



2016 Columbia River Basin Fish and Wildlife Program Costs Report

16TH ANNUAL REPORT TO THE
NORTHWEST GOVERNORS



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Overview

Since 2001, in response to a request from the governors of Idaho, Montana, Oregon, and Washington, the four states that comprise the Northwest Power and Conservation Council, the Council has reported annually on all costs related to fish and wildlife incurred by the Bonneville Power Administration (BPA) as reported by BPA, including costs to implement the Council's Columbia River Basin Fish and Wildlife Program.

In this 16th annual report, the Council provides an update of Bonneville's reported fish and wildlife costs in Fiscal Year 2016 (October 1, 2015 – September 30, 2016). The information in this report was provided by Bonneville in response to requests from the Council staff and was not independently verified by the Council or its staff. The Council prepares this report solely for informational purposes, not as a requirement of the Northwest Power Act, and has neither the expertise nor the resources to analyze the accuracy of BPA's reported costs.

Summary of 2016 costs

In Fiscal Year 2016, Bonneville reported total fish and wildlife costs of approximately \$621 million, as follows:

- \$258.1 million in direct (expense) costs.ⁱ
- \$88.2 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 \$9.8 million in costs in Fiscal Year 2016 (the other half is assigned to the Power Business Line budget).
- \$148.2 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.

- \$76.6 million in forgone hydropower sales revenue that results from dam operations that benefit fish but reduce hydropower generation.
- \$50.3 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 \$621.5 million total does not include the amount Bonneville borrowed from the U.S. Treasury in 2016 totaling \$17.2 million for program-related (capital) projects, and \$34.1 million for associated federal projects as part of the Columbia River Fish Mitigation Program. These investments are funded by congressional appropriations and repaid by Bonneville. Including them in the same total as fixed costs would double-count some of the capital investment. The total also does not reflect a credit of \$72.6 million from the federal Treasury related to fish and wildlife costs in 2016 that Bonneville is required to take under Section 4(h)(10)(C) of the Power Act. The annual credit comprises the obligations of other federal agencies for dam purposes other than hydropower, and which Bonneville pays in full. The credit is applied to Bonneville's federal Treasury debt. Subtracting the credit reduces the total fish and wildlife costs to \$548.9 million in fiscal year 2016 (the credit is explained in more detail in the "Power System Costs" section of this report).

The total of all fish and wildlife costs reported by Bonneville's Fish and Wildlife Division for Fiscal Year 2016 (\$621.5 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



\$2.418 billion. Including forgone revenue, fish and wildlife costs comprised about 25 percent of Bonneville's total power-related costs. However, because forgone revenue is not a cost, but rather an estimate of lost revenue, Bonneville's Power Business Line does not include forgone revenue in its calculation of annual costs. Without forgone revenue, fish and wildlife costs comprise 22.5 percent of Bonneville's \$2.418 billion in total power-related costs.

Fish and wildlife costs account for a significant portion of the rate Bonneville charges its wholesale power customers. Approximately one third of Bonneville's 2016-2017 wholesale rate of \$33.75 per megawatt hour is estimated to be associated with its fish and wildlife program. This includes an estimate of forgone revenue from lost hydropower sales attributable to fish operations at the dams. The Council understands the impact fish and wildlife costs have on rates and is working on measures to keep its program as efficient and effective as possible. Accordingly, the Council formed a cost-savings workgroup with Bonneville that will identify and review on a regular basis fish and wildlife projects for potential close-out or significant cost reductions. The Council

is continuing discussions regarding how it might find further cost savings and direct them to other projects associated with emerging priority areas identified in the program.

Power system costs

The Council's program and the biological opinions on Federal Columbia River Power System operations issued by NOAA Fisheries and the U.S. Fish and Wildlife Service specify hydropower dam operations for fish that also affect power generation. These measures include river and dam operations to protect spawning and rearing areas for both anadromous and resident fish and to improve passage conditions at dams for juvenile salmon and steelhead. Sometimes these operations require Bonneville to purchase power to meet loads while at other times Bonneville simply forgoes a revenue-making opportunity.

Regardless of how Bonneville handles the reduced generation, fish operations to comply with these federal requirements affect Bonneville rates for utility customers.

Bonneville customers pay the cost of power Bonneville purchases to meet regional loads. Also, compliance with these legal requirements, and others, limits the amount of revenue that would be possible from an unrestricted operation of the hydropower system. For reporting purposes, on an annual basis Bonneville calculates the value of both power purchases and forgone revenues attributable to fish operations and reports them as part of its costs to mitigate the impacts to fish and wildlife from operation of the federal hydropower system. While the Council recognizes there is debate over the reporting of these power-system costs, a principle of the Act requires the Council to consider the “monetary costs and electric power issues resulting from implementation of the program,” which are allocated by the Administrator. Nevertheless, this report includes forgone revenues and power purchases as reported by Bonneville, as the Council does not have the capability to audit Bonneville’s financial records.

The amounts of forgone revenue and power purchases vary from year to year because the demand for power and the amount of water in the Columbia River system also vary. During some months of the year (most notably spring), the hydropower system generates sufficient power, even with fish operations, to both meet firm load and generate surplus power. During these months, the fish operations often reduce so-called “secondary” revenues from sales of surplus power. Bonneville calls these revenue reductions “forgone revenues.” Among the many factors Bonneville considers in setting rates, one is the assumption of a lower amount of secondary revenue (“forgone revenues”) because of how the river and dams are operated for fish. During other months of the year, and under low-water conditions, the hydropower system does not generate enough power to meet firm loads and Bonneville must supplement through purchasing electricity from other suppliers. When fish operations necessitate these additional power purchases to meet firm loads, Bonneville identifies this increment as “power purchases for fish enhancement” in its fish and wildlife costs.

To calculate the annual power-generation share of forgone revenue and power purchases attributable to fish operations at the dams, Bonneville conducts two studies of hydropower generation for the relevant fiscal year.

One study includes all dam-operating requirements, including those for fish, and the other has no fish-protection requirements. The differences for each month are calculated and applied to the corresponding monthly actual Mid-Columbia Dow Jones wholesale electricity market prices. Combined with assumptions of the monthly power-demand load, this provides monthly estimates of the forgone revenue and power purchases resulting from the fish-enhancement operations.

In Fiscal Year 2016, the overall annual average difference between the two studies (fish and no-fish) was 902 average-megawatts. Of this, about 564 average-megawatts contributed to the estimated \$76.6 million in forgone revenue. About 248 average megawatts contributed to the estimated \$50.3 million in replacement power purchases.

As noted above, Bonneville receives a credit under Section 4(h)(10)(C) of the Northwest Power Act as reimbursement for the non-power share of fish and wildlife costs that Bonneville pays annually, including a portion of the power purchases. Other costs are not factored into that 4(h)(10)(C) credit, such as forgone revenue, interest on Treasury borrowing, amortization and depreciation of capital projects, reimbursable expenditures, and the Council budget. Non-power purposes such as irrigation, navigation, and flood control comprise a weighted, system-wide average of 22.3 percent of the authorized purposes of the federal dams. The annual credit to Bonneville is based on this percentage.

The 2016 credit was \$72.6 million. In effect, the credit reduces the fish and wildlife costs paid by electricity ratepayers. As noted earlier in this report, the grand total of all fish and wildlife costs incurred by Bonneville in 2016 was approximately \$621.5 million (including forgone revenue). Applying the 4(h)(10)(C) credit reduces Bonneville’s total fish and wildlife-related costs, meaning that ratepayers were responsible for \$548.9 million and the federal government was responsible for the nonpower-purposes share of \$72.6 million.

Background

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (16 USC 839; PL 96-501), the federal law that authorized the states of Idaho, Montana, Oregon, and Washington to form the Northwest Power and Conservation Council, directs the Council to prepare a program to protect, mitigate and enhance fish and wildlife, and related spawning grounds and habitat, of the Columbia River Basin that have been affected by hydroelectric development. The Bonneville Power Administration satisfies its Power Act responsibilities for fish and wildlife mitigation through funding of the Council's Columbia River Basin Fish and Wildlife Program. Bonneville is a federal power marketing authority within the U.S. Department of Energy that sells wholesale electricity from 31 federal hydropower dams and one non-federal nuclear power plant in the Pacific Northwest (the Federal Columbia River Power System — FCRPS).

In addition to this annual report on Bonneville's fish and wildlife costs, the Council also tracks progress of fish and wildlife efforts in the Columbia River Basin using three high-level indicators (HLI). 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 these indicators to provide a more comprehensive picture of fish and wildlife in the Columbia River Basin. Columbia River basinwide HLI information is reported in graphics that are posted on the Council's High-Level Indicator report webpage (nwcouncil.org/ext/hli). Subbasin-specific information is posted on the Council's subbasin dashboard webpage (nwcouncil.org/ext/dashboard).

The indicators, questions, and graphics are developed and refined in collaboration with fish and wildlife agencies and tribes. Information used to populate the indicator graphics is provided by 1) sponsors of projects funded through the fish and wildlife program, and 2) fish and wildlife agencies and tribes that report on projects not funded through the program. The current reporting status of the three high-level indicators can be viewed in the Table of Indicators on the Council's website (nwcouncil.org/fw/hli/table).

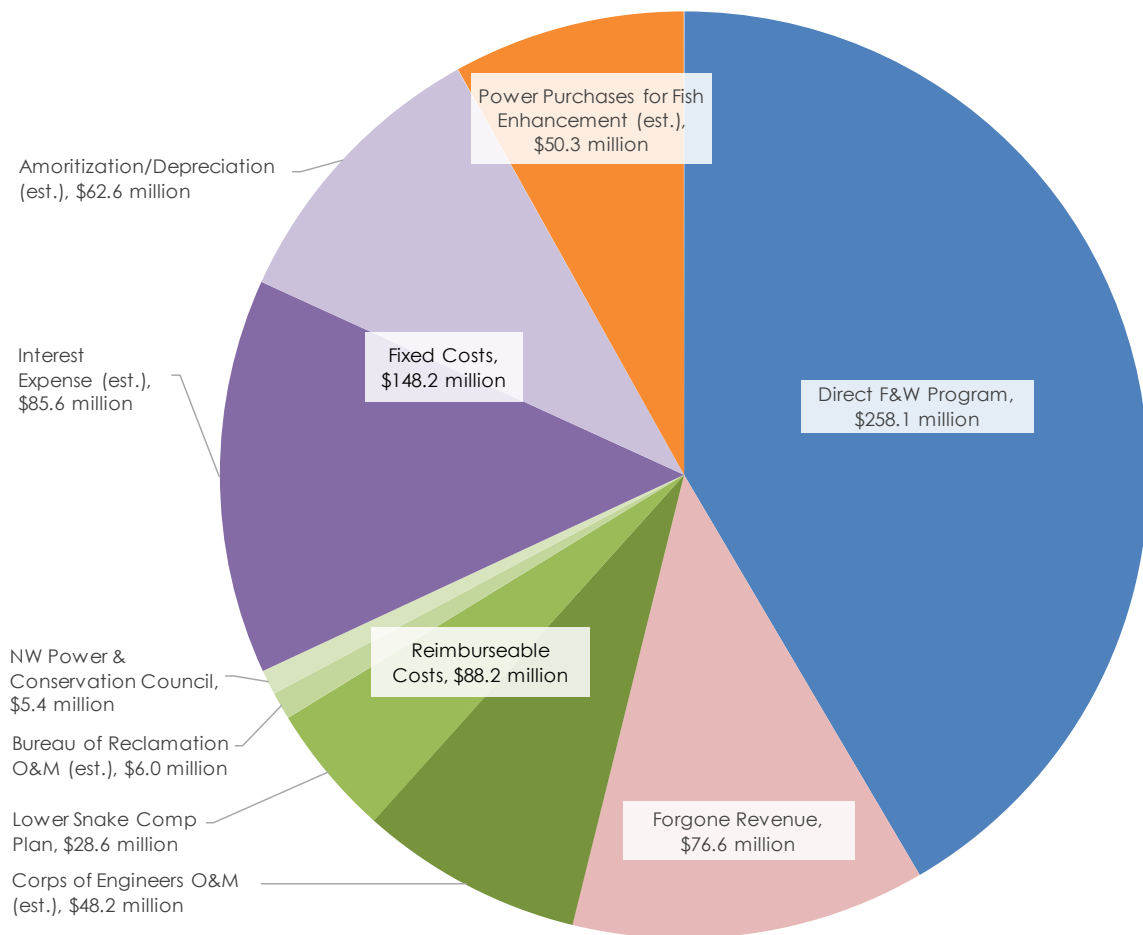


Figures

Data tables for all figures at www.nwccouncil.org/reports/financial-reports/2017-2

Figure 1: Costs by Major Area, FY2016, as Reported by Bonneville's Fish and Wildlife Division

Total of \$621.5 million does not reflect \$51.4 million in obligations to capital projects for fish and wildlife projects, software development, and structures at dams, or \$72.6 million federal credits Bonneville receives from the U.S. Treasury

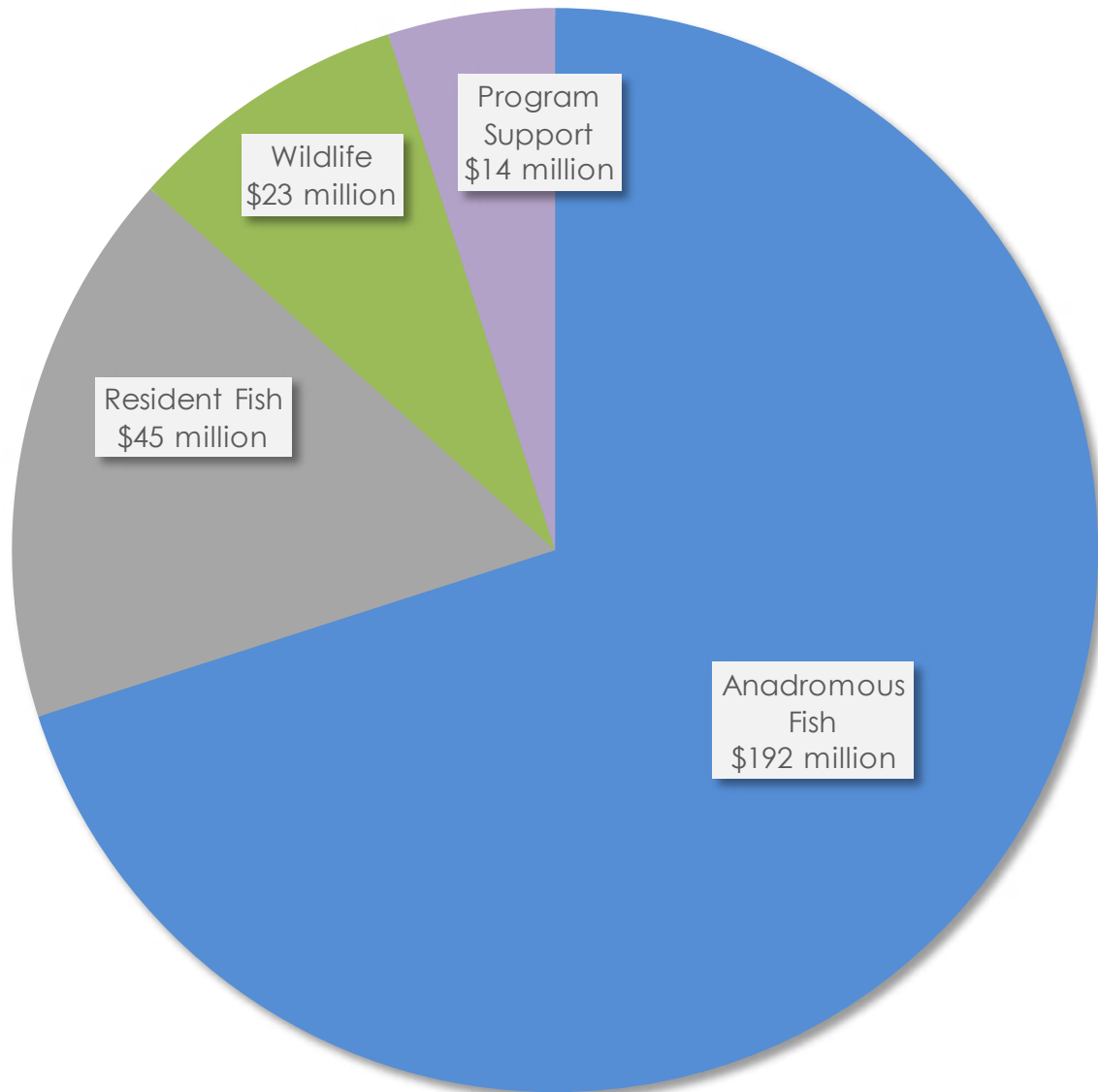


These costs, compiled by Bonneville's Fish and Wildlife Division, include forgone hydropower sales revenue (\$76.6 million in 2016). In this calculation, fish and wildlife costs (\$621 million) comprise about 25 percent of Bonneville's total power-related costs in Fiscal Year 2016 of \$2.418 billion.

Fish and wildlife costs are part of Bonneville's power-related costs and do not include costs associated with Bonneville's transmission system.

Figure 2: Costs by Types of Species, FY2016

Total: \$274.2 million includes \$16.0 million in obligations to capital projects



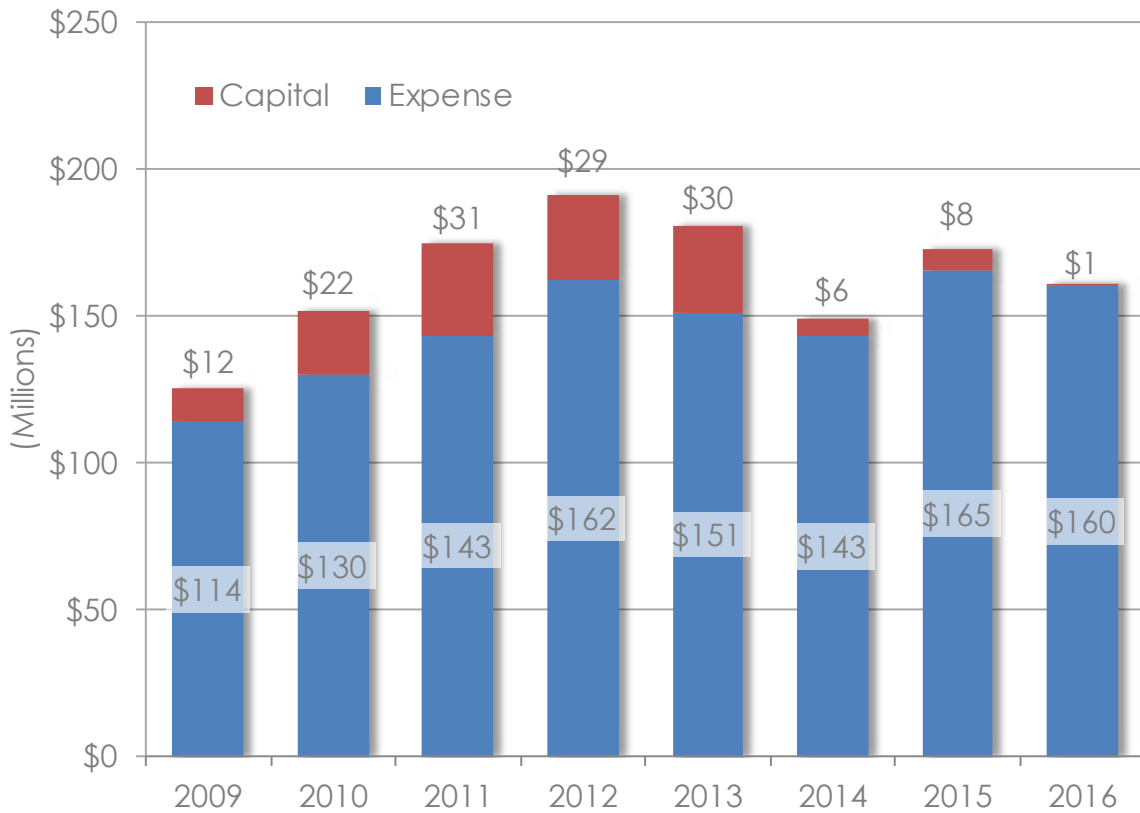
2) Program Support includes includes contracts that contain only administrative work elements or program level spending that could not be mapped to a specific project, as well as BPA internal overhead such as personnel costs.

3) FY2015 revised as of March 9, 2017.

Source: Bonneville Power Administration



Figure 3: Costs of FCRPS BiOp Projects, 2009-2016



1) Estimated spending is based at the project level. Therefore, if a project partially supports the FCRPS BiOp, all expenditures for the project are included.

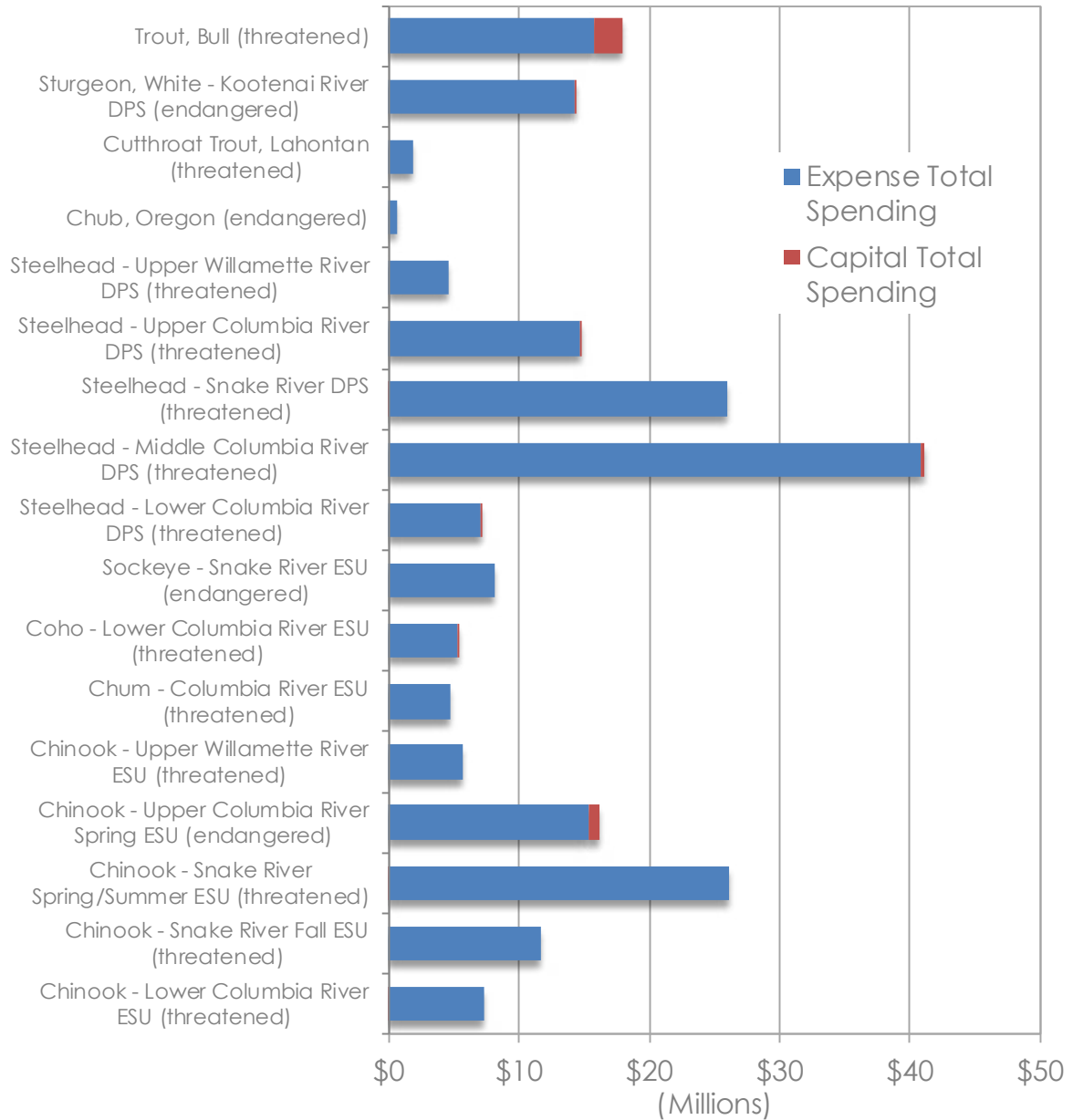
2) FY2015 reviewed as of March 9, 2017, no changes.

3) Passage projects were moved from Capital to Expense funding starting with FY16 contracts.

Source: Bonneville Power Administration

Figure 4: Costs Associated with ESA-Listed Fish, FY2016

Total: \$213.0 million (Expense: \$209.8 million, Capital: \$3.2 million)



1) Direct spending can be tracked back to a work element where the contractor explicitly identified the “Primary Focal Species” benefiting from the work.

2) Contract Administration spending can be tracked back to a work element that did not require the contractor to identify the “Primary Focal Species” benefiting from the work.

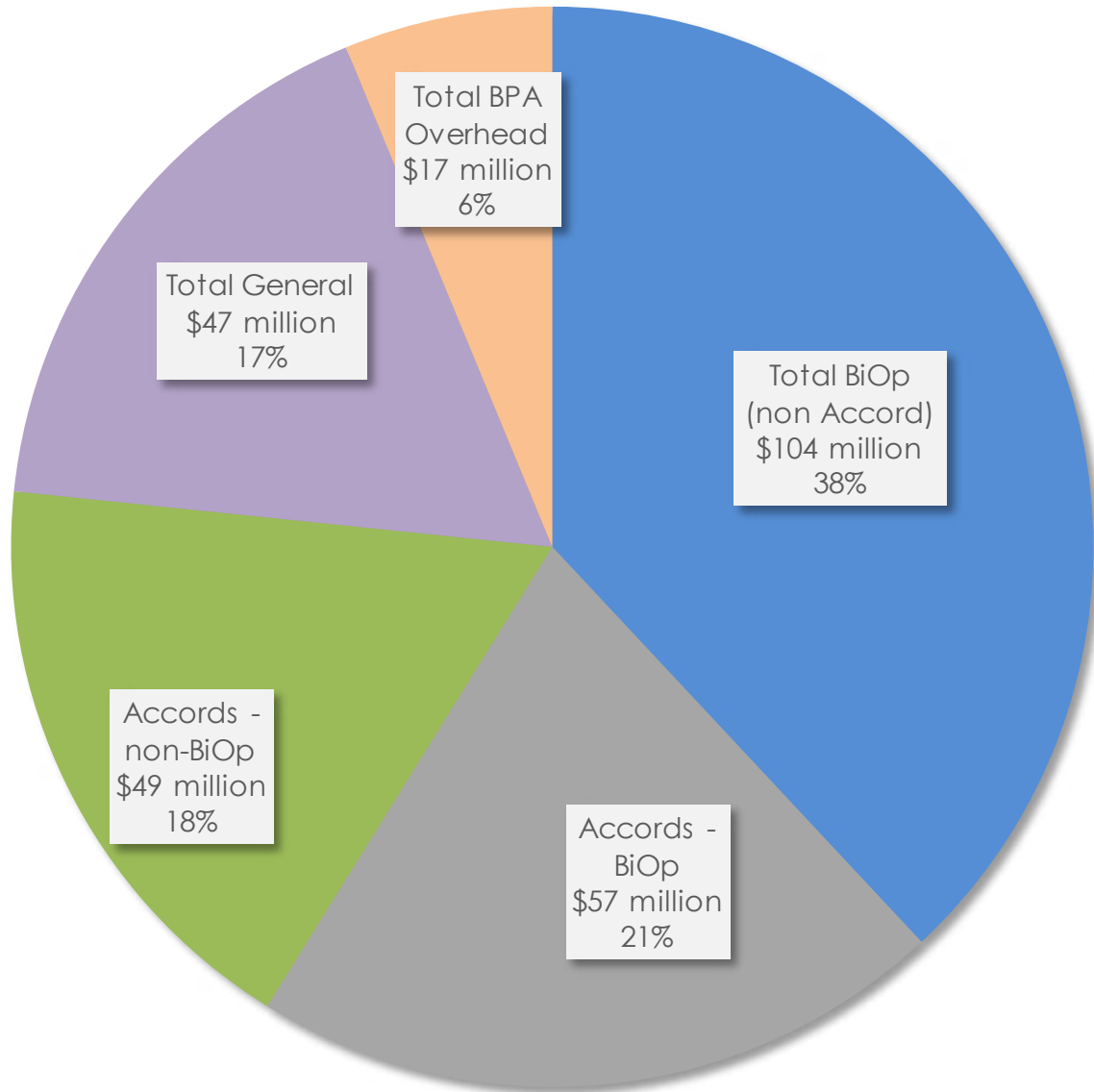
3) Negative values for Capital Spending are a result of overaccruing costs in the previous year.

Source: Bonneville Power Administration



Figure 5: Costs by Fund, FY2016

Total: \$274.2 million includes \$16.0 million in obligations to capital projects



1) BiOp tracking at fund level began in 2009, Accords began in 2008.

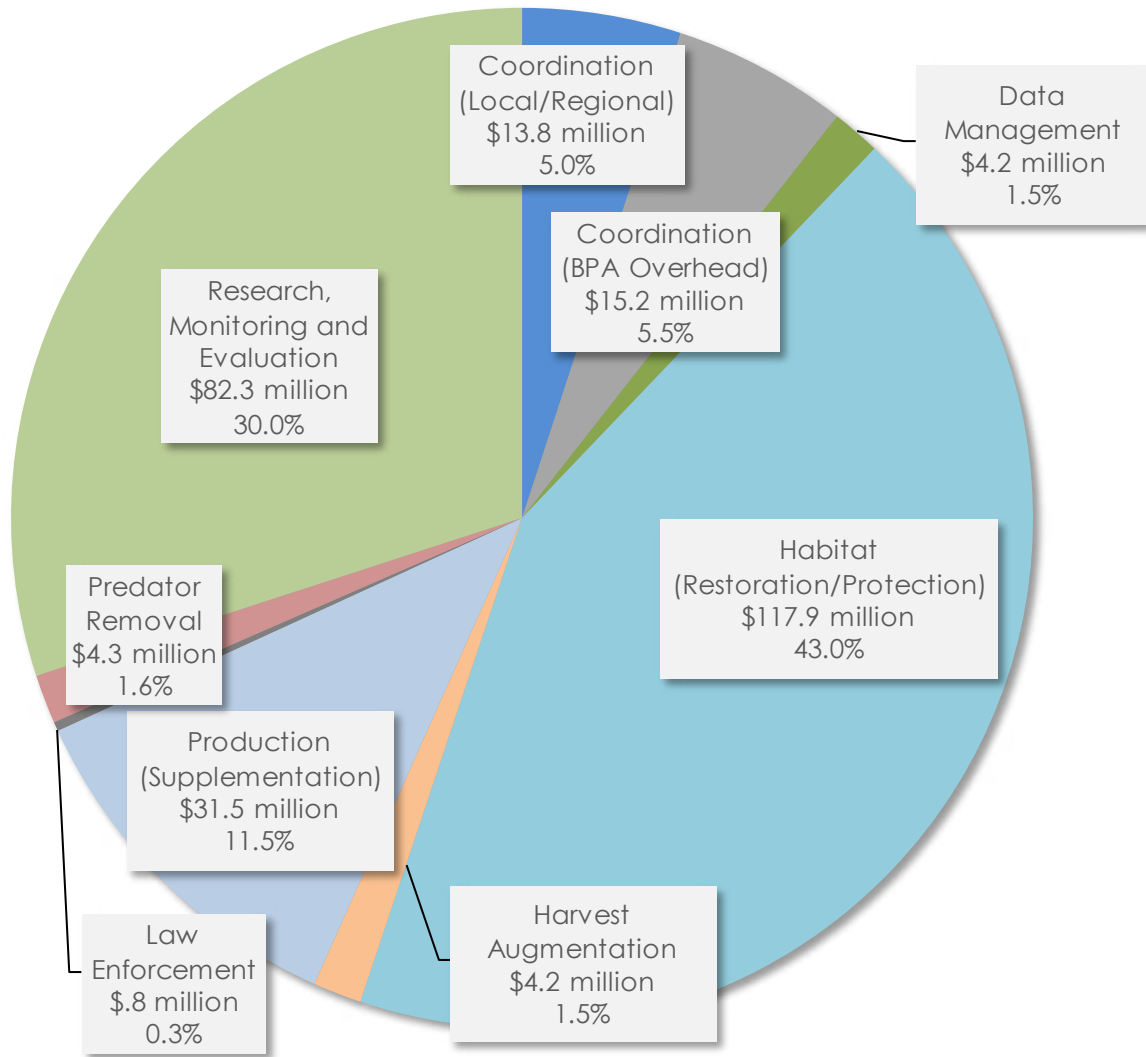
2) Spending is estimated based on the percent of funding towards a project. For example, if a project budget is 70 percent BiOp and 30 percent General, the project expenditures will be prorated 70 percent towards BiOp and 30 percent General.

3) Revised on March 9, 2017.

Source: Bonneville Power Administration

Figure 6A: Costs by Category, FY2016

Total: \$274.2 million includes \$16.0 million in obligations to capital projects



1) BPA's database identifies projects by their "Purpose" (general goal) and "Emphasis" (primary type of work, e.g., habitat restoration.) BPA does not track its project management overhead against individual projects or contracts, so there is no easy or accurate way to allocate BPA overhead to specific purposes or emphases. Thus, in the above report, BPA includes its staffing to manage the 600-plus contracts in its fish and wildlife program in the category identified as Coordination (BPA Overhead), and its direct technical services contracts for Data Management and RM&E in those respective categories.

2) Estimated spending is based at the project level. Therefore if a project is assigned an emphasis of Habitat, but also does RME, all expenditures for the project are included under Habitat.

3) Starting in Fiscal Year 2015 (and revised for FY2014), Costs by Category will now separate Coordination costs between Regional/Local Coordination and BPA Overhead.

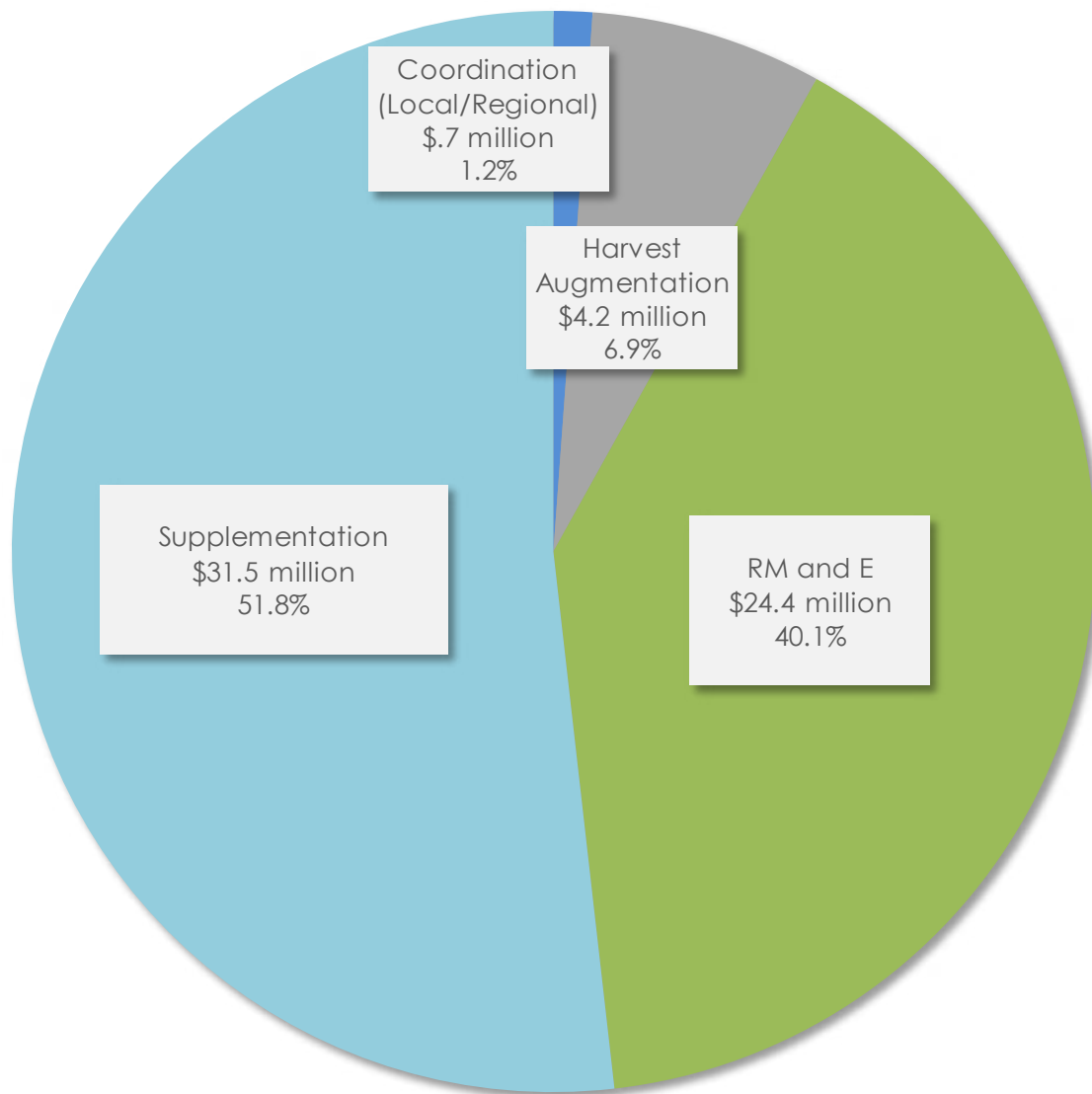
4) FY2015 - Revised as of March 9, 2017.

Source: Bonneville Power Administration



Figure 6B: Costs of Artificial Production by Category, FY2016

Total: \$60.7 million does not include obligations to capital projects



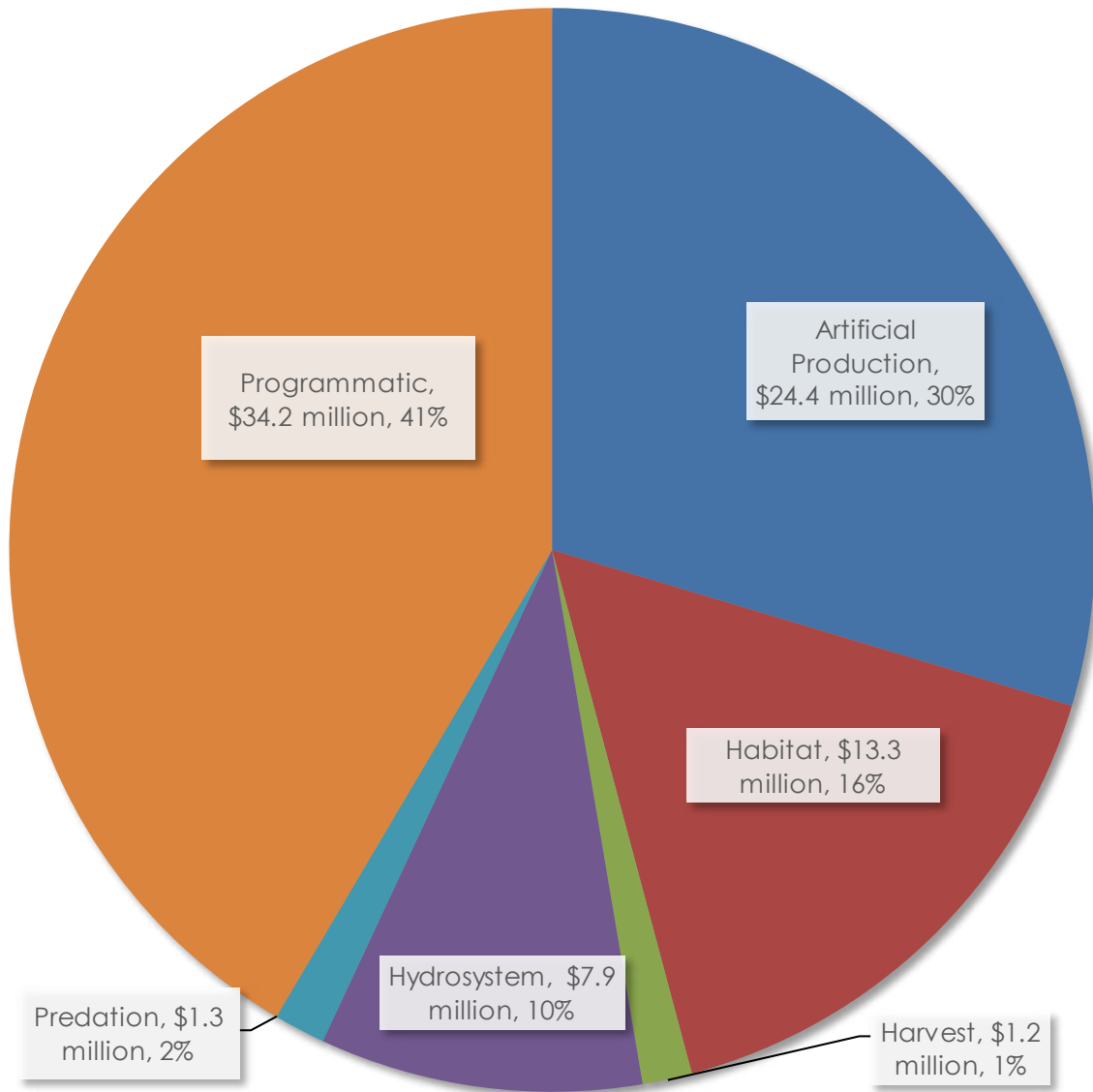
1) Estimated spending is based at the project level. Therefore if a project is assigned an emphasis of Habitat, but also does RME, all expenditures for the project are included under Habitat.

2) FY2015 reviewed on 3/9/2017, no changes.

Source: Bonneville Power Administration

Figure 7: Costs of Research, Monitoring and Evaluation (RM&E), FY2016

Total: \$82.3 million does not include obligations to capital projects



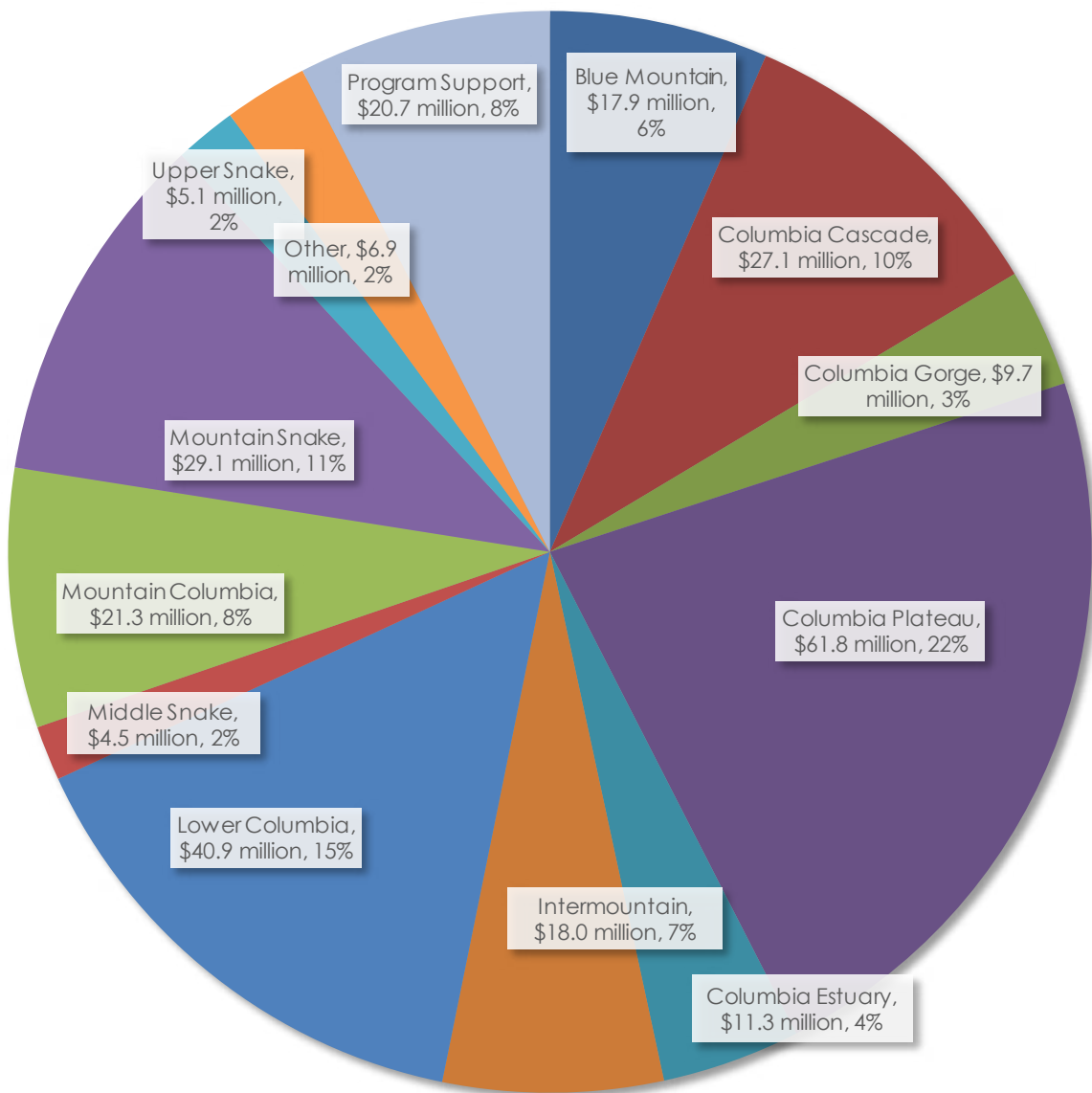
Estimated spending is based at the project level. Therefore if a project is labeled Artificial Production, but also supports Habitat, the expenditures are counted as Artificial Production.

Source: Bonneville Power Administration



Figure 8: Costs by Province, FY2016

Total: \$274.2 million includes \$16.0 million in obligations to capital projects



- 1) Starting in 2008, spending by province is tracked in Pisces based on where the contractor explicitly identified work location.
- 2) Other includes "Undetermined" locations such as Ocean, Canada; and provinces not recognized by NPCC.
- 3) Program Support/Admin/Other includes spending that cannot be traced back to a contract that has at least one work element requiring location; contracts without any work elements at all; program level spending not mapped to a specific project; and BPA Overhead.
- 4) FY15 revised as of March 9, 2017.

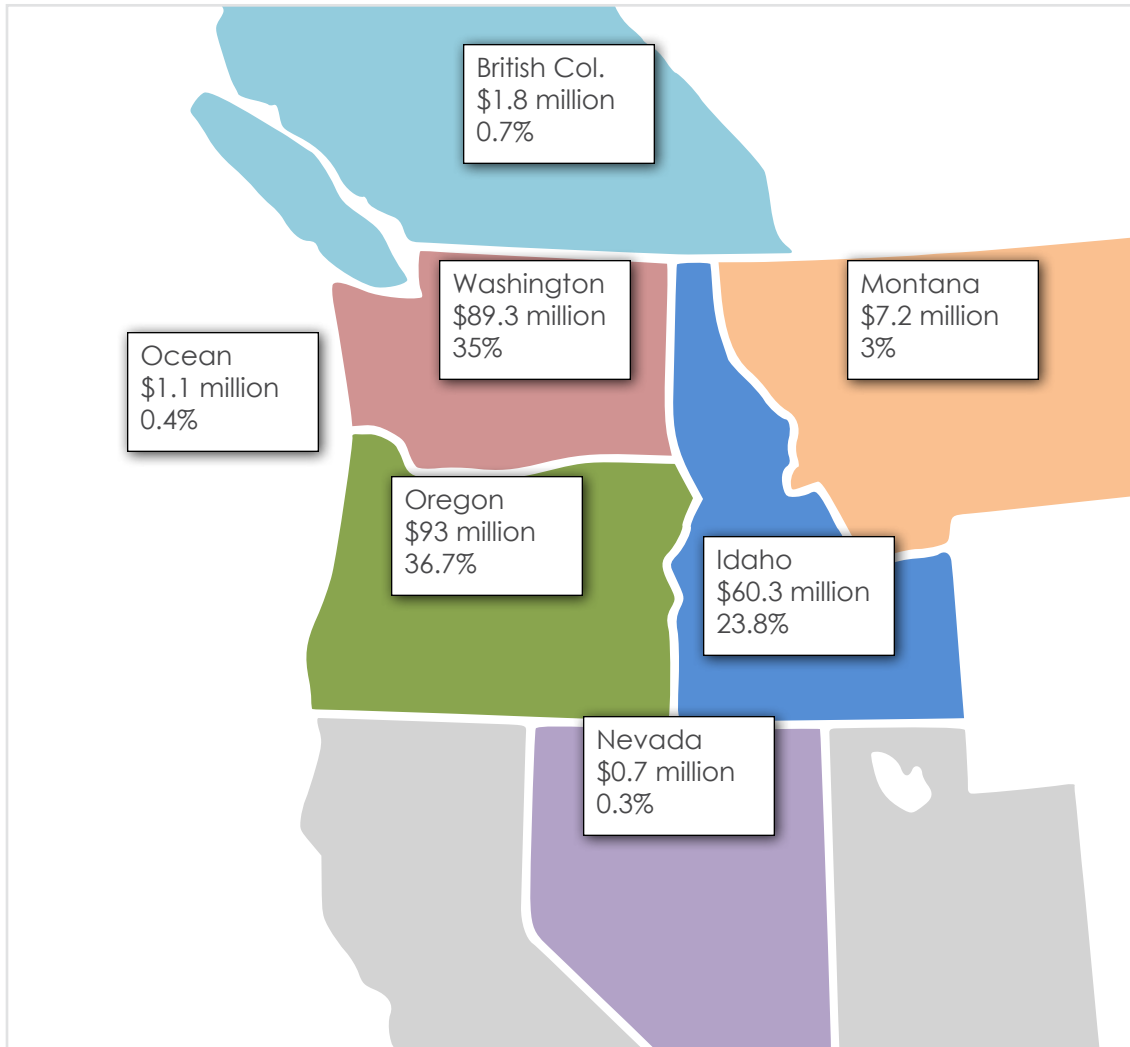
Source: Bonneville Power Administration

Province Map



Figure 9: Costs by Work Element Location, FY2016

Total: \$274.2 million includes \$16.0 million in obligations to capital projects

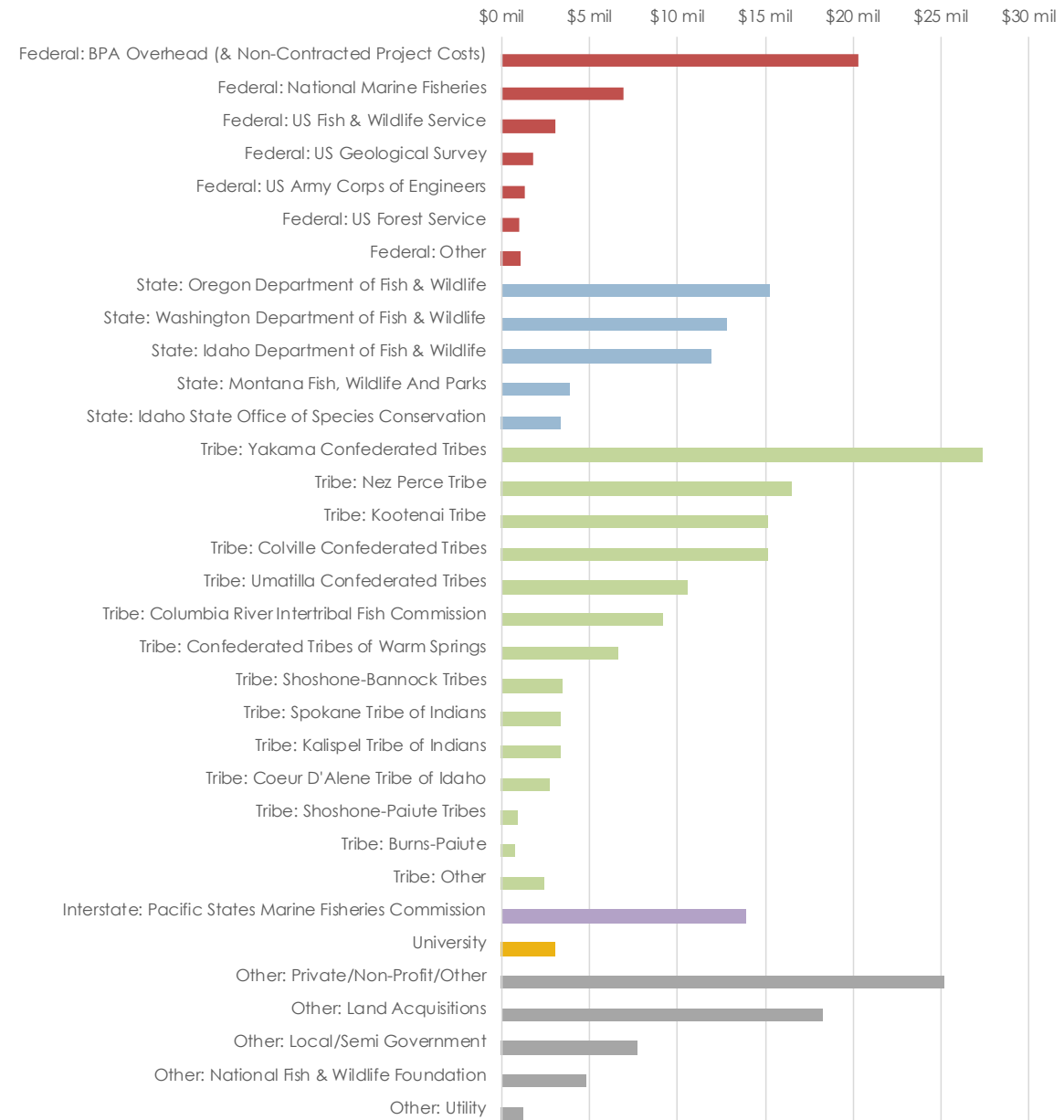


- 1) Starting in 2008, spending by state is tracked in Pisces based on where the contractor explicitly identified work location.
- 2) Program Support/Admin/Other, \$20 million, includes spending that cannot be traced back to a contract that has at least one work element requiring location; contracts without any work elements; program level spending not mapped to a specific project or NPCC province; and BPA Overhead.
- 3) FY2015 revised as of March 9, 2017.

Source: Bonneville Power Administration

Figure 10: Costs by Contractor Types, FY2016

Total: \$274.2 million includes \$16.0 million in obligations to capital projects



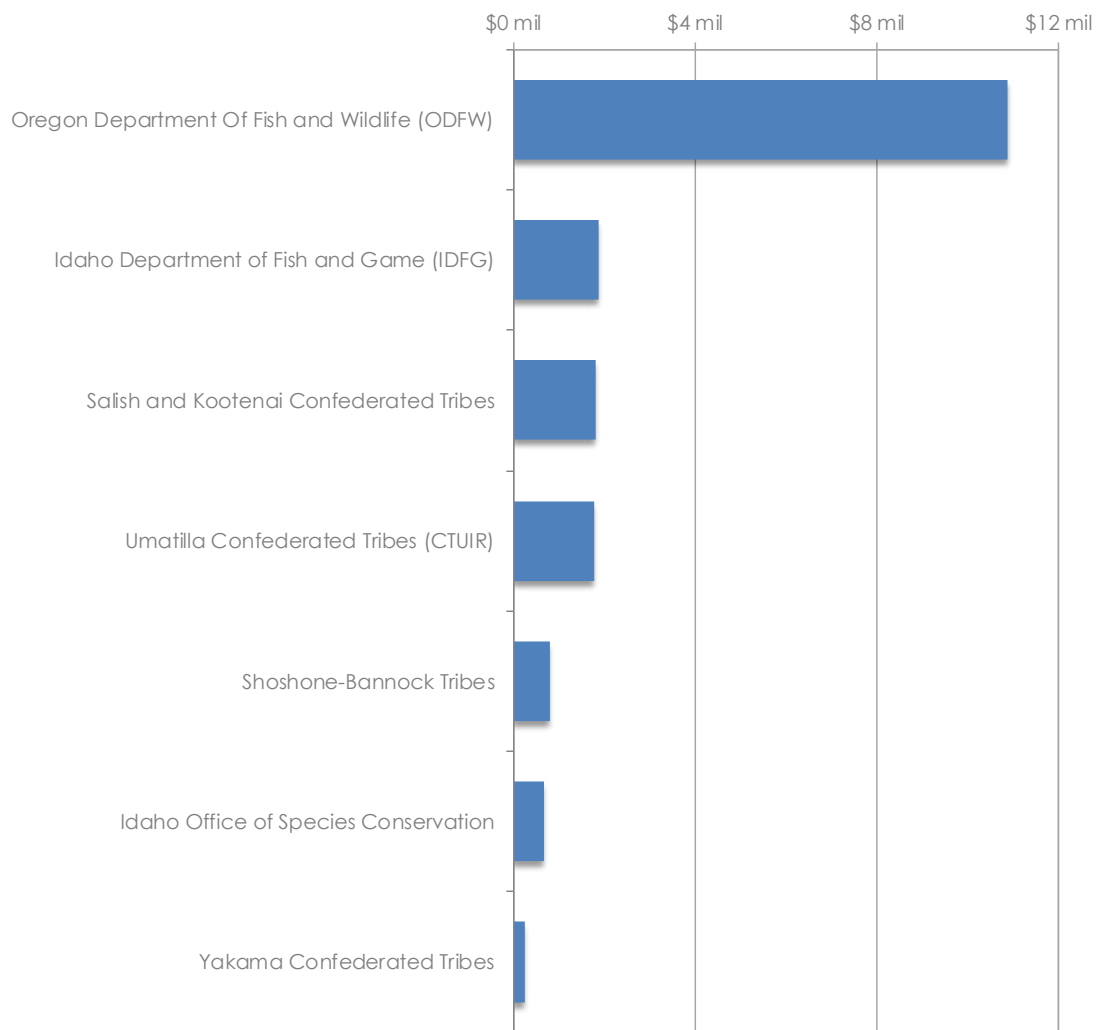
- 1) Values above include accruals.
- 2) Starting in FY13, land acquisition values may include stewardship costs for long-term operations and maintenance (O&M).
- 3) FY2015 reviewed as of March 10, 2017, no changes.

Source: Bonneville Power Administration



Figure 11: Costs of Land Purchases for Fish and Wildlife Habitat, FY2016

Total: \$18.2 million



1) Values above include bank fees, permits, etc.

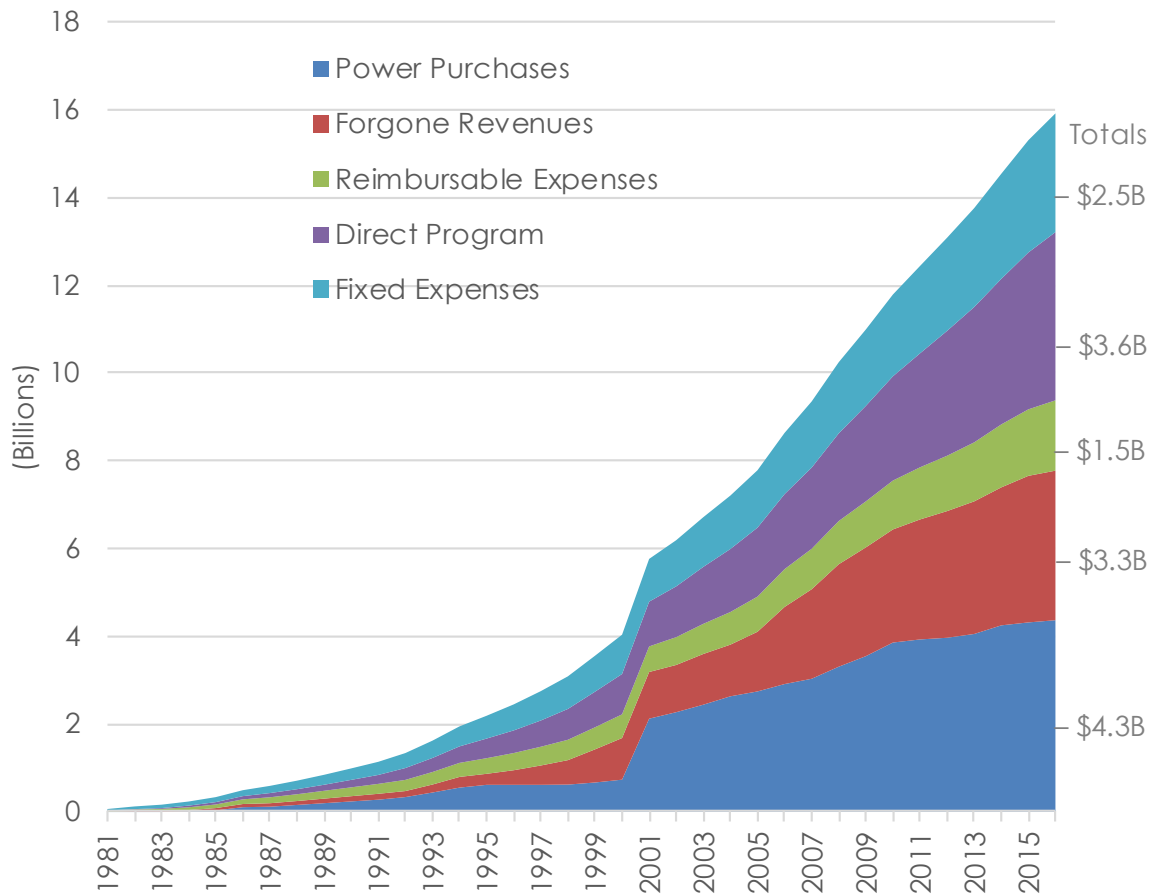
2) Starting in FY13, land acquisition values may include stewardship costs for long-term operations and maintenance (O&M)

3) No changes as of March 9, 2016

Source: Bonneville Power Administration

Figure 12: Cumulative Costs 1978-2016, by Major Spending Area

Total: \$15.9 billion does not reflect \$2.66 billion in obligations to capital projects or \$2.06 billion in credits



Source: Bonneville Power Administration



Endnotes

ⁱ Direct program costs also can include supplemental mitigation expenses, which in the past included so-called “action-plan,” “high-priority,” and “fast-track” projects. For the period 2001-2004, direct program costs included a total of \$16 million in one-time expenditures for “high priority” and “action plan” projects. The “action-plan” projects were intended to bring immediate benefits to ESA-listed salmon and steelhead that were affected by altered hydropower dam operations in the spring and early summer of 2001, when the flow of the Columbia River was at a near-record low. The “high-priority” projects were intended to bring immediate benefits to all species listed for protection under the Endangered Species Act in advance of subbasin planning (the initial subbasin plans were submitted to the Council in 2004 and adopted into the Fish and Wildlife Program in 2004 and 2005). The action-plan and high-priority expenditures were included in the calculation of 1978- 2009 total spending. “Fast Track” projects were identified under the Columbia Basin Research, Monitoring, and Evaluation Collaboration process and workshops in 2009. The projects were intended to meet high-priority gaps in the Reasonable and Prudent Alternative of the 2008 Federal Columbia River Power System Biological Opinion for salmon and steelhead by being implemented as quickly as possible. The projects can be found in the AA/NOAA/NPCC BiOp RM&E Workgroup Recommendations Report, <http://bit.ly/aWn7PR>.

ⁱⁱ Capital projects are financed over time with appropriated debt. In Bonneville’s fish and wildlife budget, the amounts are called “obligations” as opposed to project expenditures through the direct-funded part of the program. Capital projects include construction of fish hatcheries, fish and wildlife habitat improvements, and land purchases for wildlife. Capital investments in Bonneville’s budget also include those for “associated federal projects,” which include Bonneville’s share of the cost of the projects in the U.S. Army Corps of Engineers’ Columbia River Fish Mitigation Program. These projects include, among others, fish-passage improvements at the federal dams, barge transportation of juvenile salmon and steelhead, research in the Columbia River estuary, and the effort to relocate Caspian tern and double-crested cormorant nesting areas from the estuary to other locations in the Northwest.

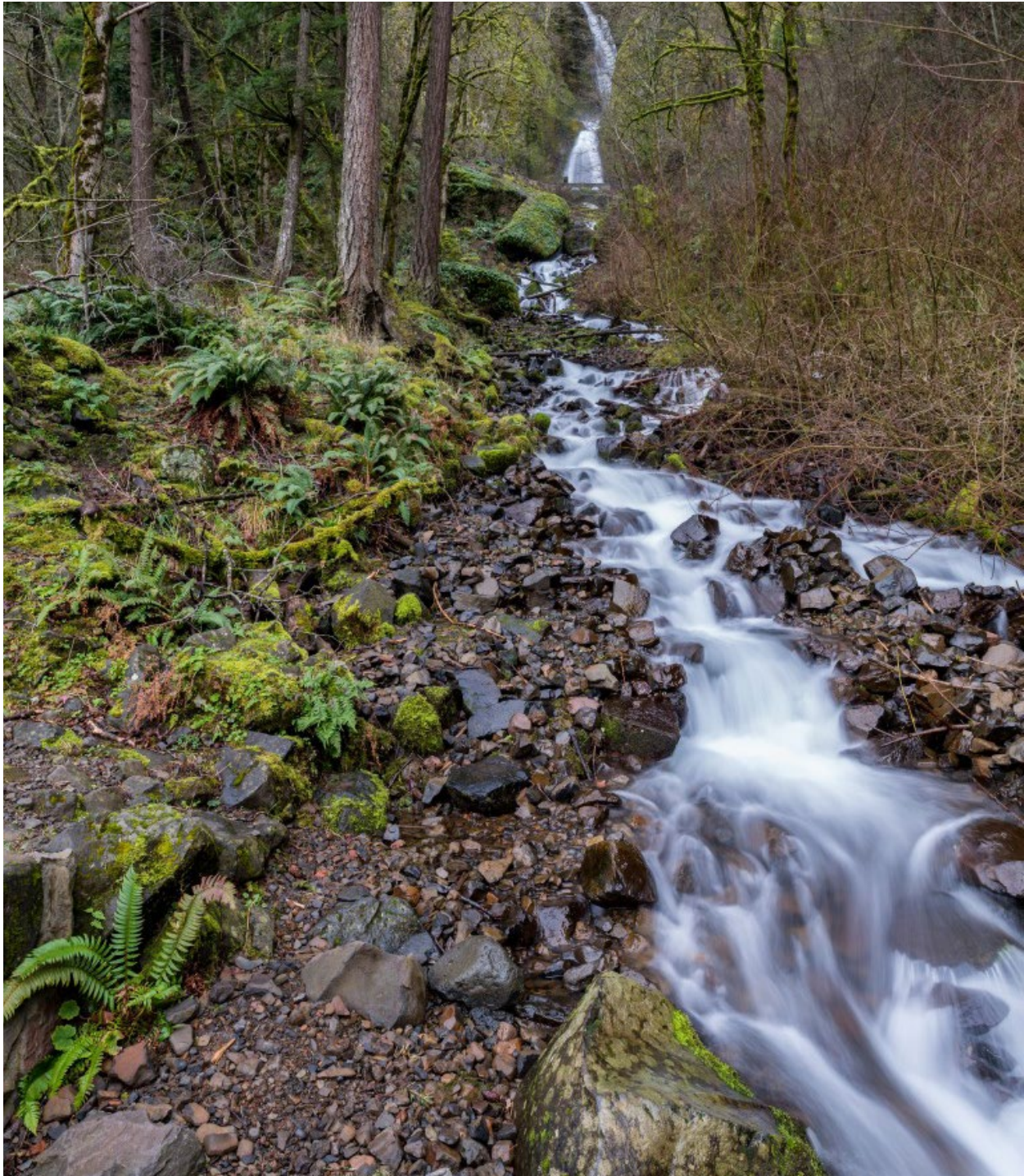
ⁱⁱⁱ The 2016 costs bring the grand total of all fish and wildlife program costs incurred by Bonneville from 1978 when the costs began to approximately \$15.9 billion. The total does not include \$2.67 billion in annual obligations to capital investments (the actual annual costs are captured in the “fixed costs” category), or \$2.06 billion in credits applied to Bonneville’s Treasury debt (discussed above).

Here, in descending order, is a breakdown of the major cost categories:

- \$4.36 billion for power purchases to meet electricity-demand requirements in response to river and dam operations that benefit fish but reduce hydropower generation.
- \$3.41 billion in forgone hydropower sales revenue. Bonneville calculates the value of hydropower that could not be generated (revenue that is forgone) because of river operations to assist fish passage and improve fish survival, such as water spills at the dams when juvenile salmon and steelhead are migrating to the ocean.
- \$3.83 billion for the Council’s direct program. This amount does not include annual commitments to capital investments in the direct program.
- \$2.69 billion in fixed expenses for interest, amortization, and depreciation on the capital investments.
- \$1.6 billion to: 1) directly fund fish and wildlife projects undertaken by the U.S. Army Corps of Engineers or the Bureau of Reclamation, some of which predate the 1980 Northwest Power Act, and for which Bonneville pays the hydropower share consistent with the Power Act (these expenditures include, for example, operations and maintenance costs of certain fish-production facilities, fish passage facilities at dams, and research activities); and 2) reimburse the U.S. Treasury for the hydropower share of major dam modifications by the Corps of Engineers, such as installing spillway weirs, bypass systems, fish-deflection screens in front of turbine entrances, and spillway gas.

^{iv} BPA Priority Firm Tier 1 rate, undelivered. See: BPA Facts, March 2017, <https://www.bpa.gov/news/pubs/GeneralPublications/gi-BPA-Facts.pdf>

^v 839b(h)(8). The Council shall consider, in developing and adopting a program pursuant to this subsection, the following principles: ... 839b(h)(8)(D). Monetary costs and electric power losses resulting from the implementation of the program shall be allocated by the Administrator consistent with individual project impacts and system wide objectives of this subsection.



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