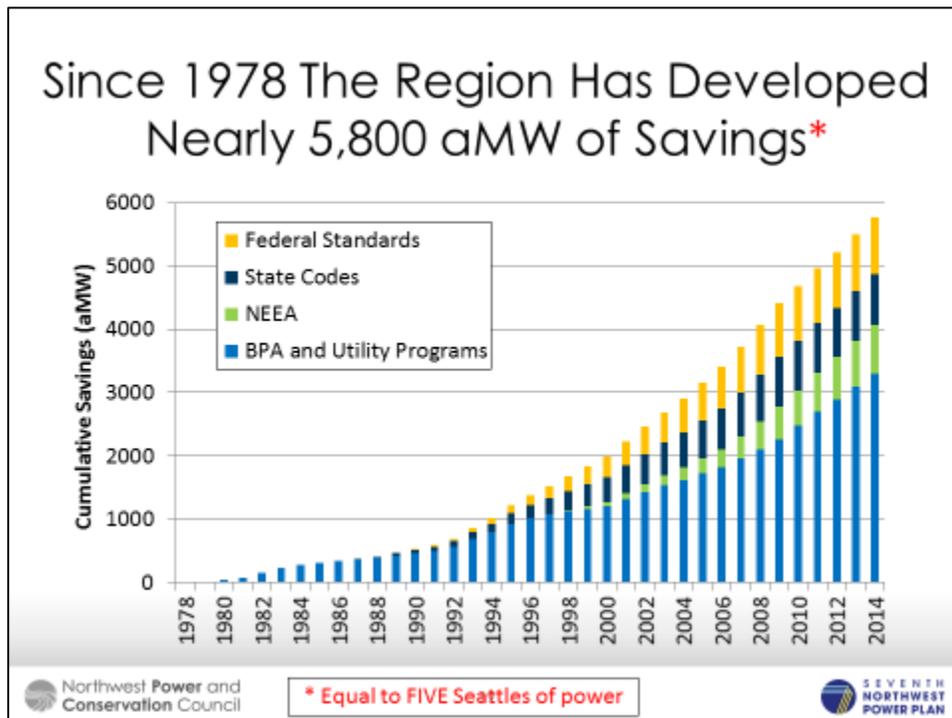
Some of the issues the Council is addressing in the new power plan include 1) the impacts of load forecast uncertainty; 2) the cost and pace of future energy efficiency improvements; 3) the cost and availability of new generating resources; 4) power system reliability and adequacy; 5) the effect of proposed federal regulations to reduce carbon emissions from power plants; 6) integration of variable-output resources like wind and solar power into the power grid; and 7) the ongoing transformation of the utility industry regarding issues such as the creation of energy imbalance markets and adaptation to lower load growth.

During Fiscal Year 2015 the Council's Power Division staff modeled a number of scenarios of future supply and demand for power. Throughout all of these modeling exercises certain findings were consistent. For example, energy efficiency appears to play a critical role in meeting both energy and winter capacity needs. Consistently, the model developed 1,300-1,430 average megawatts of new efficiency resources by 2021, the first five years of the new plan. In the modeling, efficiency was selected for development because it costs less than other resources even under low electricity and gas prices. The fact that it can be "built" relatively quickly, and in the amounts needed, without fuel price and carbon risks, also make it the option chosen most often by the model. Put another way, the model prefers efficiency not because it supplies a need for new energy but because it is less expensive than operating existing power plants or building new ones. Also, the surplus of generated energy that results from improving efficiency can be sold and exported outside the region at a profit.

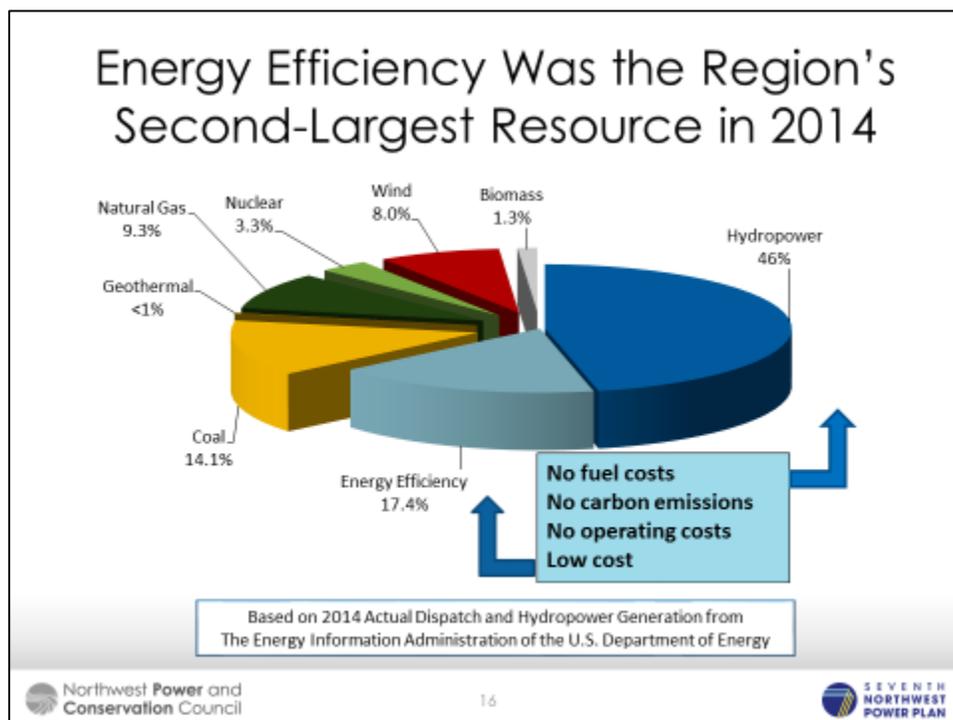
For meeting short-term peaking capacity requirements, the model preferred demand response -- a voluntary and temporary change in consumers' use of electricity when the power system is stressed -- over single-cycle combustion turbines, for reasons similar to efficiency: It's the cheapest way to maintain capacity reserves; it can be built more quickly than a single-cycle turbine that would be operated primarily to meet peak demand; and it can be acquired in the needed amounts. In addition, demand response also has no fuel price risk, and it doesn't add to an already surplus energy market.

Another consistent finding was that the model developed renewable resources primarily to satisfy state renewable energy portfolio standards, while it develops energy efficiency to reduce carbon emissions at the lowest cost. The model's preference for energy efficiency for reducing carbon emissions is not only because it has a lower cost, but because the current commercially available solar and wind technologies don't provide the winter peaking capacity needed by the region. Thermal power plants fueled by natural gas, while optioned frequently in the modeling, rarely are constructed in the model before 2026 except in scenarios that assume demand response resources aren't available.

The Council released the draft Seventh Power Plan for 60 days of public comment in October 2015, conducted eight public hearings around the Northwest, received and reviewed hundreds of comments, and approved the final plan in February 2016.



Energy Efficiency



Energy efficiency is the second-largest energy resource in the Pacific Northwest, and has been since 2012. Today, efficiency comprises 17.4 percent of the region's energy "supply." Hydropower is the top resource, at 46 percent.

Northwest energy efficiency savings in 2013 totaled 268 average megawatts, making 2013 the ninth year in a row that Bonneville, utilities, and the Energy Trust of Oregon's program savings exceeded Council plan goals. 2014 accomplishments should be calculated by the end of calendar year 2015. If 2014 savings are comparable to 2013, the total five-year savings from 2010-2015 could exceed the energy-efficiency target in the Sixth Power Plan (2010) by more than 20 percent.

Northwest utilities, the Energy Trust of Oregon, and their partners have been acquiring energy efficiency resources since 1978. Cumulative savings from 1978, incorporating utility and Northwest Energy Efficiency Alliance programs, state codes, and federal standards stood at nearly 5,600 average megawatts by the end of 2013 -- more than the annual output of the six largest hydroelectric dams in the Northwest. Put another way, 5,600 average megawatts is enough electricity to serve nearly the entire state of Oregon and all of western Montana combined. Since 1978, energy efficiency met more than 60 percent of the new demand for power.

The Council's 2015 assessment of the remaining energy efficiency potential in the Northwest identified approximately 4,300 average megawatts over 20 years at a cost less than \$100 per megawatt-hour.

Region should have adequate power supply through 2020

A preliminary assessment of the region's power supply shows that we're likely to have adequate resources through 2020. Unless economic growth increases

dramatically or the region fails to achieve the Sixth Plan's energy efficiency goals, there's a 5-percent chance of not meeting demand unless extraordinary measures are taken. Five percent is the Council's maximum threshold for a shortfall.

The Council's annual assessment helps make sure the region is on track to meet energy needs for the next five years. Since last year's assessment, which indicated a 6 percent chance of a shortfall in 2019, the region's forecast demand has dropped. Offsetting the drop in demand, however, is the loss of generation from the Big Hanaford gas-fired power plant near Centralia, Washington, which no longer is available for regional use. The net result means that, along with the continued energy savings projected in the Council's Sixth Power Plan, the region should have an adequate power supply.

The real focus, however, is on 2021, when coal-fired power plants in Boardman, Oregon, and Centralia, Washington, retire. Those two plants have a combined nameplate capacity of 1,330 megawatts. That year, the probability of not meeting demand goes up to a little over 8 percent. The region will need to acquire an additional 1,150 megawatts of dispatchable capacity or develop other measures to bring the power supply up to levels that satisfy the Council's regional adequacy standards.

Measures to replace the lost coal-fired generation include additional energy energy-efficiency savings, natural gas-fired plants, and solar photovoltaic, wind energy, and demand response programs. This issue is addressed in the Seventh Power Plan.

Council Fish and Wildlife Overview

The Columbia River Basin Fish and Wildlife Program

2014 Program amendment

In October 2014, the Council approved the latest revision of its Columbia River Basin Fish and Wildlife Program, which by law the Council revises at least every five years. The last revision was in 2009.

The program, which is funded by the federal Bonneville Power Administration under authority of the Northwest Power Act of 1980, is designed to protect, mitigate, and enhance fish and wildlife, and related spawning grounds and habitat, of the basin that have been affected by hydropower dams. Bonneville's direct spending on projects that implement the program totaled \$232 million in Fiscal Year 2014.

Under the Power Act, the Council largely bases the program on recommendations of state and federal fish and wildlife agencies and Indian tribes in the Northwest, but anyone can submit recommendations. In Fiscal Year 2013, the Council issued a call for recommendations to amend the program, following on work the Council did in 2012 to identify issues and gather information in preparation for the amendment rulemaking. The Council issued a draft program for public comment in May 2014 and, following the comment period, approved the final, amended program in October, and official program findings and response to comments in March 2015. The [program is posted](#) on the Council's website. Here are some key points of the 2014 Program:

Habitat:

- Ecosystems: The program stresses the importance of restoring functioning ecosystems
- Strongholds: States and tribes may designate habitat strongholds to help manage wild or naturally spawning fish
- Water quality: The program supports efforts to identify, assess, and reduce toxic contaminants
- Mainstem dam operations: Where there are demonstrated benefits for fish, the program supports managing flows to more closely approximate natural patterns
- Climate change: The program supports assessing whether climate change effects are altering or are likely to alter critical river flows, water temperatures or habitat; the program also supports evaluating possible actions to mitigate effects
- Columbia River estuary: The program supports assessing opportunities for floodplain reconnection and removal or lowering of dikes and levees that block access to habitat

Fish:

- Wild fish: Functioning ecosystems will support and protect wild fish
- Resident fish: Preserve, enhance, and restore native fish in native habitats
- Non-native and invasive species: Detect their presence, respond early, minimize their spread, educate the public
- Hatcheries: Defer to the agencies and tribes to define scope, purpose, methods, and appropriate management techniques, consistent with current and evolving scientific principles
- Reintroduction into blocked areas: Science-based, phased approach to put salmon back into historic habitats blocked by dams

- Sturgeon: Operate dams to provide flows that encourage sturgeon to spawn without harming ESA-listed salmon and steelhead
- Lamprey: Evaluate dam passage, passage efficiency, and direct mortality

Wildlife:

- Mitigation: Acquire and protect habitat units identified in loss assessments, encourage settlement agreements
- Protected areas: Continue to protect 44,000 miles of river reaches from new hydroelectric development, provide for exemptions where projects would have exceptional benefits for fish and wildlife

The Program:

- Adaptive management: Improve understanding of what efforts are working, evaluate program progress

Emerging priorities for the fish and wildlife program

Many of the current measures implemented through the program represent ongoing activities that already have multi-year funding and implementation commitments from Bonneville and the other federal agencies for the foreseeable future. In revising the program in 2014, the Council received recommendations for many new measures. Some would expand existing work in new or additional directions; others represent new directions for the program.

In the revised program, the Council provides guidance to Bonneville, the other federal agencies, and the region as to which of these new measures are emerging priorities for implementation in the next five years. During the course of those five years, the Council anticipates that Bonneville will take the necessary steps to integrate these priorities into the program and will report annually to the Council on its progress.

The priorities, in order, which the Council may adjust over time, are:

1. Provide for funding long-term maintenance of the assets that have been created by prior program investments
2. Implement adaptive management (including prioritized research on critical uncertainties) throughout the program by assessing the effectiveness of ongoing projects, developing program objectives when appropriate and taking into account the effects of climate change
3. Preserve program effectiveness by supporting: (a) expanded management of predators; (b) mapping and determining hotspots for toxic contaminants; and (c) aggressively addressing non-native and invasive species
4. Investigate blocked-area mitigation options through reintroduction, fish passage, and habitat improvement, and implement if warranted
5. Implement additional sturgeon and lamprey measures (passage and research)
6. Update the subbasin plans most in need of updates
7. Continue efforts to improve floodplain habitats

Developing a cost-savings process to fund emerging program priorities

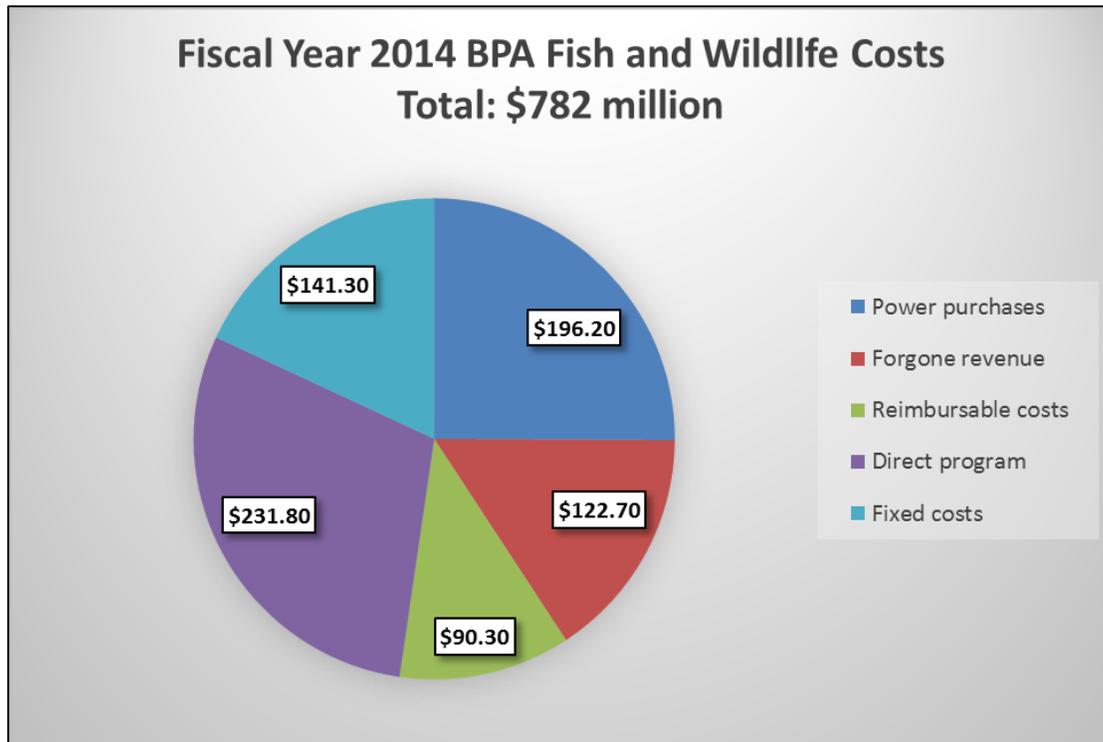
In the 2014 Fish and Wildlife Program, one of the Council's investment strategies is to work in partnership with Bonneville to find cost savings that will "assure funding for identified program priorities to maximize the biological response resulting from ratepayer and cost-shared investments."

Principles to guide this cost-savings identification effort include:

1. Cost savings efforts will not impact any existing settlement agreements or Columbia River Fish Accords between Bonneville and its partners
2. Cost savings efforts will not affect the legal defensibility of the Federal Columbia River Power System Biological Opinions or Bonneville's Endangered Species Act obligations
3. Projects that are not required by the Accords or Biological Opinions will not be unfairly burdened by any cost-savings efforts
4. Bonneville will not overspend its fiscal year budget to fund emerging program priorities
5. Any proposal to target savings from existing projects should be directed toward:
 - Projects that are closing out
 - Projects that receive unfavorable scientific or Council review
 - Efficiencies achieved within existing projects or programs
 - Cost savings efforts that have a reasonable lead time to ensure smart close out, appropriate budget planning, and to allow sponsors to transition

Council and Bonneville staff set a target of identifying cost savings equal to approximately 1 percent of the program planning budget for Fiscal Year 2017 and also identify program savings for Fiscal Year 2016.

Bonneville Power Administration fish and wildlife costs



The Council reports annually to the four Northwest governors on costs of the Bonneville Power Administration for fish and wildlife mitigation, including implementation of the Council's fish and wildlife program.

However, as is the Council's practice in these annual reports to Congress, we include a synopsis of Bonneville's costs in the previous fiscal year -- the same information we reported to the Governors. The Council issued its [2014 Columbia River Basin Fish and Wildlife Costs Report](#) in July 2015. From that report, here is a synopsis of Bonneville's costs in Fiscal Year 2014, which totaled approximately \$782.3 million: In Fiscal Year 2014, Bonneville reported total fish and wildlife costs of approximately \$782.6 million, as follows:

- \$231.8 million in direct (expense) costs
- \$90.3 million in direct costs and reimbursements to the federal Treasury for expenditures by the Corps of Engineers, Bureau of Reclamation, and U.S. Fish and Wildlife Service for investments in fish passage and fish production, including direct funding of operations and maintenance expenses of federal fish hatcheries; this category also includes one-half of the Council's \$10.2 million budget in Fiscal Year 2014 (the other half is assigned to the Power Business Line budget)
- \$141.3 million in fixed costs (interest, amortization, and depreciation) of capital investments for facilities such as hatcheries, fish-passage facilities at dams, and some land purchases for fish and wildlife habitat
- \$122.7 million in forgone hydropower sales revenue that results from dam operations that benefit fish but reduce hydropower generation
- \$196.2 million in power purchases during periods when dam operations to protect migrating fish reduce hydropower generation, such as by spilling water over dams in the spring or storing it behind dams in winter months in anticipation of required spring spill

The total of all fish and wildlife costs reported by Bonneville in Fiscal Year 2014 (\$782.3 million) includes forgone revenue and power purchases. How large is this relative to Bonneville's other costs? In the same year, Bonneville's entire Power Business Line costs totaled approximately \$2.337 billion. Adding the forgone revenue (\$122.7 million) to these costs brings the total to \$2.459 billion. Bonneville's fish and wildlife costs of \$782.6 million comprised 31.8 percent of that total.

Fish and wildlife costs account for a major portion of the rate Bonneville charges its wholesale power customers. Approximately one-third of Bonneville's wholesale rate of \$30 per megawatt hour is estimated to be associated with its fish and wildlife program.

Scientists assert that more fish today may not mean more fish in the future

2014 was a record year for salmon in the Columbia River.

More salmon returned from the Pacific Ocean and were counted crossing Bonneville Dam, 146 miles inland, on their way to spawn -- at hatcheries or in the wild -- in 2014 than in any year since record keeping at the dam began in 1938. The 2014 run was about 2.5 million fish, continuing the trend of big returns in the 21st Century compared to the 1990s.

While that's good news for people who fish and for the ecosystem, which benefits from the nutrients that natural spawners add to rivers, the big numbers may portend

less benefit for future generations of fish. That is because the productivity of naturally spawning salmon is decreasing due to a mechanism called “density dependence” that regulates the growth of populations. The detailed scientific evidence and explanation is contained in a 2015 report by the Independent Scientific Advisory Board (ISAB), a panel of 11 experts that advises the Northwest Power and Conservation Council, the federal agency NOAA Fisheries, and Columbia River Basin Indian tribes,

The ISAB report cites strong evidence that robust runs -- record-setting for the present day but still less than half their estimated historical abundance -- are approaching habitat limits. These include limits on the types and amounts of available food, shelter from predators and competitors, and the ability to move to other suitable habitats when needed. Collectively, these limits, and others, define the ‘carrying capacity’ of habitat. When carrying capacity is exceeded, salmon runs can collapse quickly to levels the habitat will support.

The ISAB report, which is posted on the Council’s website, includes a number of recommendations for fish managers and planners.

Research suggests increasing predation by marine mammals

If the circumstantial evidence bears out, adult salmon returning from the ocean to the Columbia River Basin are being killed by seals and sea lions between the estuary and Bonneville Dam in alarming numbers, according to research presented by NOAA Fisheries to the Council in November 2014.

Preliminary results of research that began in 2010 show a steady increase in fish mortality over a five-year period that may be attributable to seals and sea lions. Adjusted for other mortality factors, average spring Chinook salmon survival was just 55 percent in 2014, down from 69 percent in 2013 and 82 percent in 2012. If the estimate represents the run at large, this means about 45 percent of the 2014 spring Chinook run died somewhere between the mouth of the river and Bonneville Dam.

According to NOAA researchers, fish mortality, and the number of sea lions in the estuary, have increased dramatically in recent years. NOAA research focuses on spring Chinook because the run coincides with when the sea lion population is largest in the river. The Council has expressed support for federal legislation introduced in 2014 and again in 2015 to accelerate the process to allow the most problematic sea lions to be removed from the river.

Reintroducing salmon above Chief Joseph and Grand Coulee dams

The Council’s 2014 Fish and Wildlife Program calls for exploring the reintroduction of salmon and steelhead into historic habitat areas now blocked by dams, where feasible, including the area blocked by Grand Coulee Dam. The dam was completed in 1941, but began blocking anadromous fish passage in the late 1930s.

In response to recommendations from state and federal fish and wildlife agencies and Indian tribes, the 2014 Program calls for a science-based, phased approach to study habitat availability, suitability, and salmon potential above Grand Coulee and Chief Joseph dams. Chief Joseph is about 55 miles downstream of Grand Coulee and, like Grand Coulee, does not have fish-passage facilities.

The program also calls for Council discussions with tribal, state, federal, and other agencies regarding the purpose, scope, and progress of reintroduction efforts for

juvenile and adult anadromous fish into the blocked areas of the upper Columbia. In response to the language in the program, the Upper Columbia United Tribes, whose members were among those who recommended reintroduction language for the new program, developed a work plan to implement the feasibility studies recommended in the program.

Working to prevent an invasion of freshwater mussels

The Council and others in the Northwest, including state and federal fish and wildlife agencies and state invasive species-prevention coordinators, continued their collaboration in 2014 to prevent the introduction of invasive quagga and zebra mussels to Pacific Northwest waters.

The mussels have infested water bodies in the East and Southwest, and could be introduced to the Northwest through contaminated watercraft. The mussels can live out of water for up to 30 days. It's been estimated that the combined economic impact of a Northwest infestation could be nearly \$600 million per year. The impact could be especially troubling in the Columbia River and its major tributaries, as mussel colonies form rock-hard mats of shells that can clog water intake and delivery pipes, infest hydropower infrastructures, adhere to boats and pilings, foul recreational beaches, compete with native mussels, and disrupt food webs and the biological functioning of aquatic habitats. They pose a significant threat to anadromous fish restoration efforts in the West.

The Council has expressed support for federal legislation to direct more federal revenues to prevention efforts coordinated by the four states, the Pacific States Marine Fisheries Commission, and the Pacific Northwest Economic Region. The hope is to develop an effective "perimeter defense strategy" against a possible invasion.

Maintenance plan will protect fish and wildlife investments over time

In revising the fish and wildlife program in 2014, the Council committed to define and develop a long-term maintenance plan and process to ensure that past investments in projects that implement the program remain properly functioning and continue to benefit fish and wildlife in the basin. The plan also is intended to ensure that projects funded through the program continue to meet Bonneville Power Administration mitigation requirements.

The plan will have four categories: 1) maintenance of fish screens and diversions; 2) maintenance of hatcheries, fishways, and fish traps; 3) protection of high-priority habitats; and 4) the ongoing work of the Budget Oversight Group, which addresses miscellaneous funding requests, such as requests for money after project infrastructure is damaged or when there are special needs. The strategic plan also will include an asset management program for long-term maintenance, rehabilitation, and replacement of project investments such as fish-diversion screens and existing hatcheries.

The final plan will be informed by recommendations from the Council's Independent Economic Advisory Board (IEAB) on approaches to improving planning for long-term costs of fish and wildlife projects.

Fish-eating birds take a toll on endangered salmon

In a report to the Council, scientists from Oregon State University, the U.S. Geological Survey, and Real Time Research estimated that fish-eating birds consume 35 percent of the juvenile Upper Columbia River spring Chinook salmon, an endangered species, as they migrate downriver to the Pacific Ocean each spring. The Council's fish and wildlife program supports efforts to reduce this predation.

Caspian terns, double-crested cormorants, and California gulls pick off the juvenile fish as they migrate downriver, digest them, and then deposit Passive Integrated Transponder (PIT) tags from the fish at 12 nesting colony sites between central Washington and the estuary near Astoria, Oregon. Researchers scan the nesting sites, record the tags, which are specific to locations and fish populations, and then estimate predation rates.

In addition to upper Columbia spring Chinook, PIT tags from Snake River steelhead, upper and middle Columbia steelhead; Snake River spring/summer and fall Chinook; upper Willamette River spring Chinook; and Snake River sockeye salmon also were recorded. Snake River sockeye are an endangered species; the others are all listed as threatened. Predation rates vary by nesting colony, by salmon and steelhead population, and by year, the researchers reported.

Dry-year dam operations implemented to protect fish

Despite the below-average runoff in the Columbia River Basin this year, hydropower generation remained within normal operating limits and, thanks to a water-release strategy for the Columbia and Snake rivers that is implemented in dry years, conditions for juvenile salmon and steelhead migrating to the ocean and adult fish migrating from the ocean to spawning habitat and hatcheries were hospitable for most of the March-through-September migration season. The exception was in mid-summer, when high water temperatures made conditions difficult for some fish.

The Biological Opinion on Operations of the Federal Columbia River Power System, prepared by federal agencies to protect Endangered Species Act-listed salmon and steelhead, includes a "dry-year strategy" to boost river flows to assist migration of juvenile fish, including listed species.

Dry year operations are implemented when the Northwest River Forecast Center, a division of the federal National Oceanic and Atmospheric Administration, predicts in May that the April-through-August runoff volume at The Dalles Dam will be less than 72.2 million acre-feet, or less than 82 percent of average. When dry year operations are triggered, federal storage reservoirs are drawn down farther than normal to provide more water for fish.

More than half of the estimated 8 million acre-feet of flow augmentation for the spring and summer was provided from reservoirs in British Columbia under the Columbia River Treaty and the Non-Treaty Storage Agreement. The additional water resulted in average or near-average travel times downriver for juvenile salmon and steelhead despite the extremely low flow volume -- 51st out of the 55 lowest-flow years on record. The last time the dry year criteria was triggered was in 2010.

Working to rid river systems of northern pike

Northern pike, a voracious predator, are present in rivers in Montana and Idaho, and also in Lake Roosevelt, which is the Columbia River above Grand Coulee Dam.

Pike pose a threat to state and tribal efforts to protect and restore native sturgeon and trout species. Tribes and state fish and wildlife agencies, joined by their counterparts in British Columbia, are mounting an assault on the big fish – they can grow to more than 30 pounds and a meter in length – hoping to halt their spread before they do real damage to recreational and tribal fisheries in the lake, and possibly farther downriver.

Northern pike, an introduced non-native species in the Columbia River Basin, except in a small area in Montana along the Canadian border, probably can't be eliminated, but they can be managed and the population reduced significantly. Pike prey on salmonids. Their preference for salmonids is not good news where state and tribal agencies are working to restore native species of rainbow trout, mountain whitefish, and kokanee – all salmonids. In one study in Lake Roosevelt, salmonids made up 76 percent of the pike diet. Pike have not been found in Oregon, yet.

The Council is concerned about the proliferation of northern pike because of the potential to disrupt and set back ongoing electricity ratepayer-funded efforts to restore fish runs and enhance fisheries throughout the Columbia River Basin. If downstream migration and illegal introduction continues, pike could threaten salmon and steelhead recovery and reintroduction efforts downstream of Chief Joseph Dam. The Council is working with tribes and state agencies to revise laws to reduce the threats pike pose to resident and anadromous fish recovery projects.

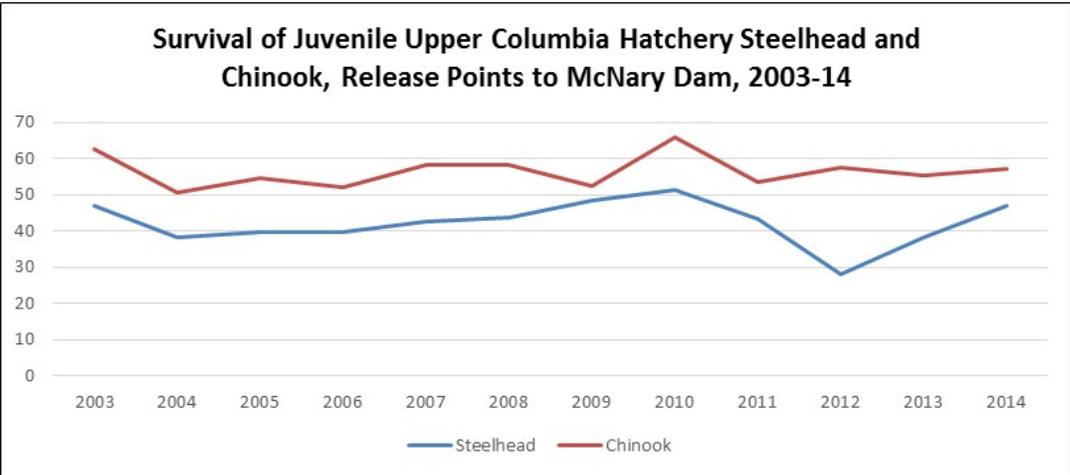
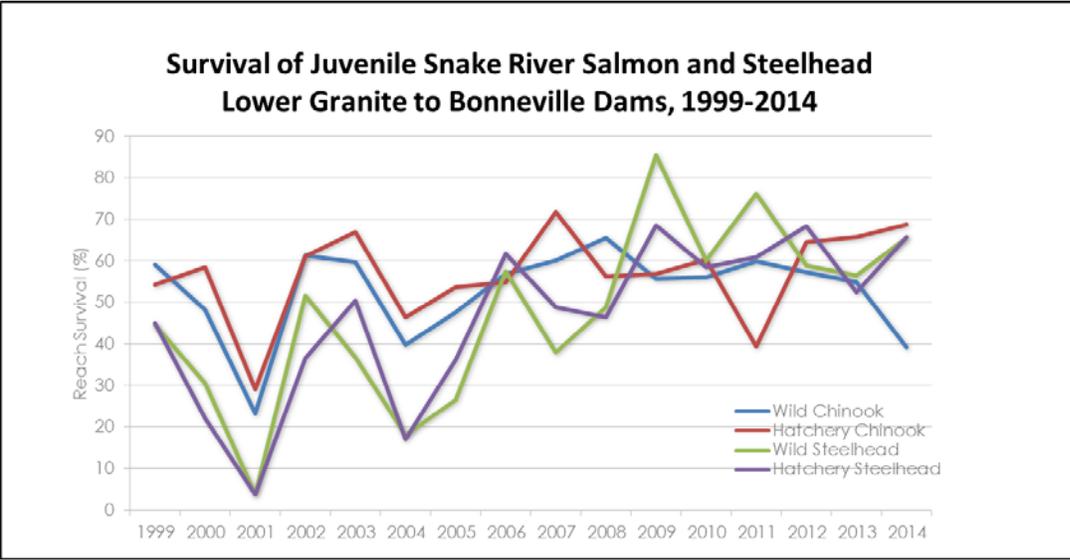
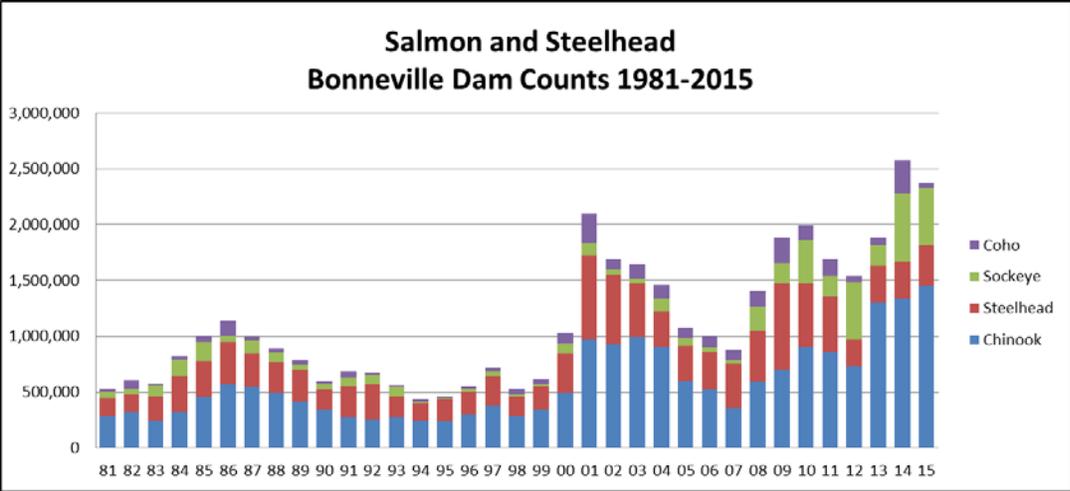
Effectiveness of actions taken under the fish and wildlife program

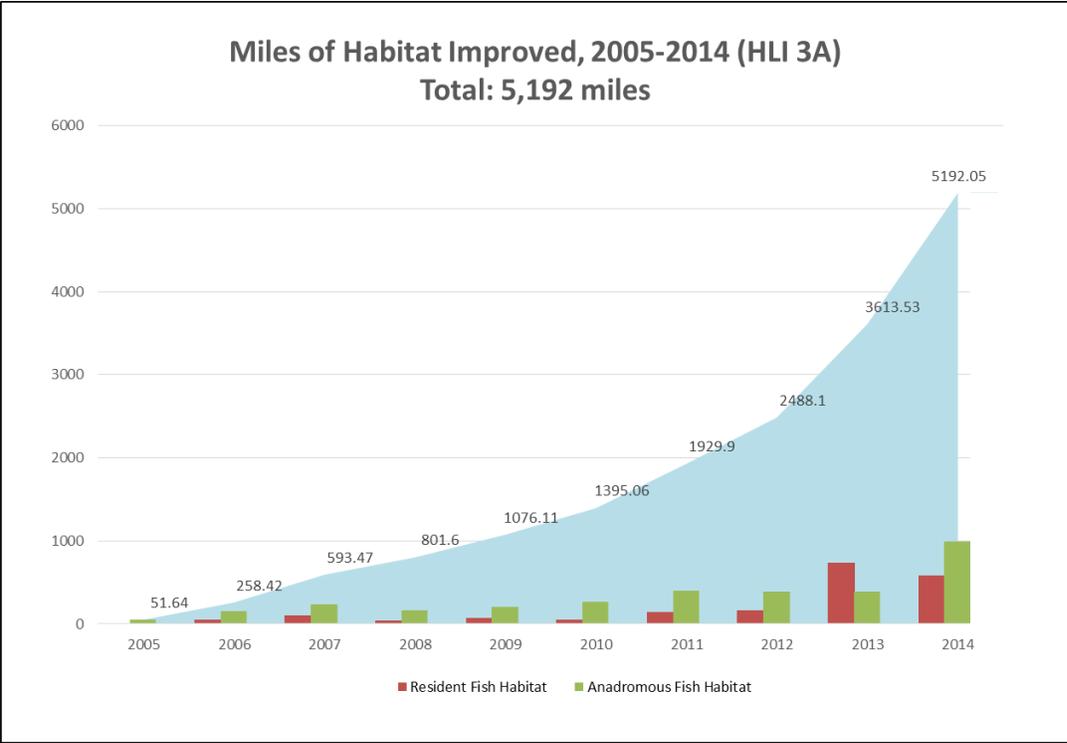
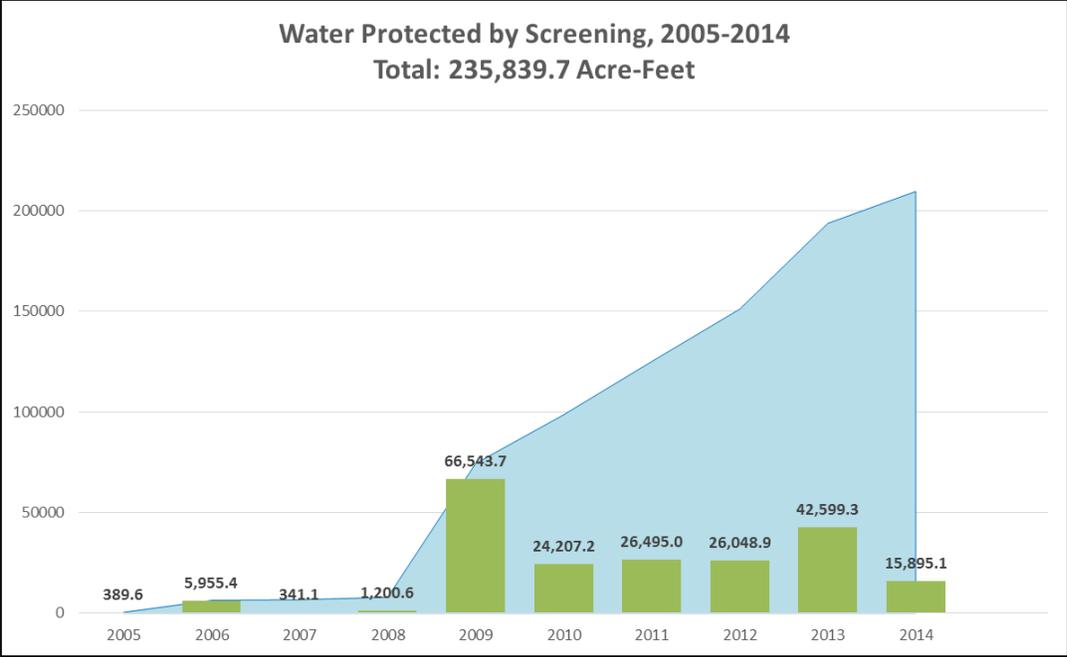
Section 4.(h)(12)(A) of the Northwest Power Act directs the Council to include in this annual report to Congress a description of the effectiveness of the fish and wildlife program.

For the last several years, as improvements in storing, accessing, and reporting data gathered through monitoring and evaluation of fish and wildlife projects has improved, the Council began tracking progress of fish and wildlife efforts in the Columbia River Basin using three high-level indicators. Posed as questions, they are:

1. Are Columbia River Basin fish species abundant, diverse, productive, spatially distributed, and sustainable?
2. Are operations of the mainstem Columbia and Snake River hydropower dams meeting the fish-passage survival objectives of the Program?
3. What is being accomplished by projects that implement the Council's Fish and Wildlife Program?

Over time, the Council expects to augment and refine the initial indicators to provide a more comprehensive picture of fish and wildlife in the basin. While this information stops short of providing evidence of the effectiveness of the Council's program or individual projects, the Council is separately pursuing additional approaches to shed light on the issue. Information in the figures below comes from NOAA Fisheries, the U.S. Army Corps of Engineers, and the Bonneville Power Administration and is reported on the www.cbfish.org website. The Council's high-level indicators are posted on the Council's website at <http://www.nwcouncil.org/ext/hli/index.php>.





Council Public Affairs Overview

Outreach, information, and communication

The Northwest Power Act directs the Council to provide for the participation and consultation of the Pacific Northwest states, tribes, local governments, consumers, electricity customers, users of the Columbia River System, and the public at large in developing regional plans and programs related to energy efficiency, renewable energy resources, other energy resources, and protecting, mitigating, and enhancing fish and wildlife resources. The Council's Public Affairs Division has the primary responsibility to implement this portion of the Act.

The Division uses a variety of communication tools to perform its mission, including printed and electronic publications, the Council's website, social media platforms, video, public meetings, and press releases that are posted as blogs on the website and then linked to the news media and other interested parties via email and social media.

The Council's website, www.nwcouncil.org, functions as the hub of its outreach efforts and public information strategy. The website, which was revised and given a new look in 2013 and 2014, contains myriad documents, publications, data bases, and other forms of information. Included on the site are the current versions of the Northwest Power Plan (www.nwcouncil.org/energy/powerplan/6/default.htm) and the 2014 Columbia River Basin Fish and Wildlife Program (<http://www.nwcouncil.org/fw/program/2014-12/program/>), as well as press releases, Council white papers, official public comment on Council products, PowerPoint presentations, videos, Council newsletters, and links to the Council's social media platforms.

Social media are used increasingly by the Council to communicate with the public. These include Facebook (www.facebook.com/nwcouncil), Twitter (@nwcouncil), and the Council's blog, which is posted to our Facebook page and the Council website.

The monthly Council Spotlight (<http://www.nwcouncil.org/news/newsletters/>) includes news about the monthly Council meetings and links to posts on the Council blog (<http://www.nwcouncil.org/news/blog/>).

The Public Affairs Division also has the responsibility of advancing the Council's mission and accomplishments with members of Congress and their staffs. In August 2015 the Council conducted its annual congressional staff trip, this time to central Idaho, using Orofino as a base and including tours of Dworshak Dam, the Nez Perce Tribal Hatchery, habitat restoration projects on the Potlatch River, and a discussion of fish and power issues in Hells Canyon and the Snake River with representatives of the Idaho Department of Fish and Game and Idaho Power Company.

The purpose of these annual trips is to better acquaint House and Senate staff with the requirements of the Northwest Power Act, the work of the Council, and a sampling of priority issues relating to the Council's work.

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. This contact primarily is through the Public Affairs and Legal divisions.

The Columbia Basin Trust (CBT), 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 once annually with the Trust Board of Directors to discuss Columbia River issues of mutual interest. In 2000, the two agencies formalized their relationship in a memorandum of understanding and designated official liaisons. The memorandum was revised in 2011.

In 2014 the Council and Trust co-sponsored a major international conference on the Columbia River that attracted more than 300 participants from the United States and Canada. In 2015, following up on commitments made at the conference, the Trust and Council worked to identify and support citizen groups and opportunities to improve cross-border communication and cooperation on transboundary Columbia River issues.

Council Administrative Overview

Council budget overview

The Northwest Power Act of 1980 establishes a funding mechanism to enable the Council to carry out its functions and responsibilities. The Bonneville Power Administration provides this funding through ratepayer revenues. The Act establishes a formula to determine a funding limitation threshold and authorizes the Council to determine its organization and prescribe practices and procedures to carry out its functions and responsibilities under the Act.

The Act further provides that the funding limitation applicable to annual Council budgets will be calculated on a basis of 0.02 mill multiplied by the kilowatt hours of firm power forecast to be sold by the Bonneville administrator during the year to be funded. The limitation may be increased to .10 mill, provided the Council makes an annual showing that such limitation will not permit the Council to carry out its functions and responsibilities under the Act. The amount these limitations yield in any year depends on Bonneville forecasted firm power sales, but in most recent years the 0.02-mill funding level would yield about \$2.4 million and the 0.10-mill funding limit would yield about \$12.4 million.

The Council's Fiscal Year 2015 budget is \$10,784,000. For this year, as in other recent years, the Council determined that the 0.02-mill limitation would not allow the Council to carry out its functions and responsibilities under the Power Act. The Council made a similar determination for fiscal years 2016 and 2017. The budget document is posted on the Council's website [here](#).

The Council is aware of the current economic challenges facing the four-state region and the need to maintain healthy financial conditions for the Bonneville Power Administration. In an effort to be responsive, the Council in fiscal years 2016 and 2017 will continue to adhere to budget constraints initiated in 1998.

To accomplish this, the Council will:

- Continue to identify efficiencies in operations and administration in order to limit inflationary increases to below 3 percent, on average, during fiscal years 2009-2017.
- Re-allocate staffing where possible to absorb new workload without increasing the number of full-time-equivalent employees.
- Re-prioritize resources as necessary to respond to new requests for technical analysis. Reschedule or postpone work anticipated during the budget-development process in order to respond to the most essential requests for studies and analyses.

The Council's Fiscal Year 2016 revised budget of \$11,425,000 includes a \$189,000 increase from the previously submitted Fiscal Year 2016 budget request of \$11,236,000. This increase is predominately due to increased contracting in the Public Affairs Division for website redevelopment.

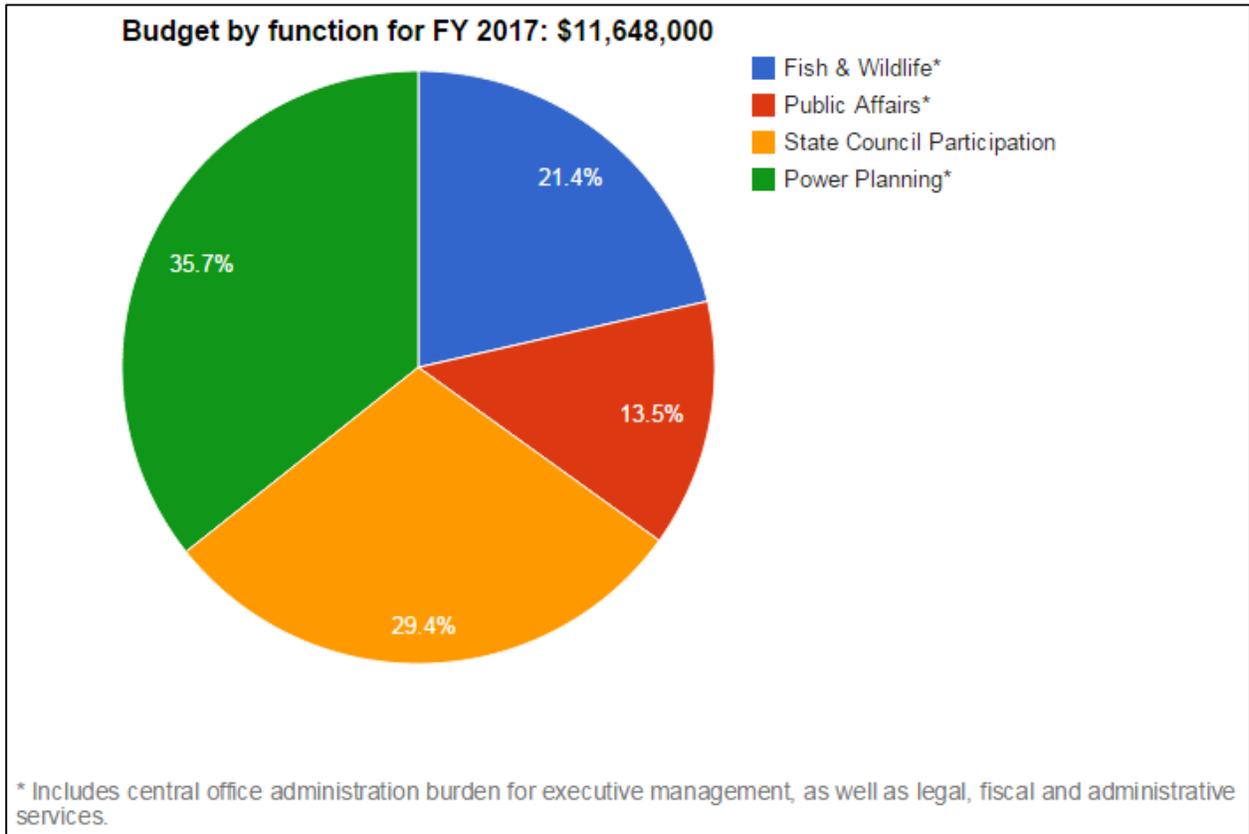
The Council's budget for Fiscal Year 2017 and Revised Fiscal Year 2016 is based on current-year expenditure levels plus adjustments for shifting workloads, certain program improvements, and cost-of-living adjustment factors as provided by the U.S. Department of Energy (Bonneville) and the Oregon Economic and Revenue Forecast. A number of cost-containment measures for personal services, travel, contracts, and services and supplies have been incorporated in the budget.

The Council proposes that a projected budget in the amount of \$11,648,000 for Fiscal Year 2017, equal to 0.094 mills per kilowatt-hour for the estimate of forecast firm power sales, be included in the Bonneville administrator's Fiscal Year 2017 budget submittal.

Here is a detailed look at the Fiscal Year 2016 revised budget:

FY 2016 Revised Program Forecast (000s omitted)						
	Power Planning	Fish & Wildlife	Public Affairs	Legal	Admin	Total
Compensation	\$1,408	\$938	\$530	\$279	\$867	\$4,022
Other Payroll Expenses	662	441	249	131	407	1,890
Travel	94	63	60	24	29	270
Contracts	265	145	200	8	40	658
Other Operating Expenses	209	8	95	18	920	1,250
SUBTOTAL	\$2,638	\$1,595	\$1,134	\$460	\$2,263	\$8,090
State Budgets:						
Idaho	\$816					
Montana	839					
Oregon	809					
Washington	871					
SUBTOTAL	\$3,335					3,335
TOTAL						\$11,425

Here is the proposed Fiscal Year 2017 budget, by Council function:



Background of the Council

Organization

The governors of Idaho, Montana, Oregon, and Washington each appoint two members to the Council. The eight-member Council sets policy and provides overall leadership for Council activities.

The Council's work is performed, depending on the tasks, by the Council's professional staff (including staff in a central office in Portland and in each state), consultants under contract, or by public agencies and Indian tribes under intergovernmental agreements. The Council's executive director is responsible for coordinating with the Council, supervising the central office staff, administering contracts, and overseeing the day-to-day operations of the Council. The Council approves major contracts and the overall work plan. The Council has 59 full-time-equivalent employees.

The central staff is organized into five divisions: Power; Fish and Wildlife; Public Affairs; Legal; and Administrative. Professional staff in each state provide technical review and assistance to Council members in evaluating matters before the Council. State staff also participate in designing and developing public-involvement programs that focus on the implementation of the Power Plan and Fish and Wildlife Program in their particular states. This support is provided through existing state agencies or by individuals directly under Council member direction.

History

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 under the authority of 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 decision-making. 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 regulate and 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 that includes 29 federal dams within the basin and two outside (in southern Oregon), 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 Columbia River Basin 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 decision-making to the fullest extent practicable,” in the words of the Act.

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

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.nwccouncil.org. Copies of Council publications are available at the website or by calling the Council. All Council publications are free.

Council Meetings, with hyperlinks to the agendas, Fiscal Year 2015

- [October 6, 2014 Pendleton](#)
- [November 4, 2014 Portland](#)
- [December 9, 2014 Portland](#)
- [January 13, 2015 Portland](#)
- [April 7, 2015 Helena](#)
- [March 10, 2015 Eugene](#)
- [February 10, 2015 Portland](#)
- [March 10-11, 2015, Eugene, Oregon](#)
- [April 7-8, 2015, Helena, Montana](#)
- [May 5-6, Portland, Oregon](#)
- [June 9-10, 2015, Coeur d'Alene, Idaho](#)
- [July 14-15, 2015, Spokane](#)
- [August 10-11, 2015, Missoula, MT](#)
- [September 14-16, Eagle, ID](#)

Selected News Articles the Mention the Council

Council Members and Offices, Fiscal Year 2015

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Comments of the Bonneville Power Administration

A letter from Bonneville Administrator Elliot Mainzer will be inserted here in the final version of this report in January 2016.

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