



2017 Columbia River Basin Fish and Wildlife Program Costs Report

17TH 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, we have reported annually on all costs related to fish and wildlife incurred by the Bonneville Power Administration, (BPA) as reported by Bonneville. This includes the cost of implementing the Council's Columbia River Basin Fish and Wildlife Program.

In this 17th annual report, the Council provides an update of Bonneville's reported fish and wildlife costs in Fiscal Year 2017 (October 1, 2016 – September 30, 2017). 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 Bonneville's reported costs.

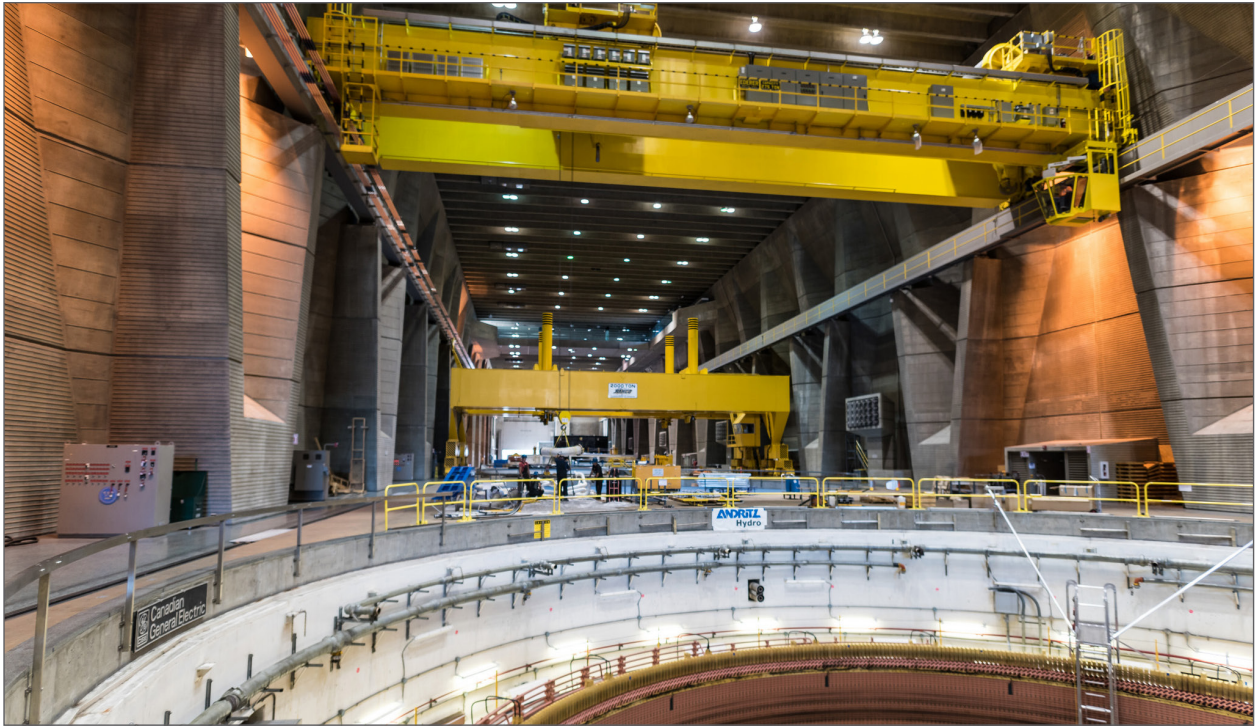
Summary of 2017 costs

In Fiscal Year 2017, Bonneville reported total fish and wildlife costs of approximately \$450.4 million, as follows:

- \$254.7 million in direct (expense) costs for the direct-funded program, which pays for projects such as habitat improvements, research, and some fish hatchery costs.
- \$85.2 million in reimbursements to the federal Treasury for expenditures of appropriated funds 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 \$10.8 million in costs

in Fiscal Year 2017 (the other half is assigned to Bonneville's Power Business Line budget).

- \$121.4 million for debt service (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.
- \$9.6 million in forgone hydropower sales revenue that results from dam operations that benefit fish but reduce hydropower generation. Bonneville's Fish and Wildlife Division considers forgone revenue as the result of spill at dams to benefit fish passage a cost attributable to fish and wildlife mitigation.
- Negative \$20.5 million in power purchases. Bonneville buys power in the wholesale market during periods when dam operations to protect migrating fish reduce hydropower generation below firm loads, such as by spilling water over dams in the spring or storing it behind dams in winter months in anticipation of flow augmentation. The negative number for 2017 is an anomaly. Power purchases and forgone revenue have a wide variance from year to year due to differences in streamflows, power prices and operations. The 2017 Fiscal Year exhibited an unusual and unintuitive result for both replacement power purchases (which are a part of the 4.h.10.C calculation) and forgone revenues. According to Bonneville, one of the reasons these "cost of fish operations" were lower in 2017 can be attributed to the modeled reservoir operations in the previous year as well as an unusual runoff. Bonneville's calculations show that operations for fish pushed some generation into months with higher power prices, and the value of that generation more than offset the fact that Bonneville lost approximately 210 average megawatts of generation due to operations for fish in 2017.



The \$450.4 million total does not include the amount Bonneville borrowed from the U.S. Treasury in 2017 totaling \$65.6 million — \$5.4 million for program-related (capital) projects, \$1.4 million for software development costs, and the \$58.9 million appropriated by Congress for associated federal projects as part of the Columbia River Fish Mitigation Program. These investments are all 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 \$53.7 million from the federal Treasury related to fish and wildlife costs in 2017 that Bonneville is required to take under Section 4(h)(10)(C) of the Northwest 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 \$396.7 million in fiscal year 2017 (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 2017 (\$450.4 million) comprises 18.2 percent of Bonneville's entire Power Business Line costs of \$2.465 billion. This amount includes forgone revenue and power purchases that result from lost hydropower sales as the result of court-ordered spill to assist juvenile fish migration past Columbia and Snake river dams. Because forgone revenue is an estimate of lost revenue and not an actual cost, Bonneville's Power Business Line does not include forgone revenue in its calculation of annual fish and wildlife costs (\$441 million), which is separate from the amount calculated by the Fish and Wildlife Division. Without forgone revenue, fish and wildlife costs comprise 17.8 percent of Bonneville's \$2.465 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 2017-2019 wholesale rate of \$35.57 per megawatt hour is estimated to be associated with its fish and wildlife program. This includes the estimate of forgone revenue.

BPA's forecast annual total power cost for the BP-16 rate period was \$2.348 billion and includes \$535 million in direct fish and wildlife costs. In addition to

BPA's forecast direct fish and wildlife costs, Bonneville estimated roughly \$200 million in forgone revenue for a total forecast annual fish and wildlife cost of \$735 million, which is 31 percent of \$2.348 billion, or approximately one-third, which is the approximate impact to rates. These estimates assume 2014 Biological Opinion operations and include the portion of costs allocated to non-power uses of the dams (Northwest Power Act Section 4(h)10(C)).

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 identifies and reviews on a regular basis fish and wildlife projects for potential close-out or significant cost reductions (greater than \$50,000). The cost-savings work began in 2015, when \$182,746 in savings were identified and reprogrammed in Fiscal Year 2016 to other projects. In 2016, savings totaling \$560,000 were identified, and in Fiscal Year

2017, Bonneville and Council staff identified additional projects and the savings grew to roughly \$1.1 million. Cost savings allow new projects to be funded by shifting money among projects without increasing the total fish and wildlife budget. Most of the projects identified for savings are in the process of a "smart closeout," meaning that their funding will decline by approximately one-third each year for three years. Due to this process, the cost-savings increase each year until the projects completely close out.



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 (forgone revenue).

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 losses resulting from implementation of the program" (Section 4(h)(8)(D)) which are allocated by the Administrator. Accordingly, 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 electrical generation at the dams, thereby lowering so-called "secondary" revenues from sales of surplus power (water that is spilled over dams to aid fish passage cannot be used to generate power). Bonneville calls these revenue reductions "forgone revenues." Among the many factors Bonneville considers in setting rates, one is an assumption that surplus power sales will be lowered 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 dam-operating requirements for fish protection, and the other has no fish-protection requirements. The differences for each month are calculated and the corresponding monthly actual Mid-Columbia wholesale electricity market prices (as reported by the Intercontinental Exchange, or ICE) are applied. 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 2017, the overall annual average difference between the two studies (fish protection and no-fish protection) was 210 average-megawatts. Of this, about 119 average-megawatts contributed to the estimated \$9.6 million in forgone revenue. About 91 average megawatts contributed to the estimated negative \$20.5 million in replacement power purchases. The negative amount, an anomaly, is explained on page 4 of this report.

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, and is applied against Bonneville's Treasury payment at the end of the year.

The 2017 credit was \$53.7 million — 22.3 percent of \$241 million, the total of fish and wildlife capital costs (\$6.8 million), direct program costs (\$254.7 million), and power purchases (negative \$20.5 million) for fish enhancement. 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 2017 was approximately \$450.4 million (including forgone revenue and power purchases). Applying the 4(h)(10)(C) credit reduces Bonneville's total fish and wildlife-related costs, meaning that ratepayers were responsible for \$396.7 million and the federal government credited Bonneville \$53.7 million.

Background

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (16 USC 839; Public Law 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 (www.nwcouncil.org/ext/hli). Subbasin-specific information is posted on the Council's subbasin dashboard webpage (www.nwcouncil.org/ext/dashboard).

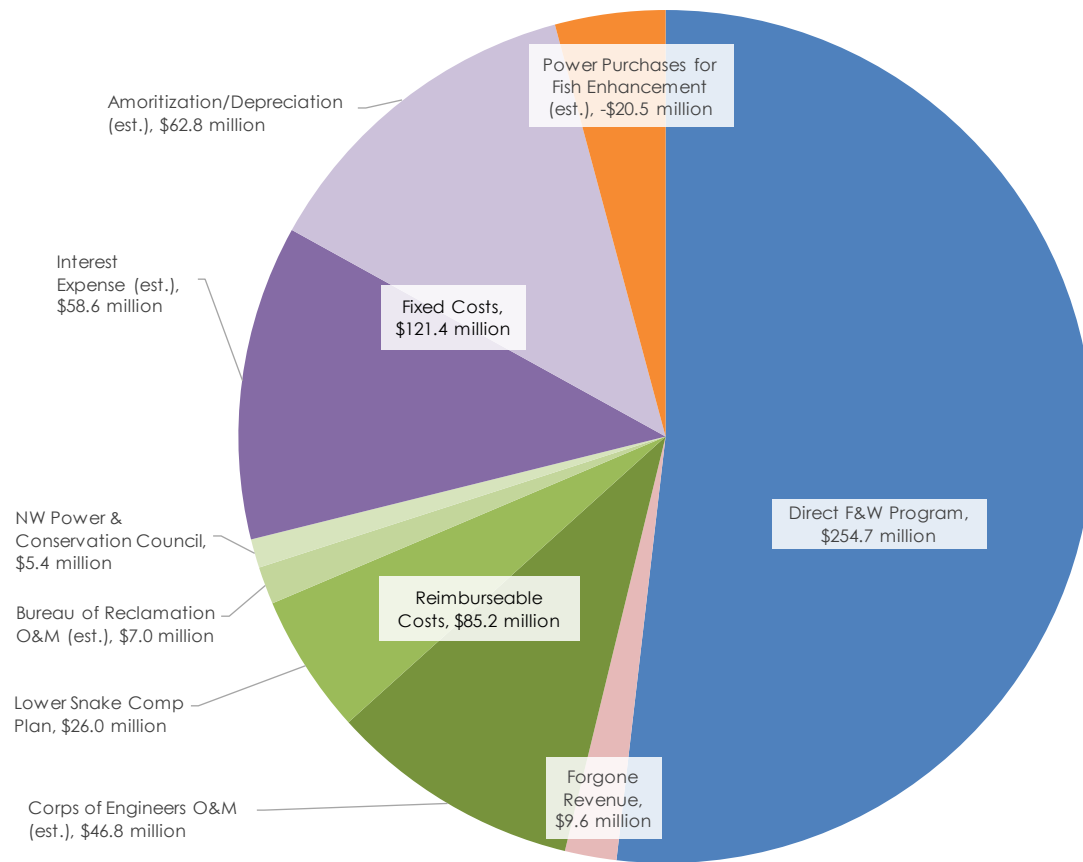
The indicators, questions, and graphics are developed and refined in collaboration with fish and wildlife agencies and tribes. Information used to populate the indicator graphics is provided by 1) sponsors of projects funded through the fish and wildlife program, and 2) fish and wildlife agencies and 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 (www.nwcouncil.org/fw/hli/table).

Figures

Data tables for all figures at www.nw council.org/reports/financial-reports/2018-4

Figure 1: Costs by Major Area, FY2017

Total of \$450.4 million does not reflect \$65.6 million in obligations to capital projects for fish and wildlife projects, software development, and structures at dams, or \$53.7 million federal credits Bonneville receives from the U.S. Treasury



This information has been made publicly available by BPA on 3/20/2018. The figures shown are consistent with audited actuals that contain Agency approved financial information, except for forgone revenues and power purchases which are estimates and do not contain Agency approved financial information.

1/ Capital Investments include both BPA's direct Fish and Wildlife Program capital investments, funded by BPA's Treasury borrowing, and "Associated Projects", which include capital investments at Corps of Engineers' and Bureau of Reclamation projects, funded by appropriations and repaid by BPA. The negative amount in FY 1997 reflects a decision to reverse "plant-in-service" investment that was never actually placed into service. The annual expenses associated with these investments are included in "Program-Related Fixed Expenses".

2/ Includes High Priority and Action Plan Expenses and other supplemental programs.

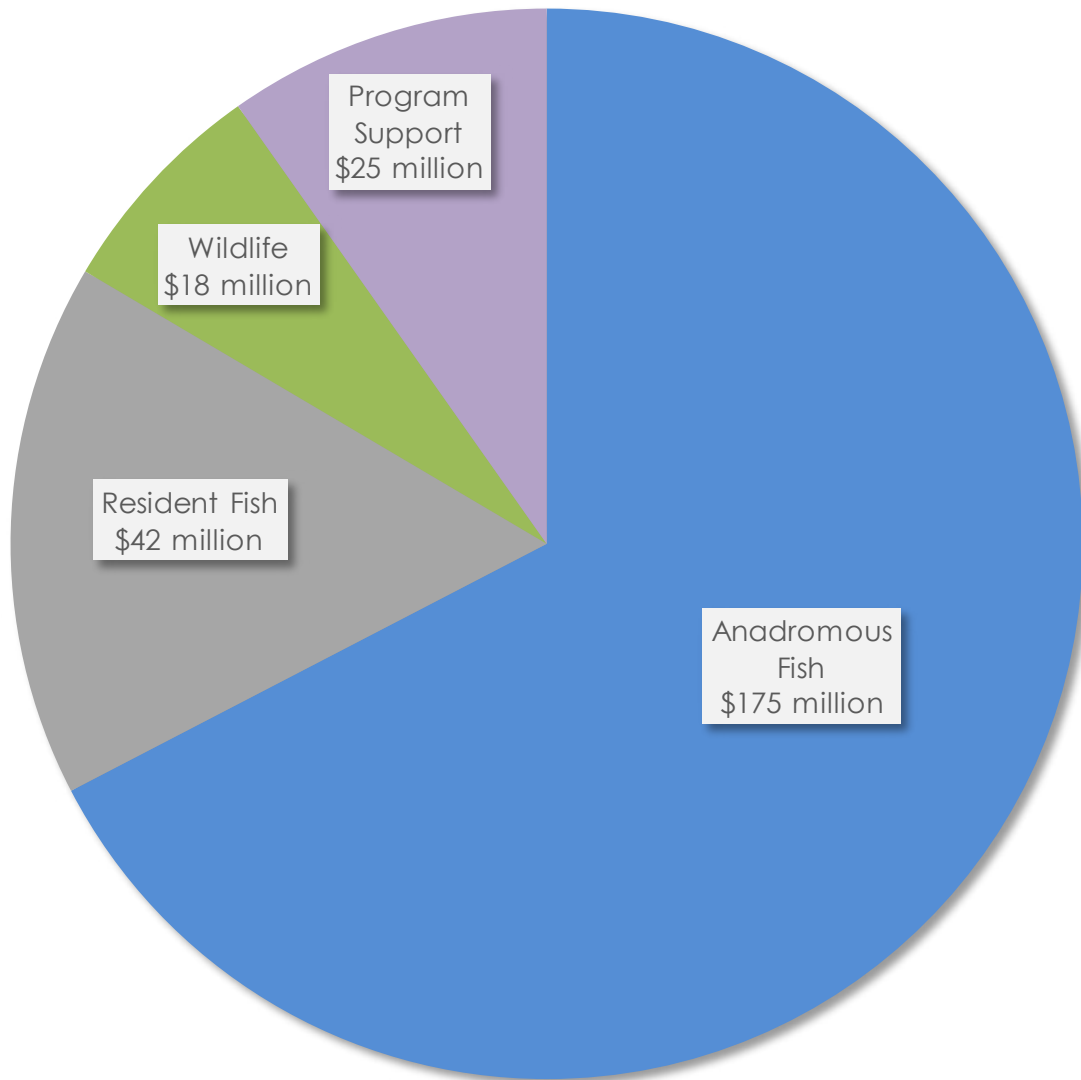
3/ "Reimbursable/Direct-Funded Projects" includes the portion of costs BPA pays to or on behalf of other entities that is determined to be for fish and wildlife purposes.

4/ "Fixed Expenses" include depreciation, amortization and interest on investments on the Corps of Engineers' projects, and amortization and interest on the investments associated with BPA's direct Fish and Wildlife Program.



Figure 2: Costs by Types of Species, FY2017

Total: \$260.0 million includes \$5.4 million in obligations to capital projects



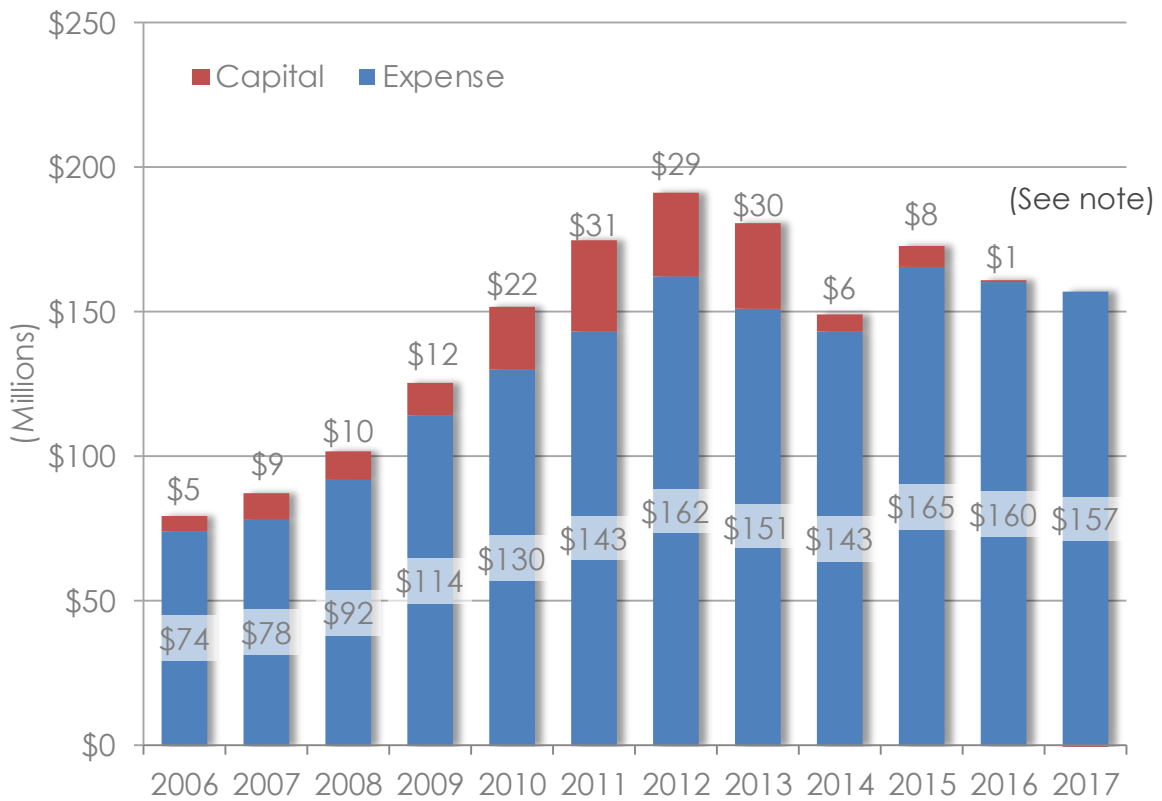
1) Starting in 2008, Spending can be tracked back to a work element where the contractor explicitly identified the "Primary Focal Species" benefiting from the work.

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) FY2017 revised as of February 21, 2018.

Source: Bonneville Power Administration

Figure 3: Costs of FCRPS BiOp Projects, 2006-2017



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

3) FY2017 reviewed as of February 21, 2018; no changes.

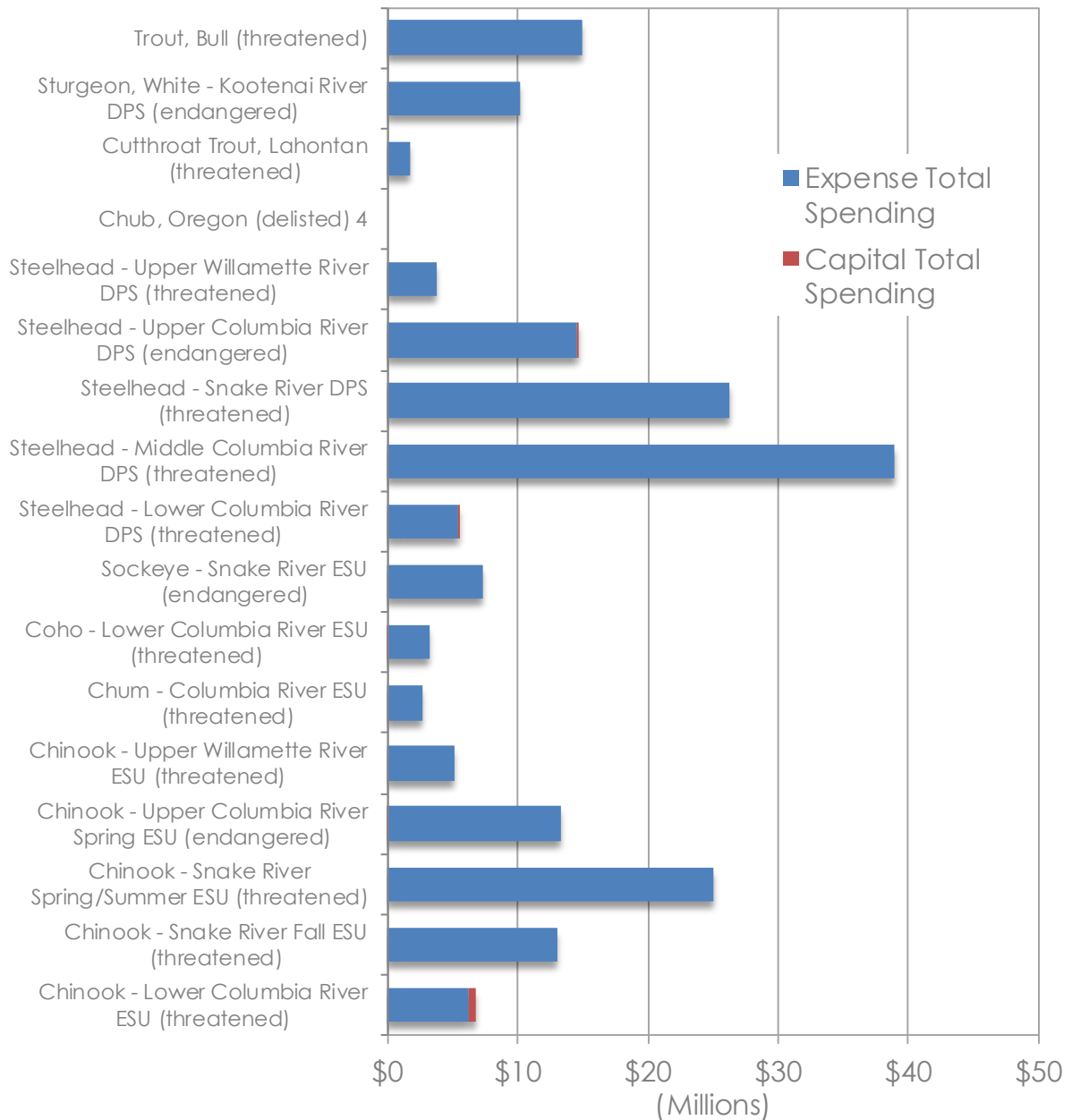
4) FY2017 Capital Spending is -\$396,792. Negative value is a result of over-accruing costs in the previous year.

Source: Bonneville Power Administration



Figure 4: Costs Associated with ESA-Listed Fish, FY2017

Total: \$191.3 million (Expense: \$191.7 million, Capital: \$-.4 million)



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.

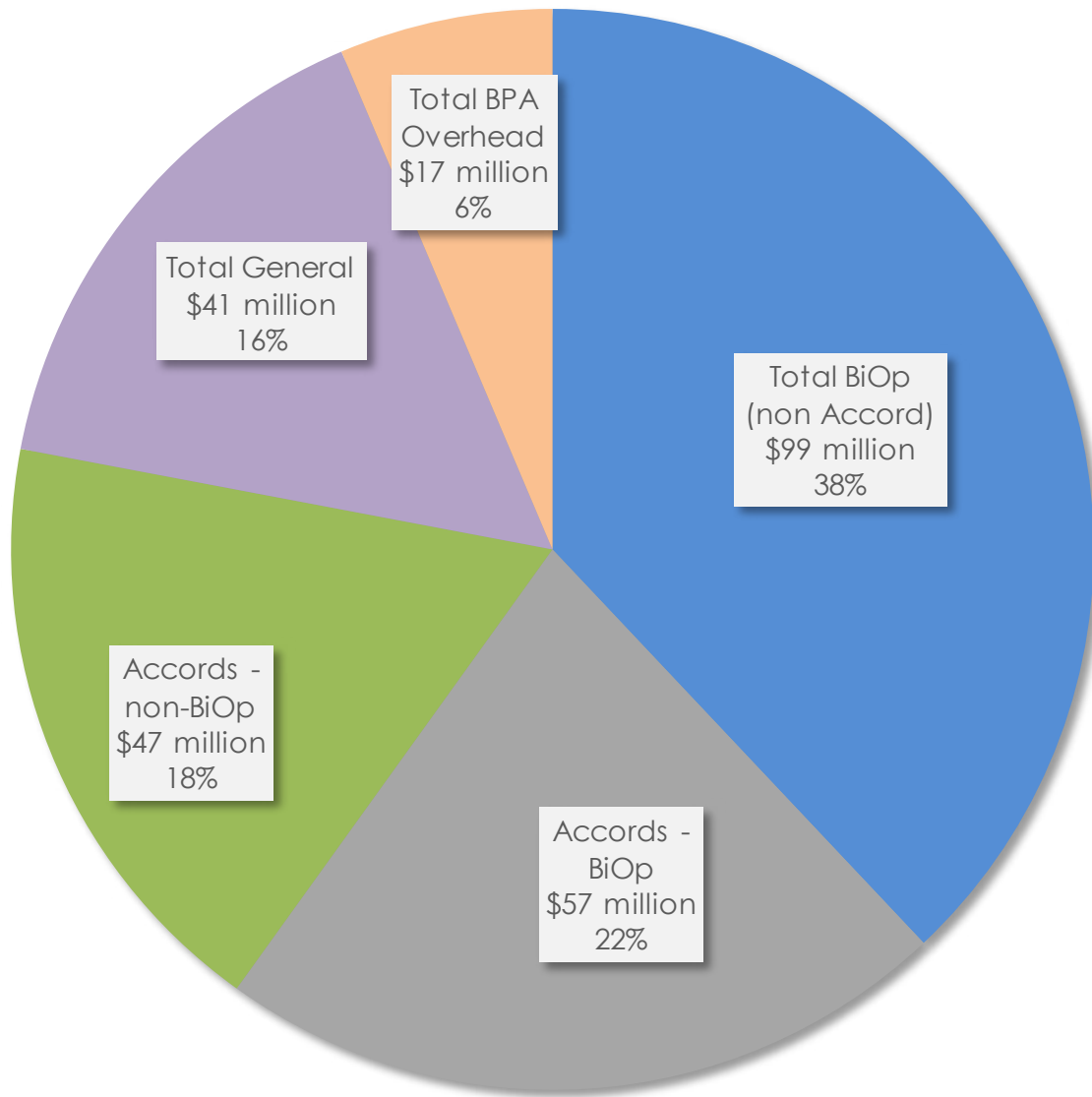
3) Negative values for Capital Spending are a result of over-accruing costs in the previous year.

4) Oregon Chub, once an endangered species, have rebounded and were delisted in 2015.

Source: Bonneville Power Administration

Figure 5: Costs by Fund, FY2017

Total: \$260.0 million includes \$5.4 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.

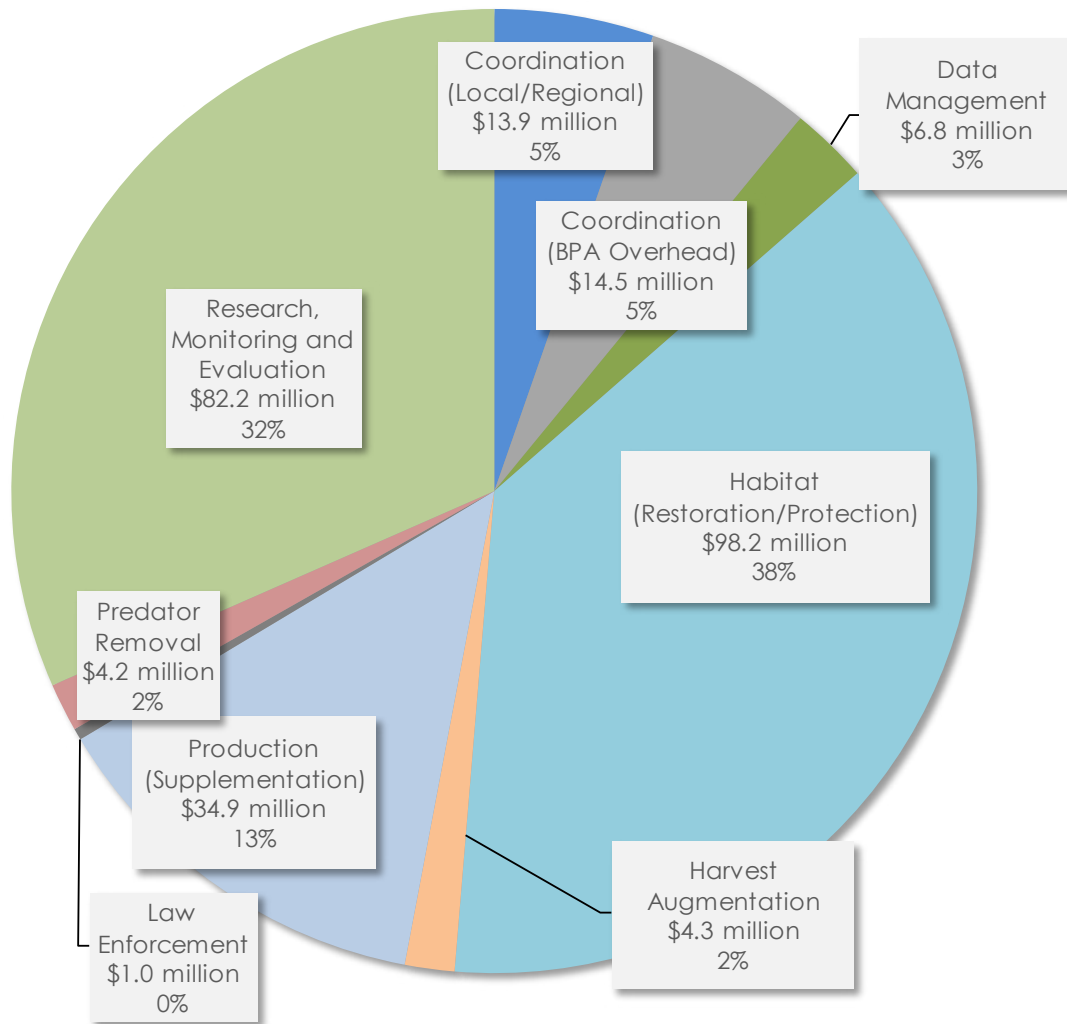
3) Revised on February 21, 2018.

4) In this figure and the corresponding table, overhead is reported two ways: BPA internal support (\$14,542,931) and technical support (\$2,023,130) for a total of \$16,566,061, rounded up to \$17 million.

Source: Bonneville Power Administration

Figure 6A: Costs by Category, FY2017

Total: \$260.0 million includes \$5.4 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 Research, Monitoring, and Evaluation in those respective categories. This differs from the BPA overhead amount reported in Figure and Table 5, which includes internal support plus technical support. Here, Figure and Table 6 only reports internal support as BPA overhead. Technical support is included in the amounts reported in the individual 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.

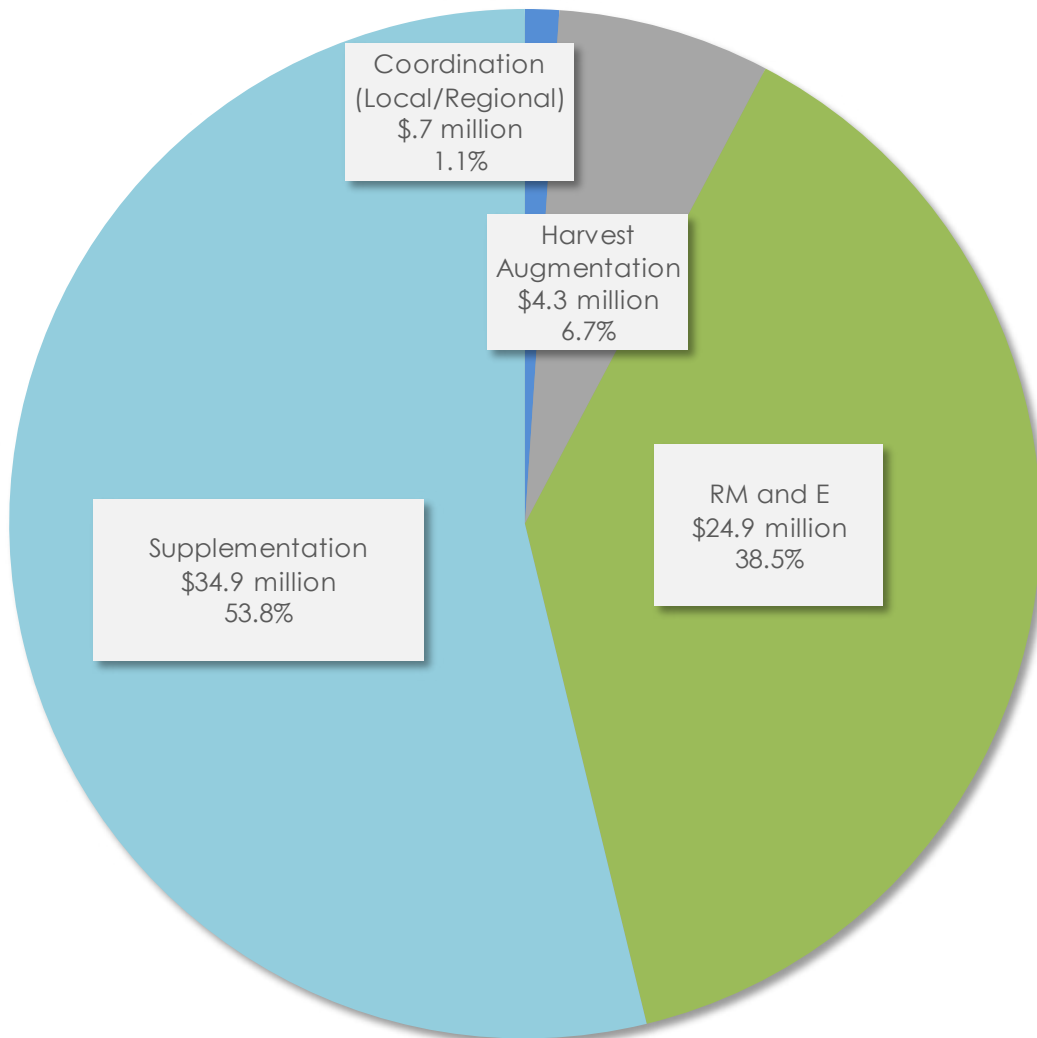
3) Starting in Fiscal Year 2015 (and revised for FY2014), Costs by Category will now separate Coordination costs between Regional/Local Coordination and BPA Overhead.

4) FY2016 revised as of February 21, 2018.

Source: Bonneville Power Administration

Figure 6B: Costs of Artificial Production by Category, FY2017

Total: \$64.8 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.

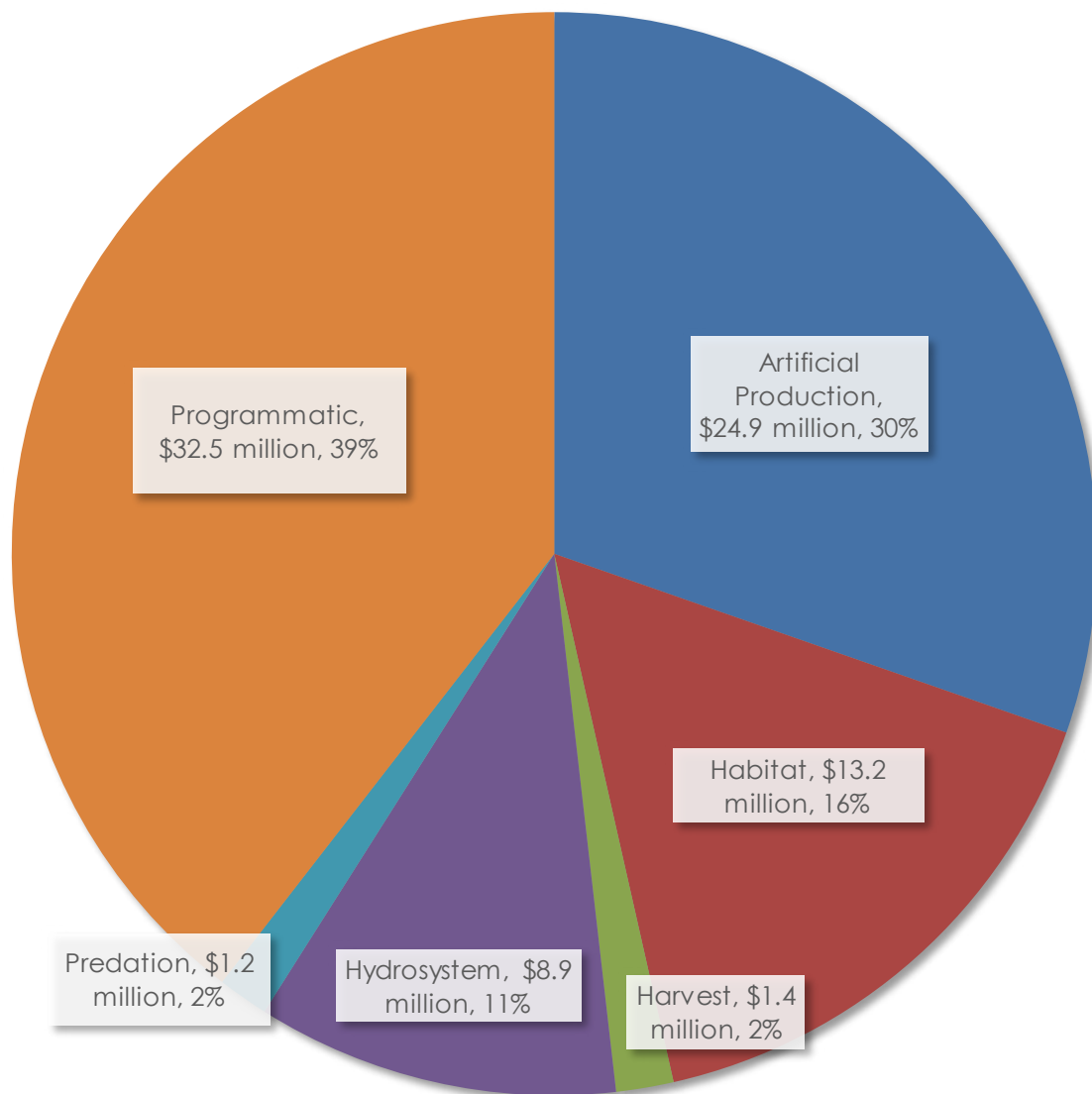
2) FY2016 reviewed on February 22, 2018, no changes.

Source: Bonneville Power Administration



Figure 7: Costs of Research, Monitoring and Evaluation (RM&E), FY2017

Total: \$82.2 million does not include obligations to capital projects



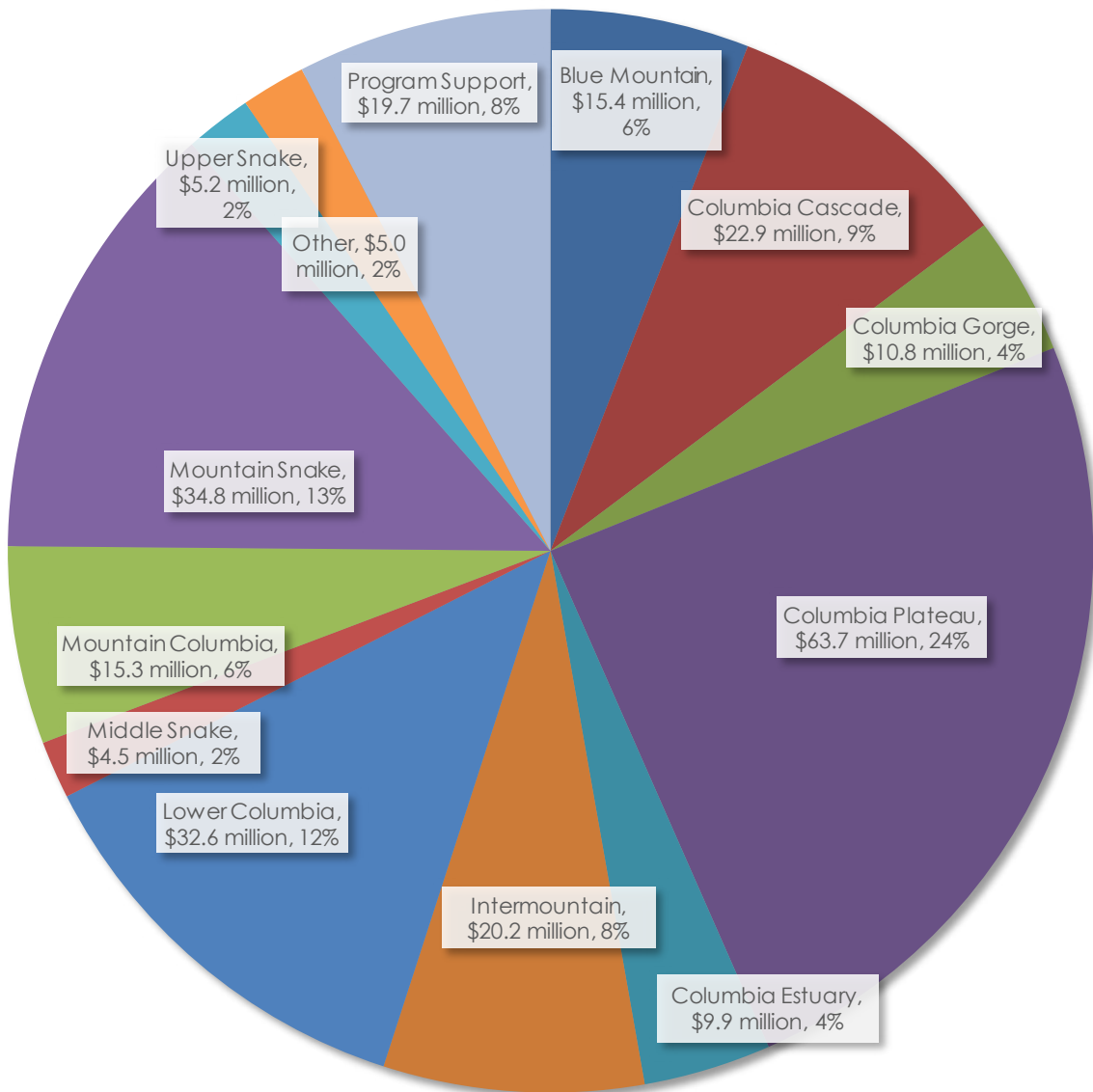
1) Estimated spending is based at the project level. Therefore if a project is labeled Artificial Production, but also supports Habitat, the expenditures are counted as Artificial Production.

2) The term “Programmatic” is used to describe projects whose purpose is broader than a specific project or region, but falls under the larger umbrella of the overall Fish and Wildlife Program. Examples include projects such as Coded Wire Tags, Climate Change Impacts, the Integrated Status and Effectiveness Monitoring Program, the Comparative Survival Study, and the Fish Passage Center.

Source: Bonneville Power Administration

Figure 8: Costs by Province, FY2017

Total: \$260.0 million includes \$5.4 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 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) FY2016 revised as of February 22, 2018.

Source: Bonneville Power Administration

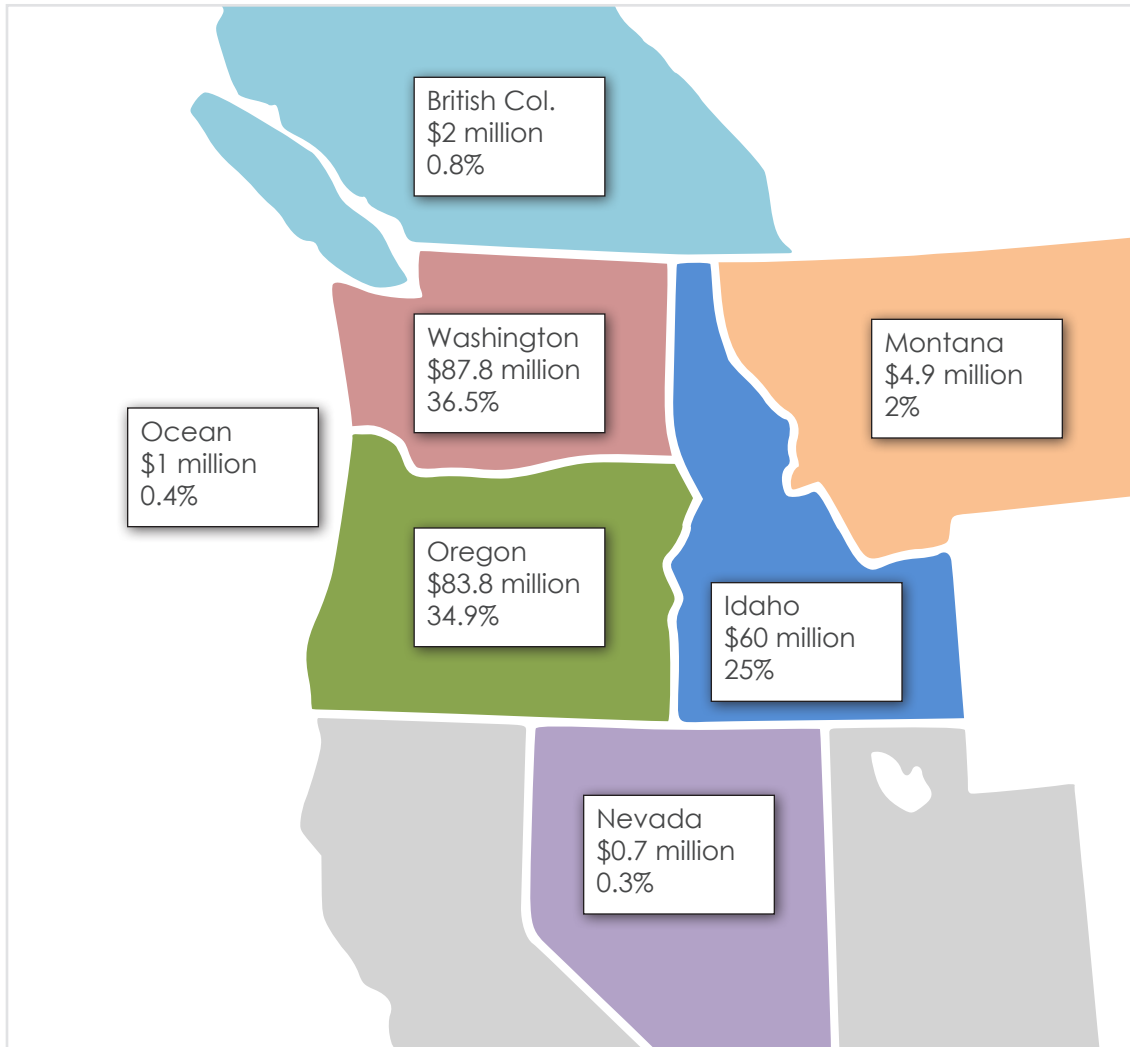


Province Map



Figure 9: Costs by Work Element Location, FY2017

Total: \$260.0 million includes \$5.4 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 (\$19.7 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.

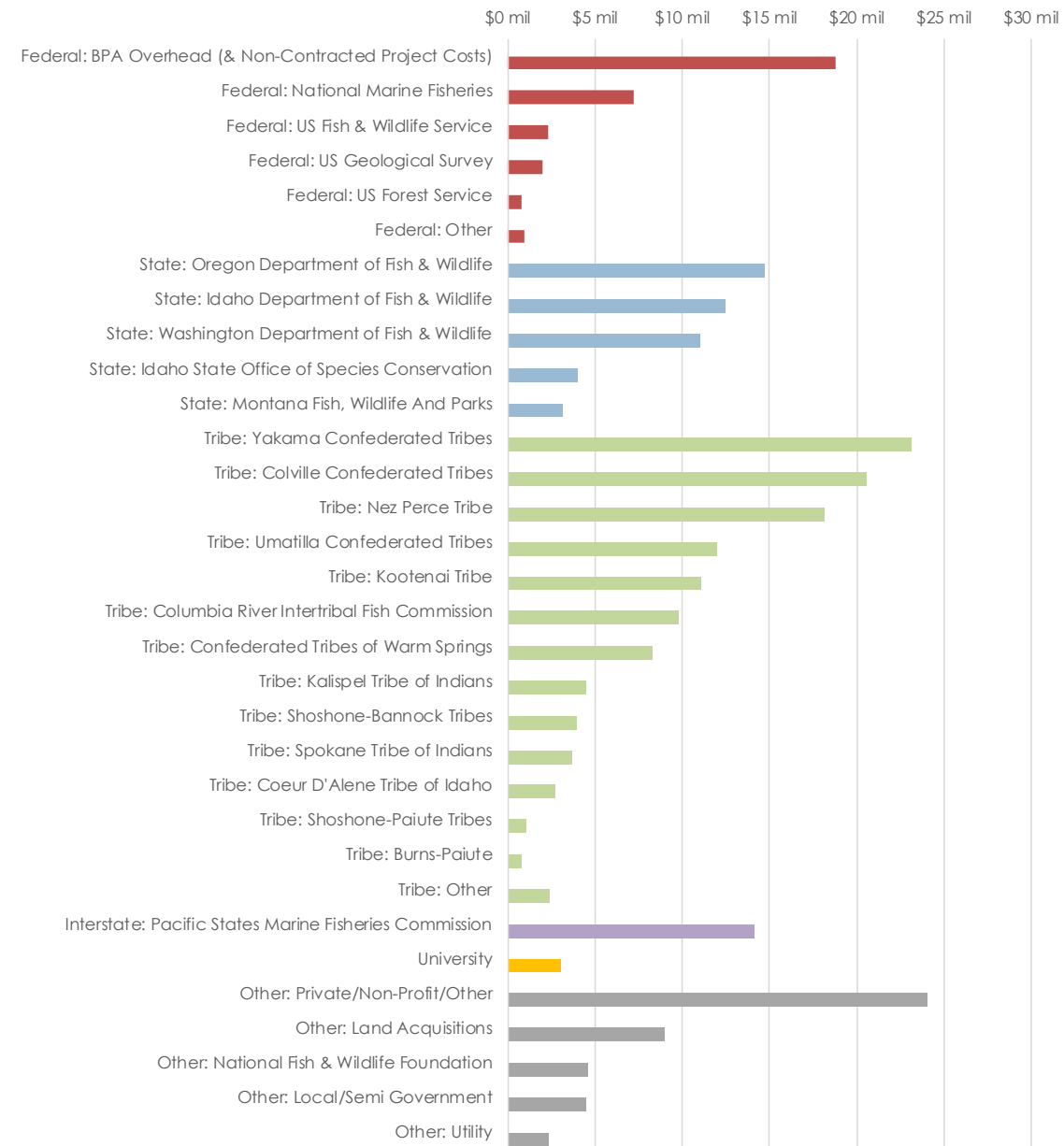
3) FY2016 revised as of February 22, 2018.

Source: Bonneville Power Administration



Figure 10: Costs by Contractor Types, FY2017

Total: \$260.0 million includes \$5.4 million in obligations to capital projects

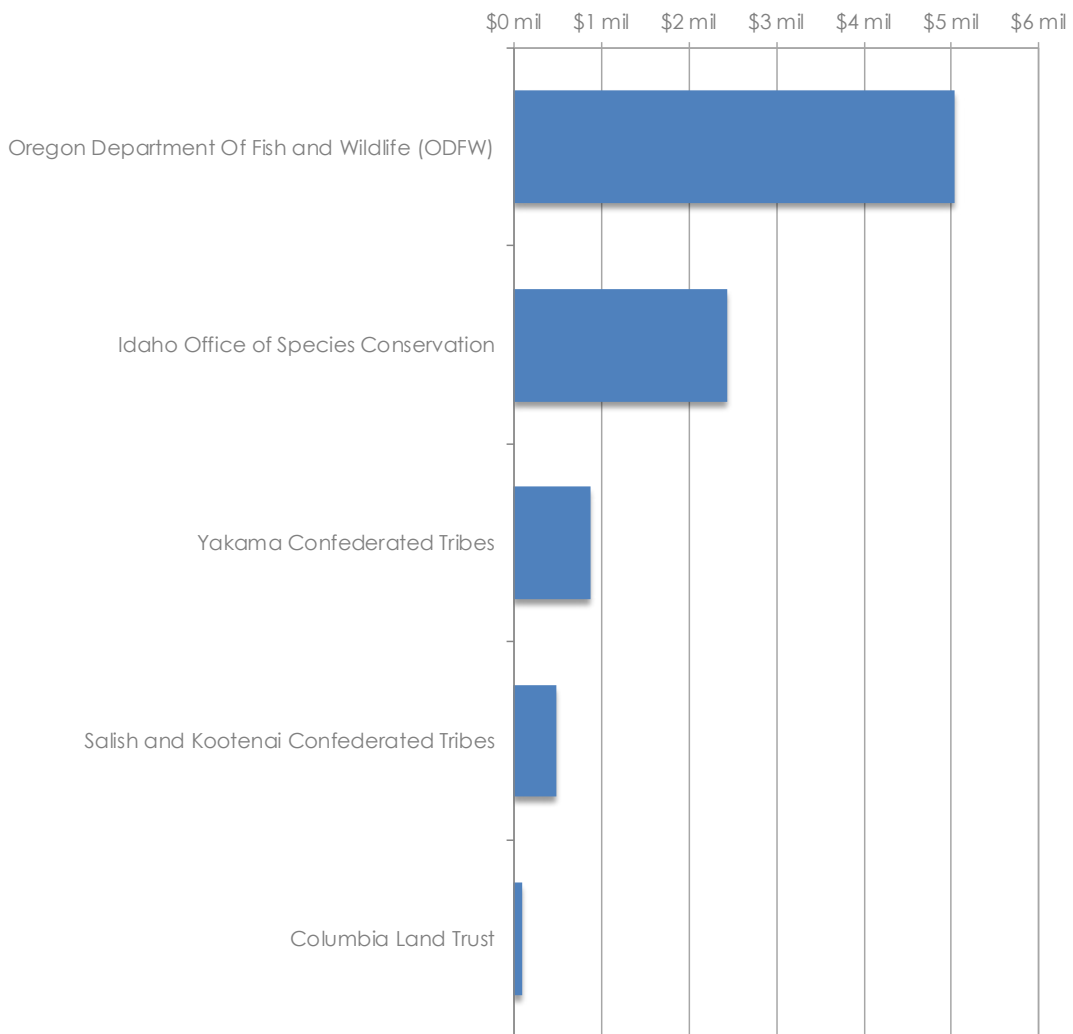


- 1) Values above include accruals.
- 2) Starting in FY13, land acquisition values may include stewardship costs for long-term operations and maintenance (O&M).
- 3) FY2015 reviewed as of March 10, 2017, no changes.
- 4) Local/Semi Government means city, county, soil and water conservation districts, and watershed council entities
- 5) "Federal: BPA Overhead (and Non-contractoed Project Costs)" refers to BPA overhead costs and also non-contracted project costs such as PIT tag costs, utilities, advertising, NEPA, and expenses involving ancillary land acquisition expenses

Source: Bonneville Power Administration

Figure 11: Costs of Land Purchases for Fish and Wildlife Habitat, FY2017

Total: \$9 million



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

2) Starting in FY2013, land acquisition values may include stewardship costs for long-term operations and maintenance (O&M).

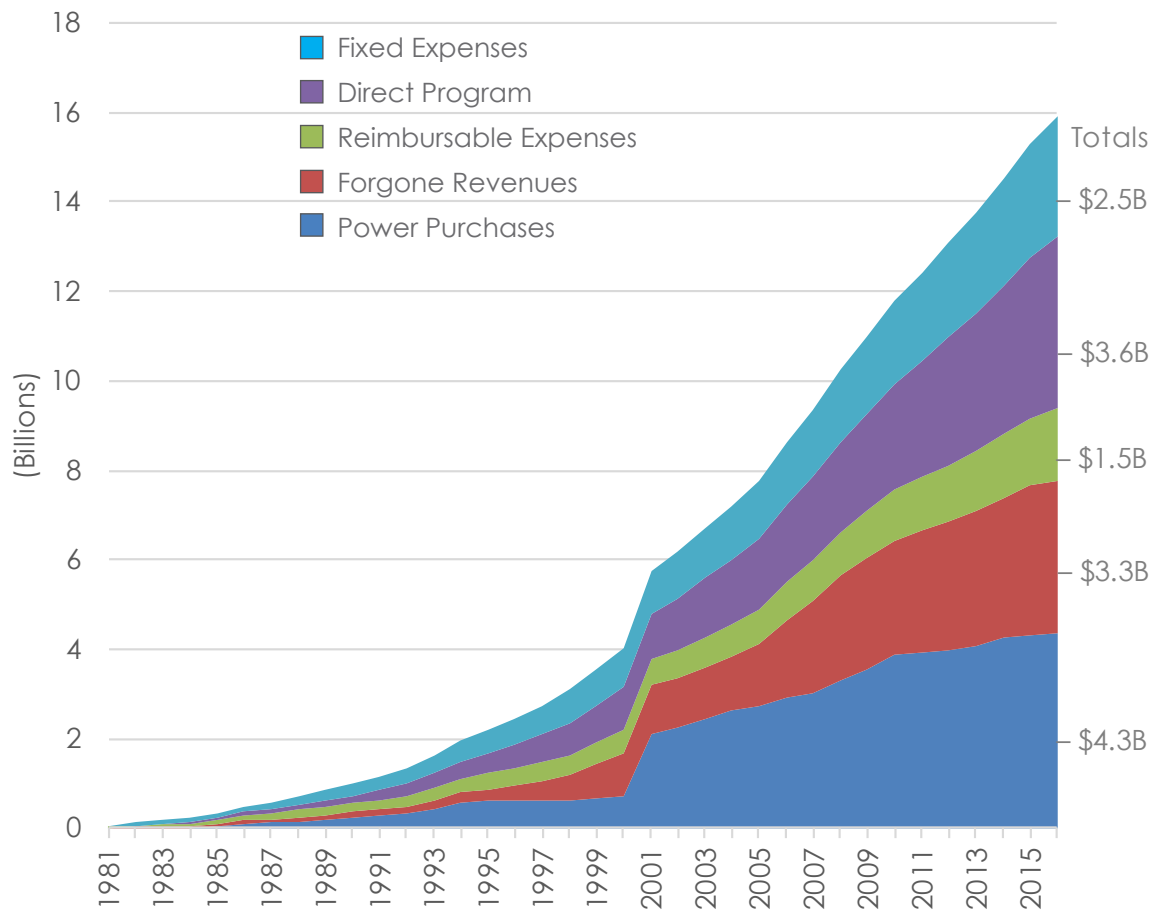
3) FY2016, no changes as of February 22, 2018.

Source: Bonneville Power Administration



Figure 12: Cumulative Costs 1981-2017, by Major Spending Area

Total: \$16.4 billion does not reflect \$2.78 billion in obligations to capital projects or \$2.19 billion in credits



Source: Bonneville Power Administration

Endnotes

ⁱ 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 over a certain amount 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.

ⁱⁱ The 2017 costs bring the grand total of all fish and wildlife program costs incurred by Bonneville from 1978 when the costs began to approximately \$16.34 billion. The total does not include \$2.78 billion in annual obligations to capital investments (the actual annual costs are captured in the “fixed costs” category), or \$2.19 billion in credits applied to Bonneville’s Treasury debt (discussed above).

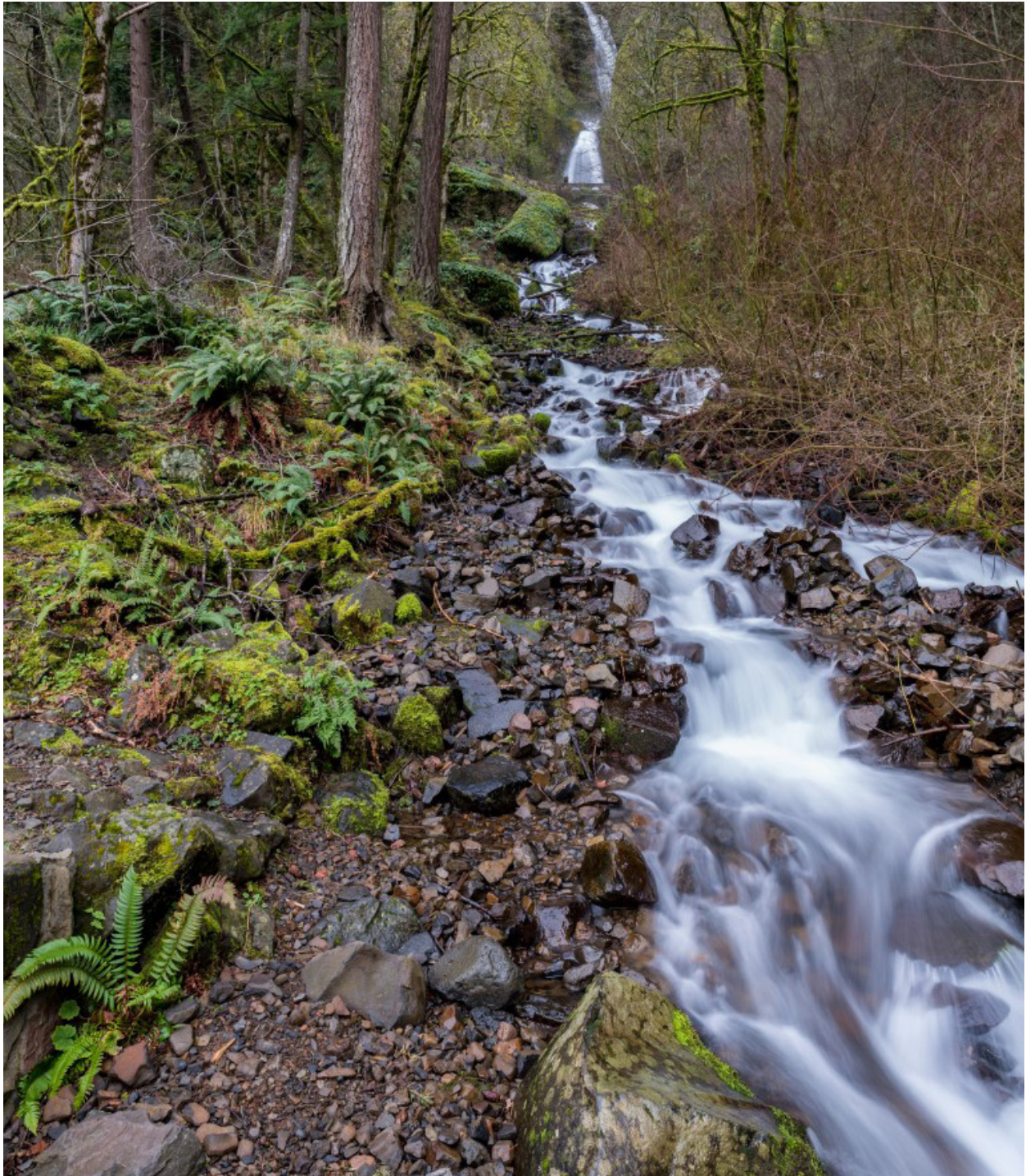
Here, in descending order, is a breakdown of the major cost categories:

- \$4.08 billion for the Council’s direct program. This amount does not include annual commitments to capital investments in the direct program.
- \$2.81 billion in fixed expenses for interest, amortization, and depreciation on the capital investments.
- \$1.69 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 control devices.
- \$3.42 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.
- \$4.34 billion for power purchases to meet electricity-demand requirements in response to river and dam operations that benefit fish but reduce hydropower generation.

ⁱⁱⁱ BPA Priority Firm Tier 1 rate 2018-19. See www.bpa.gov/Finance/RateInformation/Pages/Current-Power-Rates.aspx

^{iv} 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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