

**Second Annual Report to the Northwest Governors
On Expenditures of the Bonneville Power Administration**

**to Implement the Columbia River Basin Fish and Wildlife Program
Of the Northwest Power Planning Council**

November 2002

Council Document 2002-13



Executive Summary

For Columbia River Basin fish and wildlife, particularly salmon and steelhead, 2001 was a year of extreme contrasts and extreme expenses. It was a year when record runs of salmon and steelhead returned from the Pacific Ocean — nearly double the number of fish that returned in 2000 — only to encounter the second-lowest Columbia River runoff in 73 years of record keeping. It was a year when hydropower dam operations to benefit fish were greatly curtailed compared to a normal water year. It was also a year when a lingering drought knocked 4,000 megawatts out of the region's hydropower supply — nearly enough electricity for four Seattles — and wholesale power prices shot up to ten times normal levels.

In this second annual report to the Governors of Idaho, Montana, Oregon and Washington, the Northwest Power Planning Council provides an update of the Bonneville Power Administration's fish and wildlife expenditures through Fiscal Year 2001. Bonneville is the federal agency that sells the output of 31 federal dams and one non-federal nuclear plant in the Columbia River Basin. Bonneville's expenditures implement the Council's Columbia River Basin Fish and Wildlife Program and also requirements of the 2000 Biological Opinions on hydropower operations issued by the National Marine Fisheries Service, for salmon and steelhead, and by the U.S. Fish and Wildlife Service for bull trout and Kootenai River white sturgeon. These expenditures, detailed later in this report,

include both on-the-ground efforts and river operations that affect hydropower.

In the unusually dry year of 2001, the revenue impacts of river operations were extraordinary. Bonneville estimates power purchases and forgone revenues, respectively — increased costs and reduced revenues, respectively — that result from the annual water storage and river operations requirements adopted to protect fish from the impacts of the Columbia River Basin hydropower system, or to mitigate for those impacts, including protection for threatened and endangered species. For Bonneville, reduced hydropower production can result in both increased costs for power purchases and lost revenues from hydropower sales it could not make.

Because of these non-power requirements, Bonneville at times has to buy power from other suppliers in order to meet its load requirements, or forgoes power sales in order to meet fish operations requirements. Given the power system reliability issues posed by drought and high power market price conditions in 2001, Bonneville determined it could not fully meet fish operations requirements and declared a power system emergency in the spring that lasted for six months.

As a result of the extreme weather and power conditions, Bonneville's estimated power purchases and forgone revenues to offset the power that was not generated due to fish operations

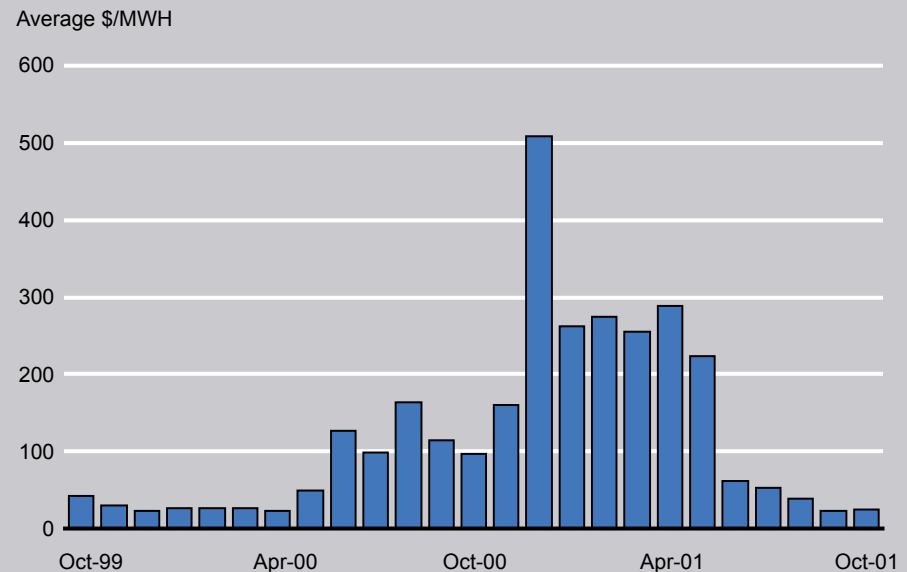
at Columbia and Snake river dams totaled \$1.5 billion in 2001. This one year of costs accounts for 25 percent of Bonneville's total fish and wildlife costs since 1978. Primarily, these costs were due to power purchases in the first several months of the year, when market prices were high and Bonneville sought to meet the April 10 reservoir levels stipulated in the Biological Opinions. For example, in January 2001, the average price during heavy load hours at the Mid Columbia trading hub was \$262 per megawatt-hour. Prices began to decline in May and by December

had reached a more normal \$26 per megawatt-hour, a ten-fold reduction. If energy prices had been at that normal level for the entire year, Bonneville's cost of forgone revenue and power purchases would have been \$122.3 million.

The grand total of Bonneville's fish and wildlife expenditures, 1978 through 2001, now stands at \$6.01 billion. Here is the breakdown:

- \$2.17 billion for power purchases to meet load requirements in response

FIG 1
Dow-Jones
Monthly Average Prices, Mid-Columbia Market
October 1999 - October 2001



to required river operations that reduce hydropower generation.

- \$1.27 billion in forgone revenues. This is the calculated value of hydropower that could not be sold because of required river operations to improve fish survival, such as water spills at the dams.
- \$1.02 billion to implement the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program. These expenditures are for on-the-ground efforts such as habitat improvements, habitat purchases, research, fish production, and so on. The Council is working to integrate onsite

mitigation objectives of the 2000 Biological Opinions on hydropower operations into the fish and wildlife program. More information about the Council's program, including details of projects that are being implemented through the program, is available at the Council's website, www.nwcouncil.org.

- \$957.7 million for fixed expenses, primarily debt service on federal bonds issued to pay for capital investments at the dams.
- \$582.9 million to reimburse the Federal Treasury for the power share of other federal agency efforts, primarily those of the U.S. Army

Corps of Engineers, to improve fish and wildlife survival apart from the Council's program. Primarily, this is for fish passage improvements at federal dams and federal hatcheries.

In addition, Bonneville funded a number of "High Priority" projects designed to provide on-the-ground, immediate biological benefits to ESA-listed anadromous fish as well as a number of "Action Plan" projects designed to benefit stocks affected by the declaration of a power emergency in 2001. As of August 2002, \$7.4 million had been contracted for the Action Plan projects and \$10.3 million had been contracted for the High Priority projects.



Background

In July 1999, the four Northwest Governors asked the Northwest Power Planning Council to begin reporting annually on expenditures of the Bonneville Power Administration to implement the Council's Columbia River Basin Fish and Wildlife Program. The Governors directed the Council to provide an accounting and assessment of those expenditures, and to devise a method of assessing the response of the basin's fish and wildlife resources to funding decisions.

The Council issued its inaugural report in January 2001. That report included, at the Governors' request, historical documentation on past

expenditures and program successes and failures. This second report includes updated information on Bonneville's expenditures and also information about Columbia River salmon and steelhead runs and fisheries.

The Northwest Power Act and the Power Planning Council

The Northwest Power Act of 1980, the federal law that authorized the states of Idaho, Montana, Oregon and Washington to form the Northwest Power Planning Council, directs the Council to prepare a program to protect, mitigate and enhance fish and wildlife of the Columbia River Basin that have been affected by

hydropower. The Act also directs the Administrator of the Bonneville Power Administration, the federal agency that sells electricity generated at federal dams in the Columbia River Basin, to use the Bonneville fund in a manner consistent with the Council's program. The Council has amended its program periodically since 1982, when the first program was adopted. The current program was adopted in October 2000.

The Columbia River Basin Fish and Wildlife Program

The Council is a planning, policy-making and reviewing body. Consistent with the Northwest Power Act, the Council develops the fish and wildlife program and monitors its implementation. The program is implemented primarily by Bonneville but also by the region's fish and wildlife agencies and tribes, the U.S. Army Corps of Engineers, the Bureau of Reclamation and the Federal Energy Regulatory Commission and its licensees.

The program directs scientific research, habitat protection, including acquisitions and easements, construction projects to improve habitat and fish passage, hatchery development and operation, and also establishes certain reservoir elevations and flow requirements to protect anadromous and resident fish and their habitat. Other measures call for using stored water to maintain appropriate water temperatures and protect streambeds.

A Broad Focus on All Fish and Wildlife

The Council's program addresses hydropower impacts on all fish and wildlife of the Columbia River Basin. These species include anadromous (ocean-going) fish such as salmon and steelhead, resident fish (those that live and migrate only in freshwater) and wildlife. Hydroelectric projects created a number of problems for fish and wildlife including mammals and birds. Dams altered river flows, inundated spawning, rearing and shoreline habitat areas and blocked natural migration patterns. For some species, the creation of reservoirs behind the dams created new habitat by flooding shoreline areas. Waterfowl such as migratory ducks and geese particularly benefited in this way, and the Council's program accounts for these habitat gains in calculating net habitat losses.

The Council has a broad mandate regarding fish and wildlife mitigation in the Columbia basin and has worked to incorporate the needs of listed species with its broader obligation to protect, mitigate, and enhance fish and wildlife species harmed by the construction and operation of the hydropower system.

Project Reviews and Subbasin Planning

Through an annual process since 1996, the Council and Bonneville solicit projects to implement the program. The Council submits project proposals for





review by the Columbia Basin Fish and Wildlife Authority,¹ the Independent Scientific Review Panel² and the general public and then recommends projects to Bonneville for funding.

recommendations will be based on these plans, which the Council anticipates completing and amending into the fish and wildlife program by mid-2004.

Currently, the Council is transitioning from an annual cycle for project review and recommendation to a three-year cycle and also is working with state and federal fish and wildlife agencies, Indian tribes and watershed-based citizen organizations to develop comprehensive plans for each of the 62 tributary subbasins of the Columbia River. Future project solicitations, review and

¹ The Authority is an association of state and federal fish and wildlife agencies and the 13 Indian tribes in the Columbia River Basin. The Authority coordinates planning and implementation of fish and wildlife management issues among its members.

² The Independent Scientific Review Panel was created by the Council in response to a 1996 amendment to the Northwest Power Act that called for greater scientific scrutiny and public accountability of expenditures through the Council's program. The 11 members of the Panel are nominated by the National Academy of Sciences and appointed by the Council.

Bonneville's Fish and Wildlife Expenditures

Bonneville reports its fish and wildlife expenditures as the combined totals of spending on 1) the Council's direct program, 2) federal agency operation and maintenance costs that are funded directly by Bonneville (formerly reimbursed by Bonneville), 3) the repayment to the Federal Treasury of the power share of capital investments for fish and wildlife projects, and 4) revenue impacts, which are the estimated net impacts on Bonneville's revenue from

adjusting dam operations to benefit fish. These revenue impacts include forgone revenues and power purchases. Under the terms of a six-year memorandum of agreement (MOA) signed by federal agencies in 1996, Bonneville's annual fish and wildlife budgets were anticipated to average \$435 million, of which \$127 million was estimated for direct funding of the expense component of the Council's program, \$125³ million was estimated for capital investments and reimbursements,

and \$183 million was estimated for revenue impacts from adjusting dam operations to benefit fish. That agreement expired at the end of Fiscal Year 2001 and was not renewed.

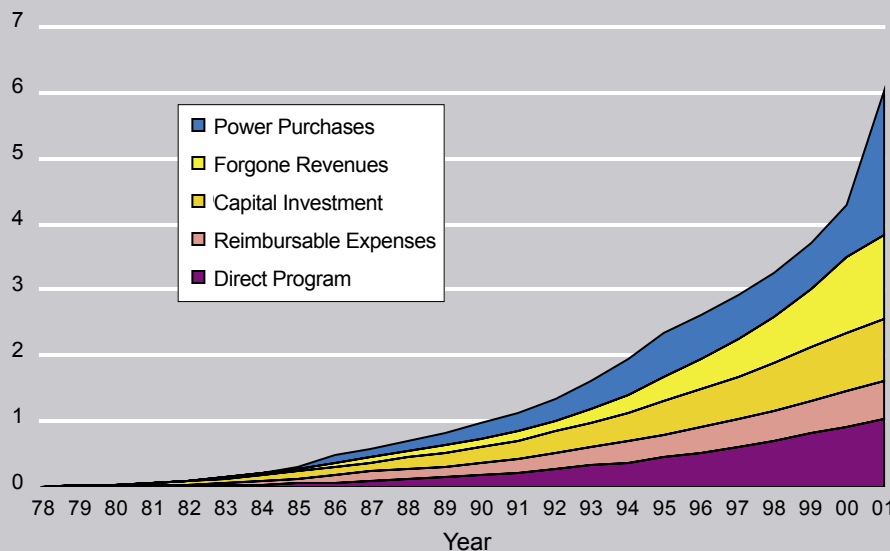
However, Bonneville committed to increase its spending to implement the Council's fish and wildlife program during the current rate case period, 2002-2006. In December 2001, Bonneville Administrator Steve Wright announced that the agency's target budget level for the Council's program, which integrates 2000 Biological Opinion measures, would increase in the new rate period to a range that averages \$186 million per year.⁴ The increase reflects 1) the fact that the Council's base program is growing as projects are implemented over multiple years, and 2) that implementation of the Council's program is being increasingly integrated with implementation of the reasonable and prudent alternatives of the 2000 Biological Opinions on operations of the Federal Columbia River Power System.

grows. Second, each year the Council will receive recommendations for new, scientifically sound projects that will have to compete with ongoing projects for funding. Third, a number of new projects will be designed to address both the Council's program and the requirements of the 2000 Biological Opinions on hydropower operations. Integrating those two planning efforts is an important long-term goal for the Council that would benefit all fish and wildlife in the basin. While acknowledging the challenges of prioritizing among competing demands, the Council will continue to work with Bonneville and the region to ensure that the projects recommended to implement the program are scientifically credible and economically responsible.

The \$186 million figure represents a substantial increase over spending commitments in the now-expired memorandum of agreement. Nonetheless, challenges remain for the Council in working within the funding guidelines. First, the base expenses for the program are growing as the program

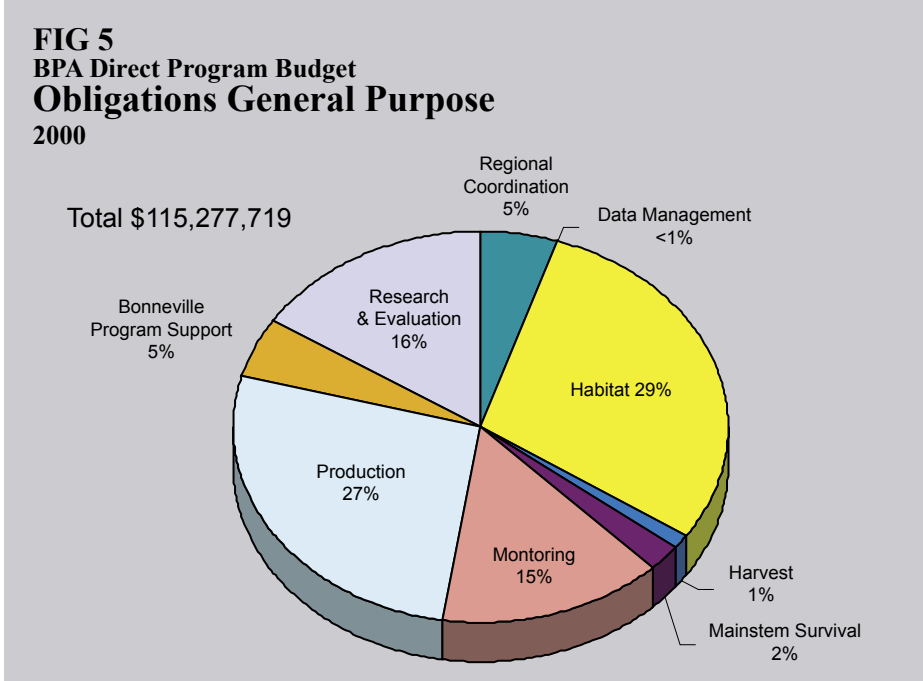
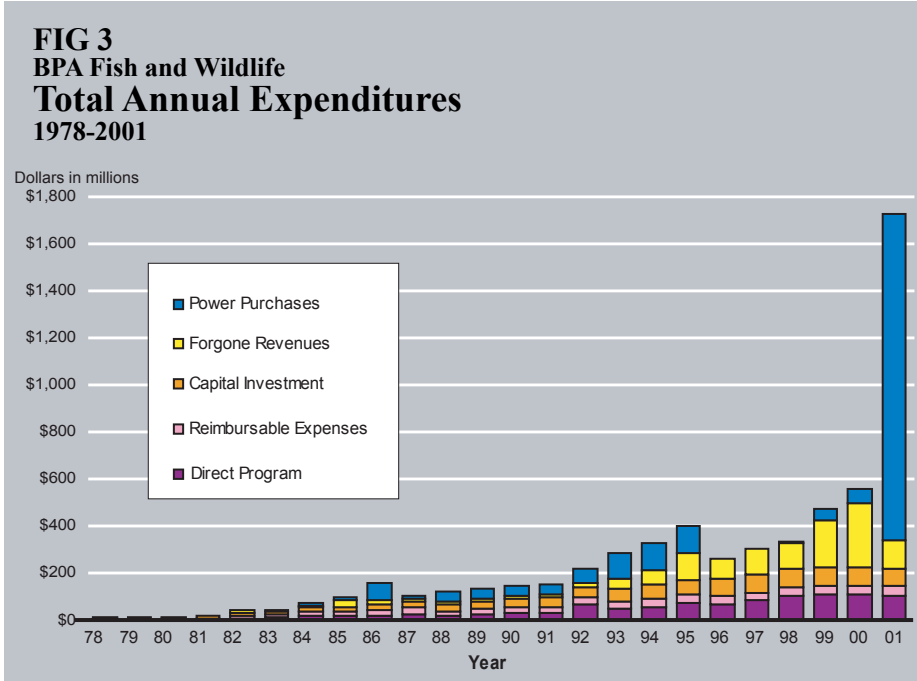
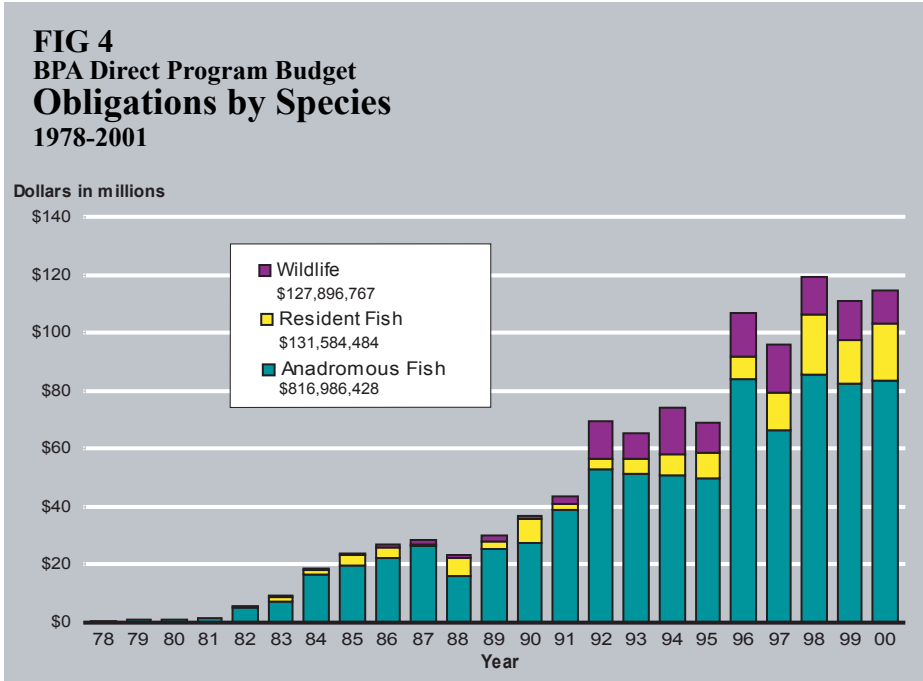
FIG 2
BPA Fish and Wildlife
Cumulative Expenditures
1978-2001

Dollars in Billions



³ The \$127 million for the direct program comprised \$100 million in direct expenditures and \$27 million from the capital budget.

⁴ This figure includes \$150 million in expenses and \$36 million in capital borrowing per year.



Total Expenditures through Fiscal Year 2001

From 1978 through Fiscal Year 2001, Bonneville's fish and wildlife expenditures to implement the Council's program totalled \$6.01 billion. This represents a net increase of about \$2.5 billion from the cumulative total of \$3.5 billion we reported in our inaugural report in 2001, which covered the years 1978-1999. That total figure, however, did not include the cost of two key elements of fish and wildlife program expenditures in 1999. Power purchases and forgone revenues have been calculated since then and are included in the new total.⁵

Power Purchases Attributed to Fish Operations at the Dams

Of the \$6.01 billion spending total for the years 1978-2001, \$1.39 billion, or 23 percent, represents a calculation of power purchases attributable to fish operations at the dams in Fiscal Year 2001 alone. In general, power purchases that Bonneville attributes to fish operations are for lost energy production caused by spill, flow augmentation, lowered forebay elevations at the dams or other hydropower operations for fish required by the federal Biological Opinions, such as requirements for water storage in upstream reservoirs. Bonneville also purchases power to meet load — the demand of its customers. Power purchases to support fish operations are distinct from forgone revenues, which Bonneville also includes

in its accounting of total fish and wildlife costs. Forgone revenues are discussed in the next section of this report.

In its Fiscal Year 2001 annual report, Bonneville reported that its total power purchase costs increased by 262 percent compared to 2000, and that it had to purchase 137 percent more megawatt hours in 2001 than in 2000. According to the report, Bonneville's total expenditure for power in 2001 was \$2.29 billion — \$1.39 billion of this attributable to fish operations required by the Biological Opinions.

As noted earlier, because of California's energy crisis and the drought, 2001 was a year of extraordinarily high power prices for all West Coast power purchasers, including Bonneville. Like other power purchasers, Bonneville was forced into a West Coast power market characterized for the first several months of the year by tight supplies and high prices. In fact, in 2001 the relative cost in terms of power purchases of all dam operations, including non-power operations such as irrigation, recreation, flood control and navigation, rose to unprecedented levels.

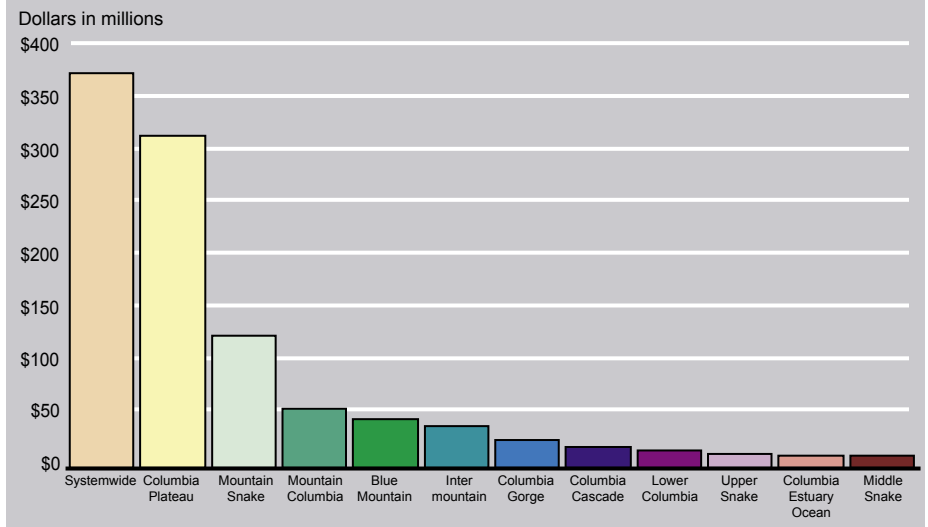
Collectively, non-power uses of the dams account for 23 percent of their authorized purposes; hydropower accounts for 77 percent. Bonneville pays all of the costs of dam operations

and then receives a credit against its annual debt-service payment to the U.S. Treasury for the 23 percent attributable to non-power uses. In 2001, the credit amounted to \$337 million (23 percent of \$1.39 billion), according to figures provided by Bonneville. In addition, Bonneville also received a credit of \$247 million in 2001 because of the power emergency. That money represented a portion of the credits that had accumulated over time. Thus, Bonneville received a credit against its Treasury payment of \$584 million in 2001, and so

the net power purchase costs attributable to fish operations were \$806 million.

To determine how much of its power purchases to attribute to fish operations, Bonneville performs two annual calculations of its total power purchases — one that includes the Biological Opinion requirements for river operations and one that does not. Bonneville attributes the difference in power purchases to the fish requirements and, therefore, assigns the costs to its fish and wildlife budget. It is difficult to distinguish power purchases that

FIG 6
BPA Direct Program Budget
Obligations by Province
1978-2001



⁵ For the inaugural report, Bonneville was not able to provide figures for forgone revenues (\$197.8 million) and power purchases (\$47.6 million) in 1999.

occur in response to fish operations at the dams from purchases that occur to meet demand for power. Water that is run through a dam for power purposes may also benefit fish downstream by keeping river levels higher than they would be otherwise, for example. So rather than use actual river operations like these in its calculations, Bonneville uses an estimate of the firm load carrying capability of the federal hydropower system — without fish operations — as the base and compares this to actual operations to determine how much lost energy production to assign to fish requirements. Rather than actual prices paid for power, Bonneville uses the Dow-

Jones Mid-Columbia average monthly price of bulk electricity to calculate the value of the power purchases. These calculations yield average losses and costs, which Bonneville believes is the fairest method of calculating them, as actual costs and power purchases will vary through the year.

Forgone Power Revenues Attributed to Fish Operations at the Dams

Of the \$6.01 billion spending total, approximately 20 percent (\$1.2 billion) was attributed to forgone hydropower revenues. These revenues were not realized due to lost energy production

caused by spill, flow augmentation, lowered forebay elevations at the dams or other hydropower operations required by the Council's program and the Biological Opinions.

To determine forgone revenues, Bonneville calculates the net value of the hydropower revenues gained and lost as a result of the fish measures. During average and near-average water years, Bonneville can absorb forgone revenues and still meet its financial obligations. In drier years, when the reduced water supply means less available hydropower, unrealized income from lost power sales becomes more controversial because of the impact on Bonneville's budget — especially if Bonneville has to purchase energy at other times of the year or raise its rates to compensate for lost revenues.

As with power purchases, not all spill is related to the fish operations. For example, from time to time water is evacuated from reservoirs for flood control purposes (sometimes through spill) or because there is no market at the moment for hydropower. Bonneville prepared such an accounting for spills that occurred between 1997 and 2000, and the data was reported by NOAA Fisheries in annual reports to the Oregon Department of Environmental Quality. While the amounts varied, less than half of the spill in those years was in response to fish operations, according to the Fish Passage Center. Forgone revenues that result from these river operations have not been calculated separately for this report, but the Council

will work with Bonneville to provide such an accounting in future reports.

2001 was a dry year, but Bonneville's forgone revenues and increased power purchase costs were lower than they might have been because, as noted at the beginning of this report, Bonneville declared a power emergency and provided only a portion of the required fish measures. For the year, Bonneville reported forgone revenues of \$115.9 million. That is less than in 2000, when forgone revenues totaled \$193.1 million, but significantly less water was spilled at the dams in 2001 than in 2000.

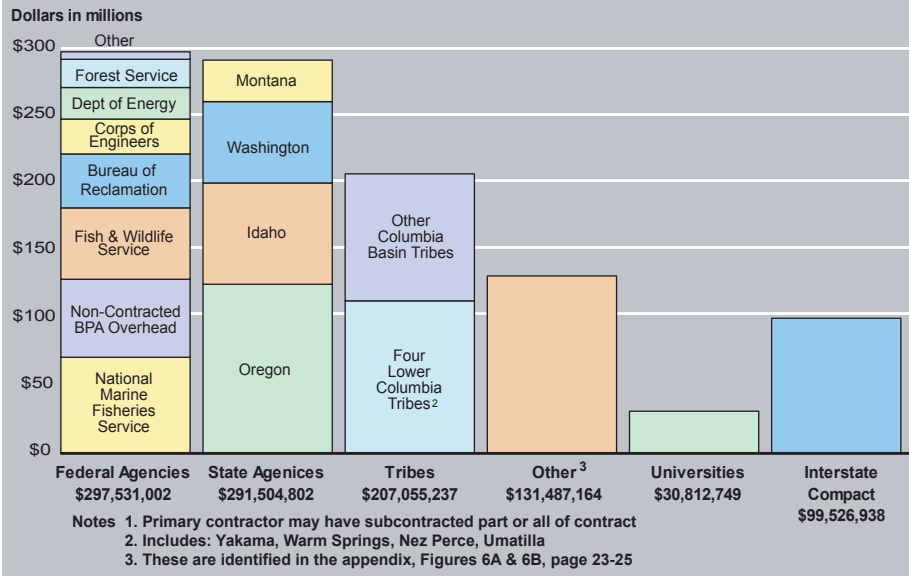
Direct Program Expenditures

The direct program, for which the Council provides oversight, accounted for \$1.02 billion between 1978 and 2001. This is approximately 16.9 percent of the total expenditures for that period.⁶

Bonneville provided a breakdown of its direct-program obligations by major categories for Fiscal Year 2000, but not for 2001. Figures for that year still were being calculated when this report was compiled.

For 2000, in which direct-program expenditures totaled \$115.2 million, habitat projects accounted for \$33.8 million (29.3 percent), artificial production of fish accounted for \$30.6 million (26.5 percent), mainstem Columbia and Snake river habitat expenditures totaled \$2.6 million (2.2 percent)⁷, and fish harvest programs amounted to \$1.2 million (1 percent). Bonneville also reported direct-program obligations of \$18.3 million for research and evaluation (15.8

**FIG 7
BPA Direct Program Budget
Obligations by Prime Contractor¹
1978-1999**



⁶ Direct program expenditures, 1978-2001, total \$1,020,200, or 16.9 percent of \$6,018,800,000.

percent), \$16.9 million for monitoring (14.6 percent), \$5.77 million (5 percent) for regional coordination efforts related to the fish and wildlife program, such as the work of the Columbia Basin Fish and Wildlife Authority, \$97,500 for data management (less than one-tenth of 1 percent) and \$5.72 million (4.9 percent) for Bonneville's internal program support.

It should be noted that Bonneville contracts with project sponsors to implement their projects, but that in most cases these "prime contractors" assign a portion of the work to others. This changes — significantly, in some cases — the amount of money actually received by the various parties that

implement the Council's fish and wildlife program. For example, between 1978 and 1999, the Oregon Department of Fish and Wildlife received \$121.4 million but distributed more than \$33 million of that amount to others — \$11.5 million of it to the Washington Department of Fish and Wildlife, for example. This disaggregated information — following the money from prime contractor to subcontractors — is not readily available for all contracts. But for the years following 2001, the Columbia Basin Fish and Wildlife Authority is able to track estimates of payments that will be made to subcontractors from information provided by project sponsors on their project proposal forms.

In terms of species, Bonneville's direct program obligations in Fiscal Year 2000 included \$83.6 million for anadromous (ocean-going) fish (72.6 percent of the total), \$19.5 million for resident fish (16.9 percent) and \$11.4 million for wildlife (9.9 percent).



⁷ This does not include the cost of improving fish passage survival at federal dams, which are reported separately. These expenditures are partially reimbursed by Bonneville to the federal agencies that operated the dams, either the U.S. Army Corps of Engineers or the Bureau of Reclamation. In 2000, the reimbursable expenditures totaled \$37.6 million. These are not part of the Council's direct program.

Columbia River Basin Fish and Wildlife

Anadromous Fish

The Northwest Power Act notes the “significant importance” of anadromous fish in the Columbia River basin “to the social and economic well-being of the Pacific Northwest and the Nation” and asserts these fish “are dependent on suitable environmental conditions substantially obtainable from the management and operation of the Federal Columbia River Power System and other power generating facilities on the Columbia River and its tributaries.”⁸

In its 2000 fish and wildlife program revision, the Council established three interim biological objectives for anadromous fish — interim until subbasin plans identify actual targets — that call for halting the decline in salmon and steelhead populations above Bonneville Dam by 2005, restoring the widest set of healthy naturally reproducing populations of salmon and steelhead by 2012 and increasing the total adult run size to 5 million fish by 2025 and, within 100 years, achieving population characteristics that fully mitigate for hydropower-related losses.

Adult fish returns set records in 2001 for many different salmon species, attributable to good out-migration conditions several years ago, improved (cooler) ocean conditions and, of course, Bonneville-funded investments in the

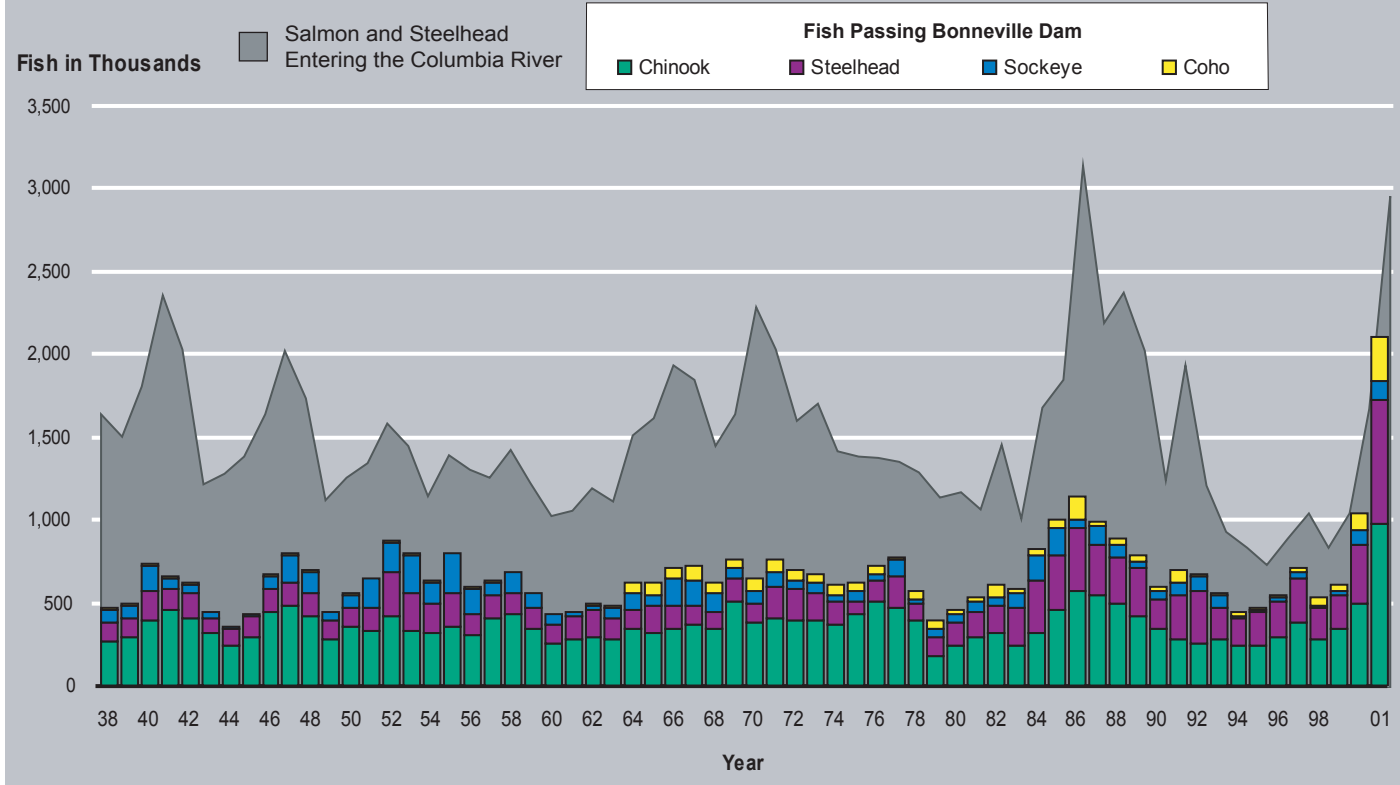
basin. As Figure 7 shows, more than two million salmon and steelhead crossed Bonneville Dam in 2001, exceeding the previous record during that period by almost a million fish. Many of these were hatchery fish, but preliminary indications are that the number of wild fish passing

Bonneville Dam were increasing as well, at least through 2000.

Juvenile fish had a harder time because of the drought, which adversely impacted fish habitat including migration through the hydropower system. To

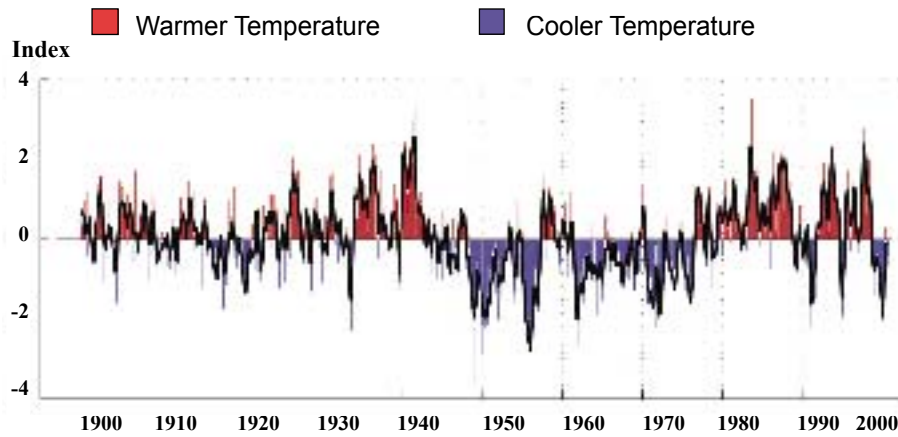
ensure a reliable electricity supply, Bonneville greatly reduced the amount of water spilled over Snake and Columbia River dams — spills requested by the National Marine Fisheries Service to aid the migration of Endangered Species Act-listed juvenile salmon and steelhead

FIG 8
Salmon and Steelhead Entering the Columbia River and Passing Bonneville Dam
1938-2001



⁸ 16 USC 839 (6), also cited as Northwest Power Act Section 2.(6).

FIG 9
Ocean Cycle Temperature Cycles
 1900-2000



to the ocean. Analysis by the Council and the Fisheries Service suggested that the reduced spills increased mortalities of juvenile fish migrating in the river by sending more of them through turbines at the dams if they were not collected for transportation downriver in barges.

However, researchers for the Fisheries Service speculated that even though a smaller percentage of the annual migration survived the inriver migration, favorable ocean conditions may result in a larger percentage of returning adult fish than in recent years when ocean conditions were less favorable. As shown in the figure on ocean temperatures, the north Pacific remains in a cool cycle, and this should encourage good feeding conditions for Columbia Basin salmon. The juvenile fish from the migration of 2001 will begin to return as adults in two to three years.

FIG 10
Spring and Summer Chinook Passing Bonneville Dam
 1977-2001

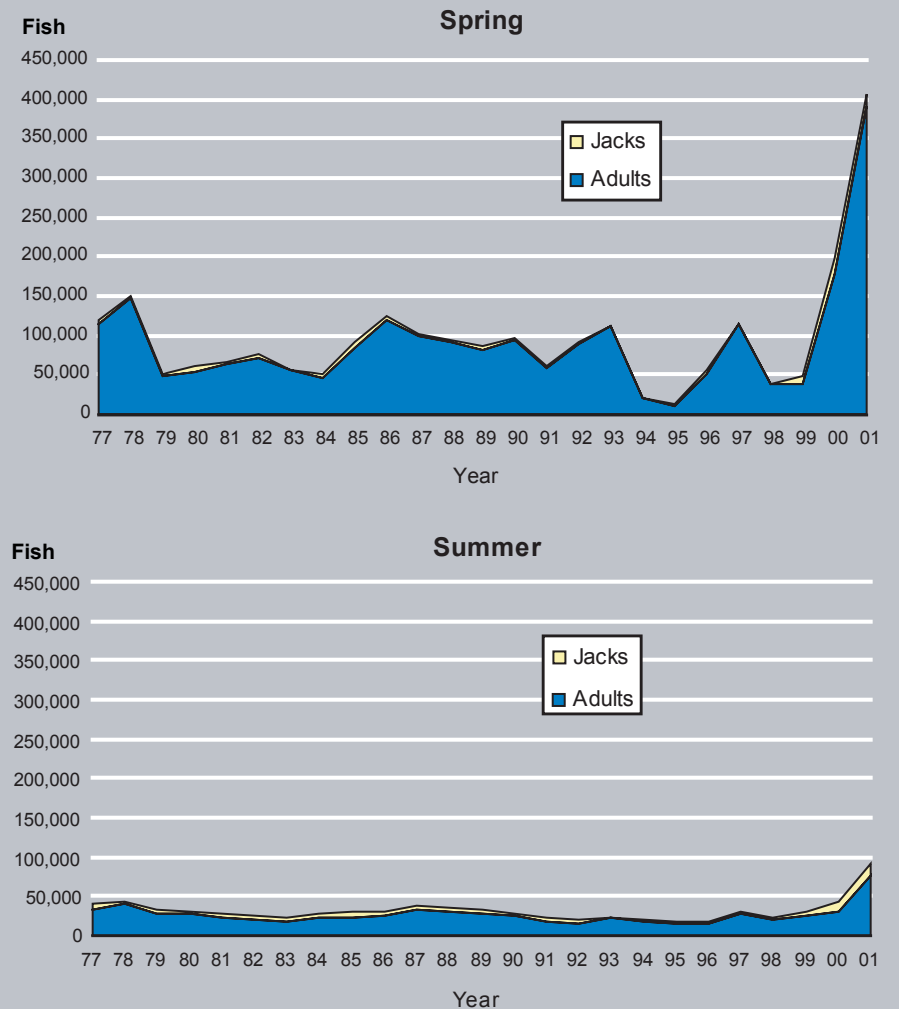
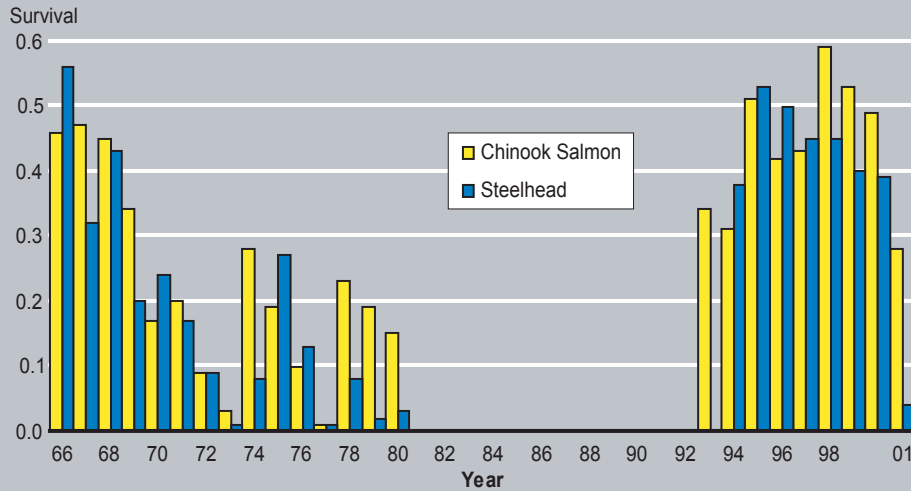


FIG 11
Estimated Inriver Juvenile Survival through the Hydrosystem, Upper Snake through Bonneville Dam 1966-1980, 1993-2001



a Extrapolation based on three dam and reservoirs as survival estimates between Ice Harbor Dam and The Dalles Dam did not change between 1966 and 1970 after completion of John Day Dam in 1968.
 b Based on product of two non-rounded numbers
 c No data for steelhead in this year



FIG 12
Where do the fish go? Fish counted at each mainstem dam, 2001

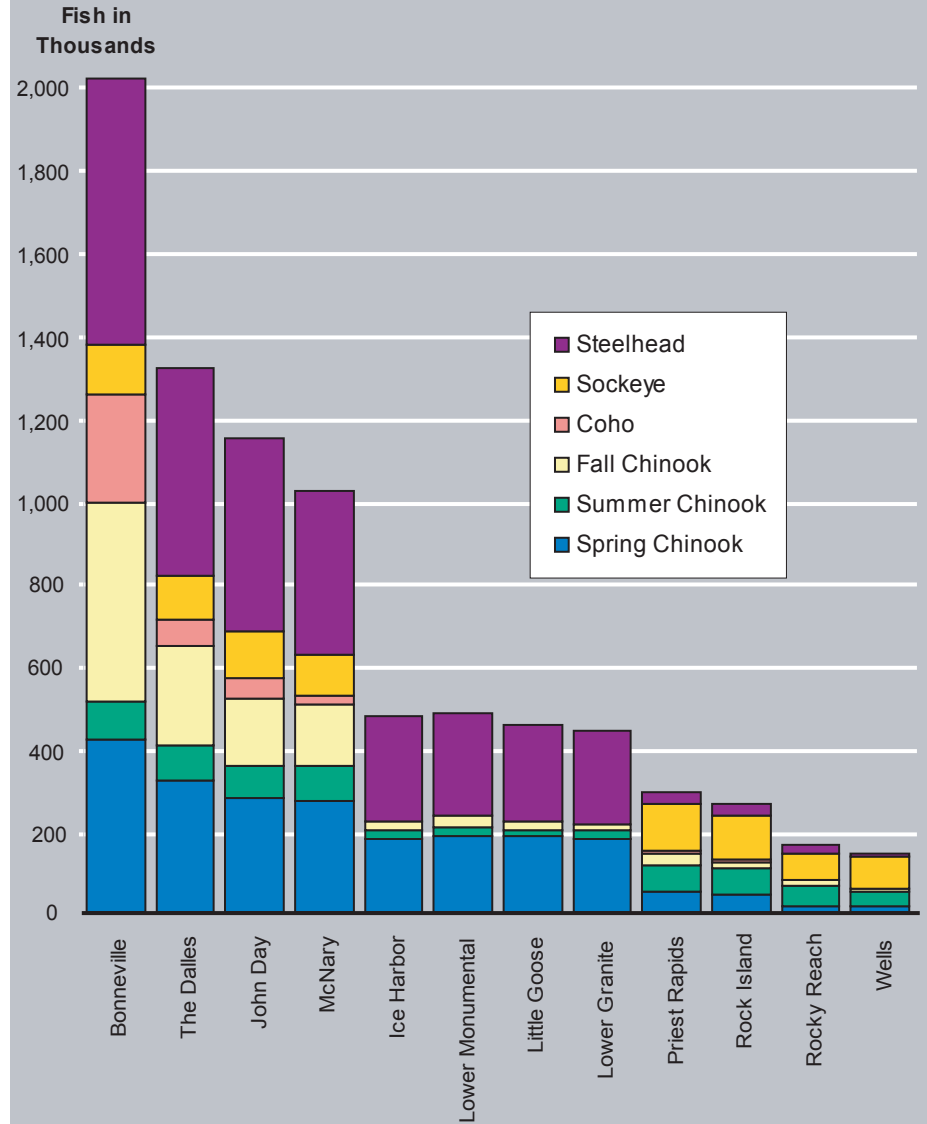


FIG 13
Wild Fish Passing Bonneville Dam
1990-2000

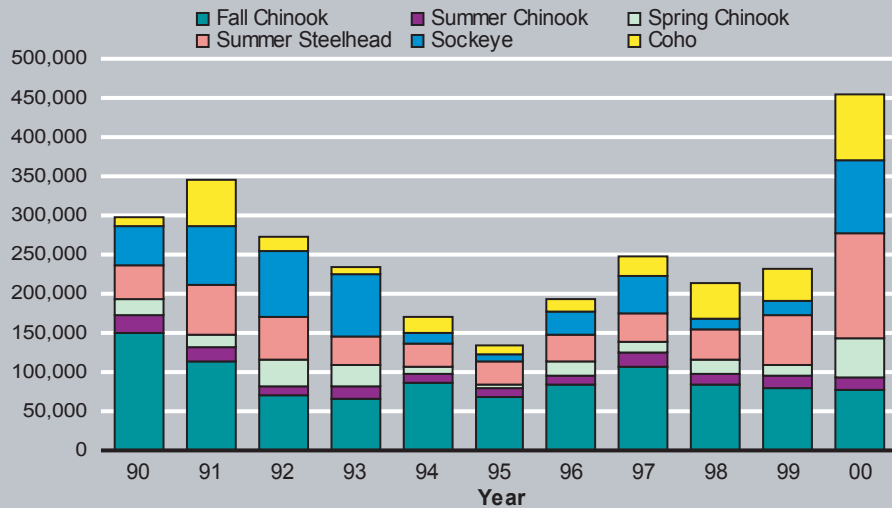
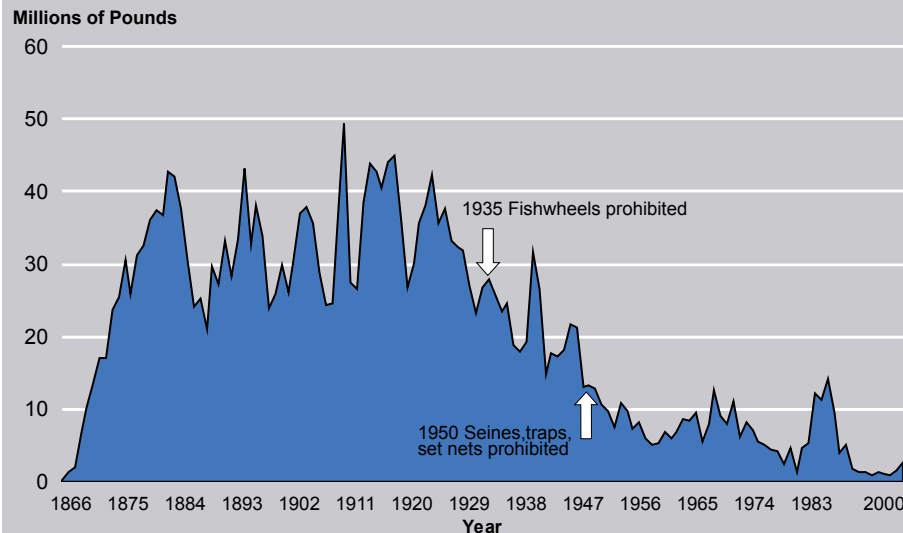


FIG 14
Commercial Landings of Salmon and Steelhead from
the Columbia River
1866-2000



Resident Fish

Resident fish are those that live and migrate within freshwater rivers, streams and lakes of the Columbia River Basin, but do not travel to the ocean. Resident fish exist throughout the basin and are particularly important in areas where anadromous fish runs are blocked by natural or manmade obstructions. Hydroelectric projects created a number of problems for resident fish, altering river flows, inundating spawning and rearing areas and blocking natural migration patterns.

The Council's program addresses resident fish losses caused by hydropower development and operation, and substitution of resident fish to compensate for losses of salmon and steelhead in areas permanently blocked by hydropower projects. In fact, vast areas that once were the destinations for large runs of salmon and steelhead were permanently blocked by the construction and operation of two federal dams, Grand Coulee and Chief Joseph. The program provides mitigation by substituting other fish species primarily through the construction and operation of fish hatcheries, such as those for trout and kokanee in Lake Roosevelt. These facilities provide important and valuable tribal subsistence and public recreational fisheries. An effort also is being made to conserve the endangered white sturgeon in the Kootenai River in Idaho, in conjunction with fish and power agencies in British Columbia where sturgeon spend a portion of their lives.

The program includes a resident fish substitution policy for areas in which

anadromous fish have been extirpated. The policy calls for restoring native and resident fish species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where original habitat conditions exist and where habitats can be feasibly restored. The policy also calls for taking actions to reintroduce anadromous fish into areas blocked by dams, such as above Chief Joseph and Grand Coulee dams, where feasible, and for administering and increasing opportunities for consumptive and non-consumptive resident fisheries for native, introduced, wild and hatchery-reared stocks that are compatible with the continued persistence of native resident fish species and their restoration to near historic abundance. This includes intensive fisheries within closed or isolated systems, and recreational fisheries such as those in Northeastern Washington and Northwestern Montana.

As shown in Figure 3 of the Appendix, between 1978 and 2000 Bonneville's spending for resident fish totaled \$131,584,484. In 2000, the amount was \$19,598,122.

Wildlife

Development of the Columbia Basin hydropower system affected many species of wildlife as well as fish. Some floodplain and riparian habitats important to wildlife were inundated when reservoirs were filled. In some cases, fluctuating water levels caused by dam operations created barren vegetation zones, which expose wildlife to increased predation.

In addition to these reservoir-related effects, a number of other activities associated with hydroelectric development altered land and stream areas in ways that affect wildlife. These include road construction, draining and filling of wetlands, stream channelization, and ongoing operation of the dams. Thus, there are losses attributable to both the construction of

dams and their related facilities and to the continuing operation of the dams.

Through the program, wildlife species affected by hydropower development were identified and loss estimates were determined for each mainstem dam. Mitigation for these losses is measured in terms of habitat units in order to account for habitat quantity (acres) as well as quality. Habitat units are calculated by multiplying a measure of habitat quality for a selected wildlife species by the area of available habitat. When property is acquired for wildlife mitigation purposes, it is evaluated for its suitability to provide food, shelter and reproductive conditions for various species. This suitability is expressed in habitat units.

The Council and Bonneville worked with the region's wildlife managers and Indian tribes to develop a system of

Endangered Species Act Status of Columbia River Basin Fish Populations

Species	Status	Date listed
Sockeye, Snake River	Endangered	1991
Chinook, Snake River Fall-run	Threatened	1992
Chinook, Snake River Spring/Summer-run	Threatened	1992
White Sturgeon, Kootenai River	Endangered	1994
Steelhead, Upper Columbia	Endangered	1997
Steelhead, Snake River Basin	Threatened	1997
Steelhead, Lower Columbia River	Threatened	1998
Bull Trout, Columbia Basin	Threatened	1998
Chinook, Lower Columbia River	Threatened	1999
Chinook, Upper Willamette River	Threatened	1999
Chinook, Upper Columbia River Spring-run	Endangered	1999
Chum, Columbia River	Threatened	1999
Steelhead, Upper Willamette	Threatened	1999
Steelhead, Middle Columbia River	Threatened	1999

crediting habitat acquisitions against the losses. Taken together, acquired and enhanced acres are counted as mitigation against losses. Habitat unit gains, which can result when inundation of reservoirs creates new habitat for certain species, are estimated and subtracted from total losses to calculate net losses. Bonneville estimates the development of the hydrosystem caused a total loss of 404,567 habitat units for all affected species. There were compensating habitat unit gains of 53,487, leaving a net loss of 351,080.

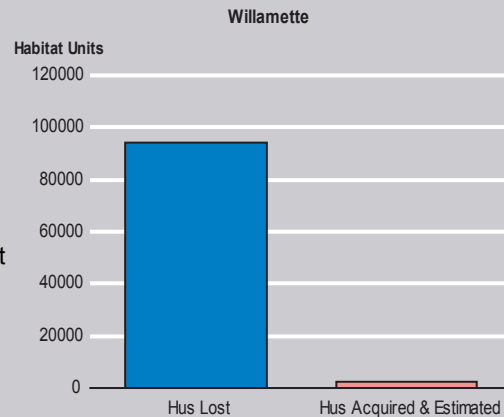
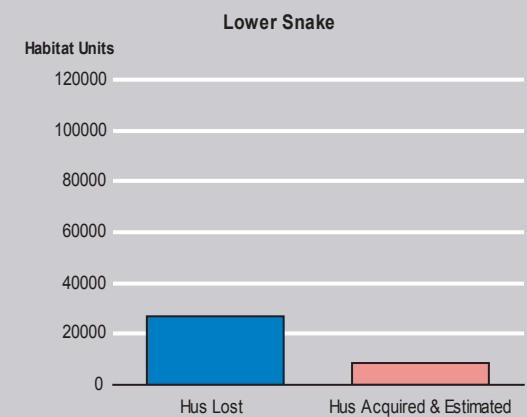
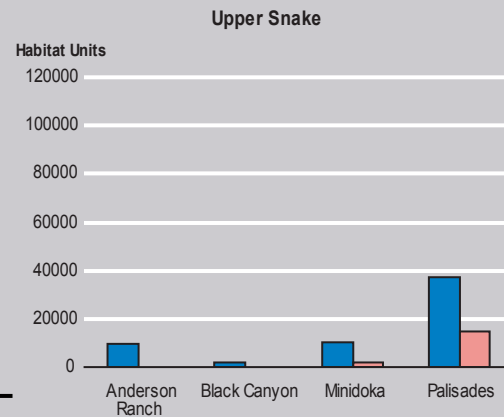
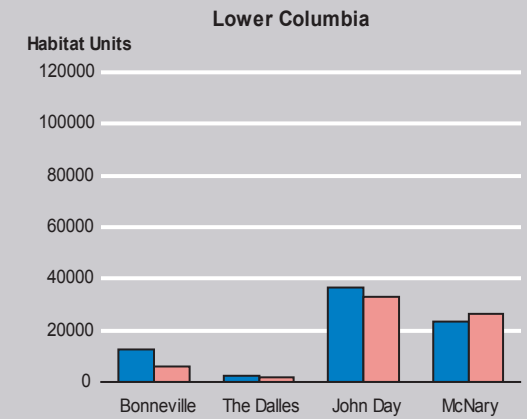
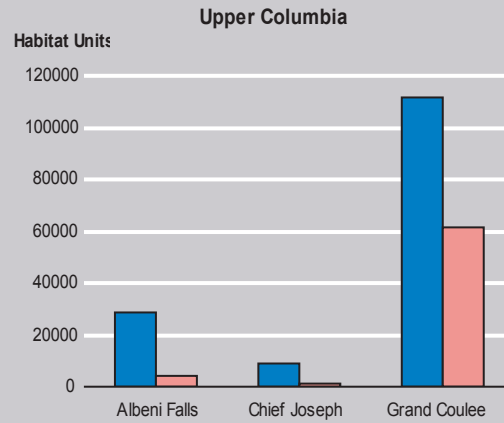
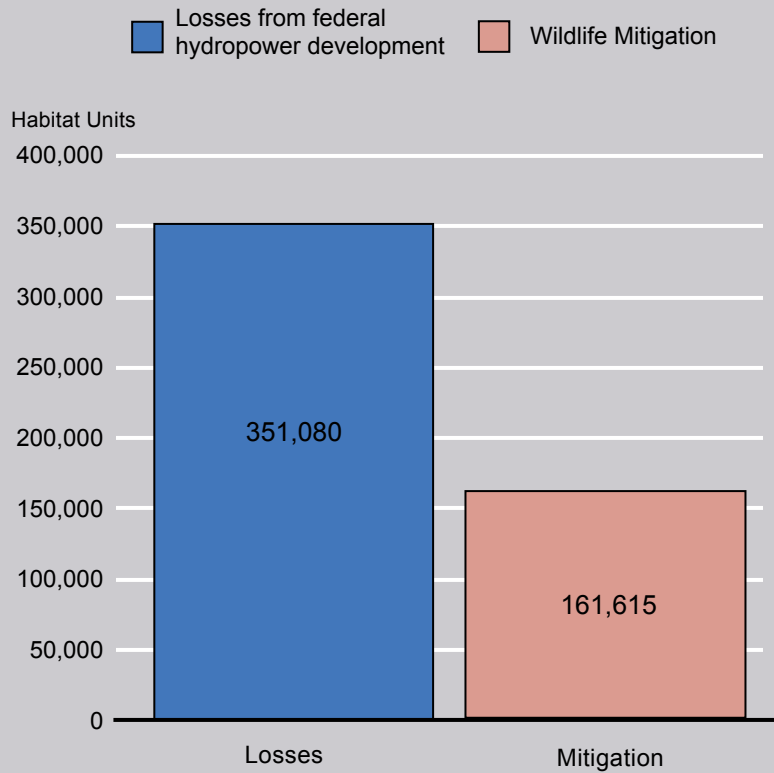
Habitat unit losses and acquisitions are presented in Figures 14 and 15. More detailed information, including specific information about species and dams, location and types of purchases and mitigation costs is reported in Tables

14A-D and Table 15 in the Appendix. To date, 139,514 habitat units have been acquired through acquisitions of habitat or habitat-protection agreements. An additional 22,101 habitat units have been estimated for the property acquired but not yet credited to losses for specific species. The Council and Bonneville are continuing to discuss the issue of how to accurately credit acquired habitat units against identified losses.

As shown in Table 3 of the Appendix, Bonneville's wildlife spending from 1978 through 2000 totals \$127,896,767. For 2000 alone, the amount was \$11,491,168.



**FIG 15
Wildlife Habitat Units: Lost & Acquired**



Mitigation Projects where credits have not been accounted:

- Denny Jones BLM allotment: 34,022 acres
- Denny Jones State allotment: 4,355 acres
- NE Oregon Project acquisition: 1,175 acres
- Enhancement Potential on 24,350 acres acquired to date

* Note: "Acres acquired within the state of Idaho for Dworshak agreement are not measured in habitat units and are not included in these totals."

** The Habitat Units lost and mitigated, by species and by dam, are shown in figure 15c, page 34.

FIG 16
Wildlife Habitat Units Lost, Most-Affected Species

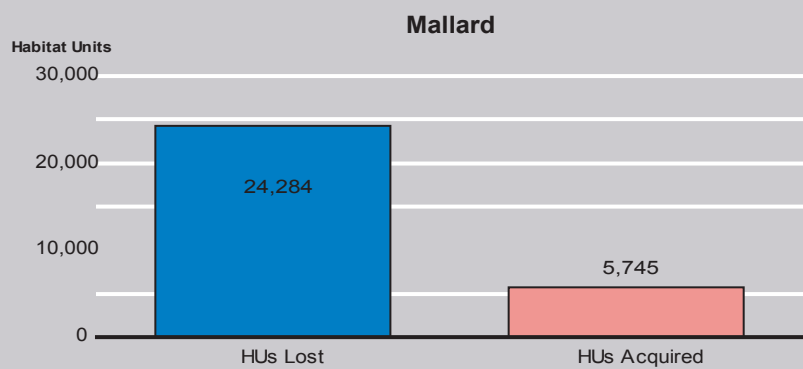
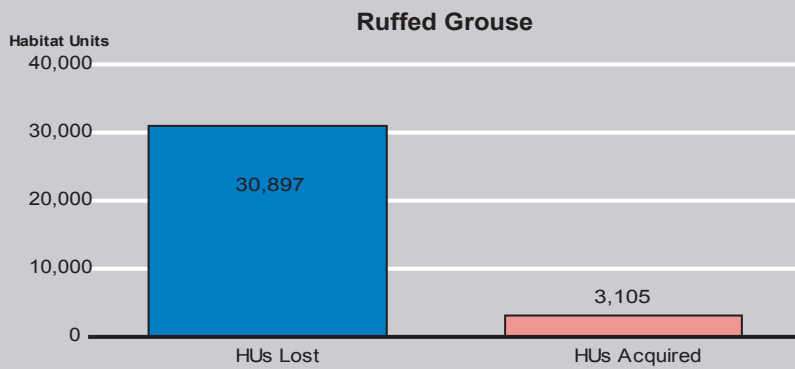
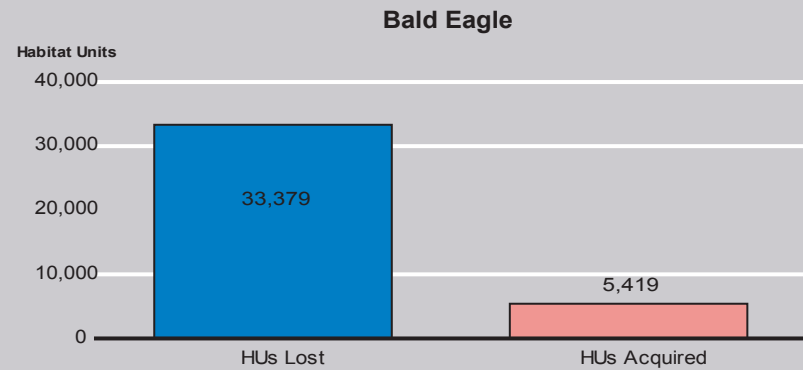
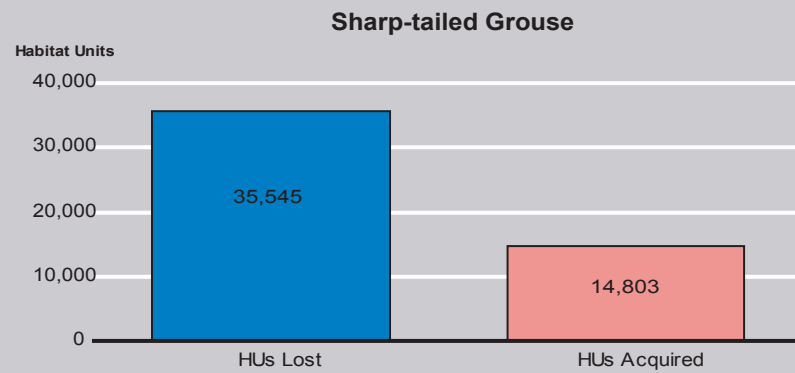
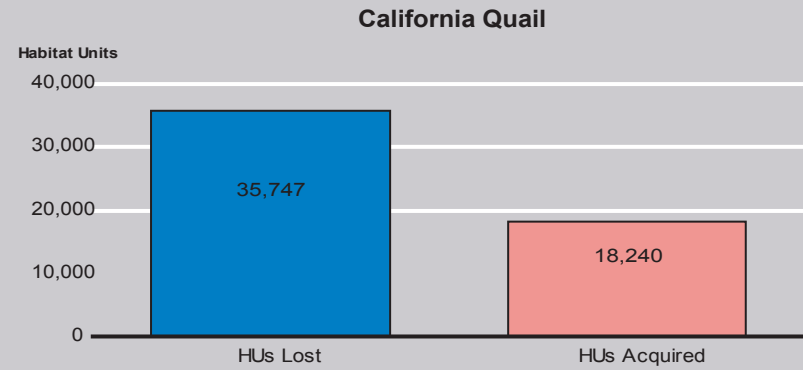
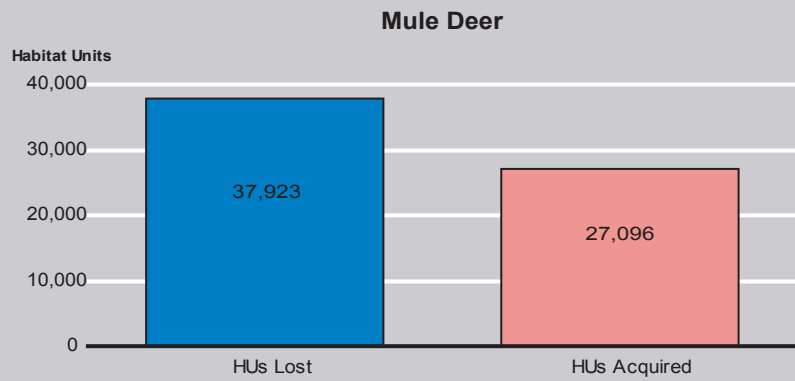


FIG 17
Properties Protected by BPA for Wildlife Purposes
1978-2001

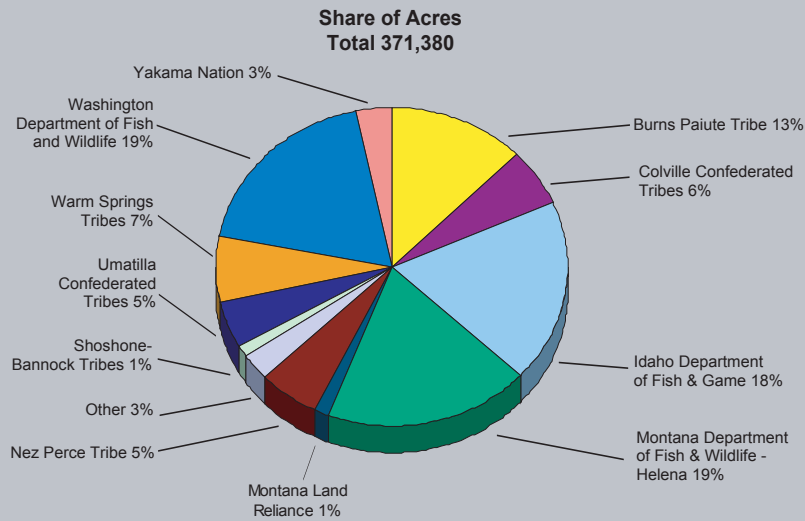
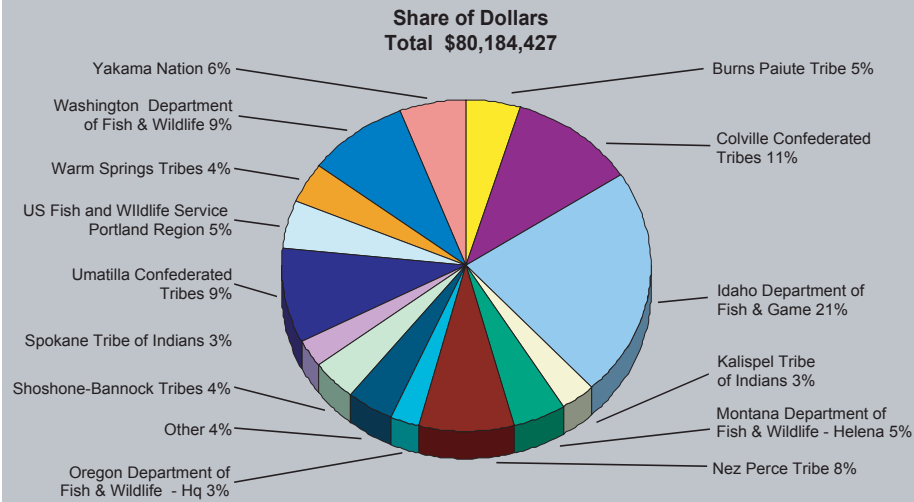
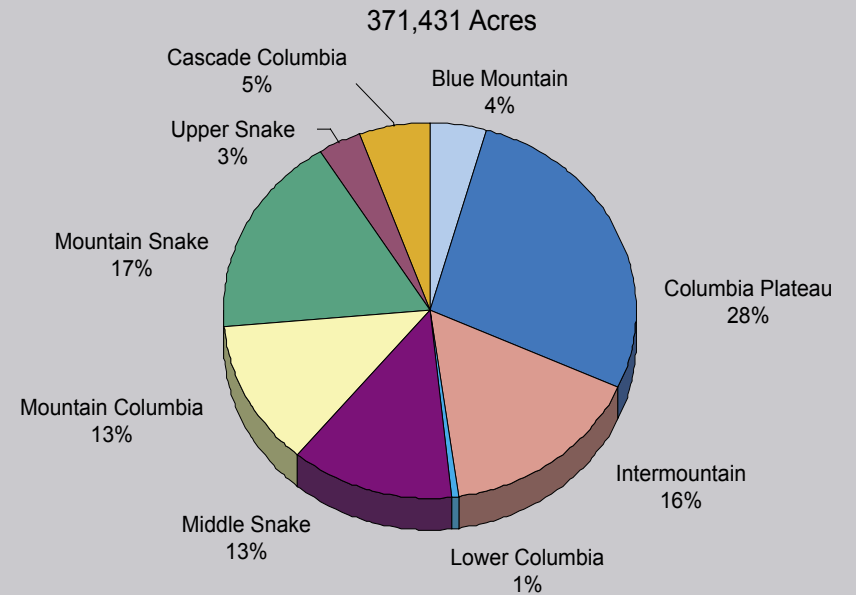


FIG 18
Properties Purchased by BPA for Wildlife Purposes
by Province*
1978-2001



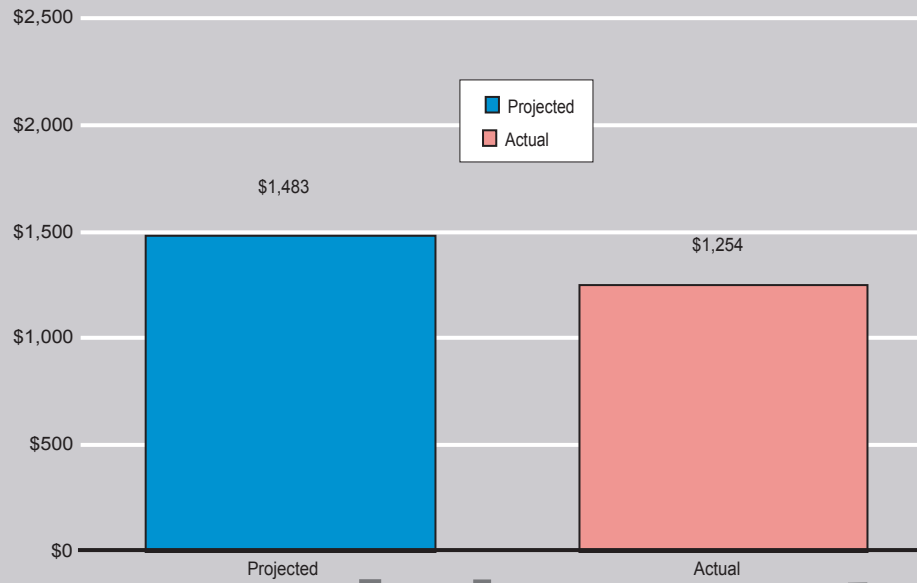
* This figure includes all types of property purchases. See Table 18, page 38.



FIG 19
BPA Fish and Wildlife
Budgeted, Actual and Estimated Expenditures
1996-2001 (Memorandum of Agreement)

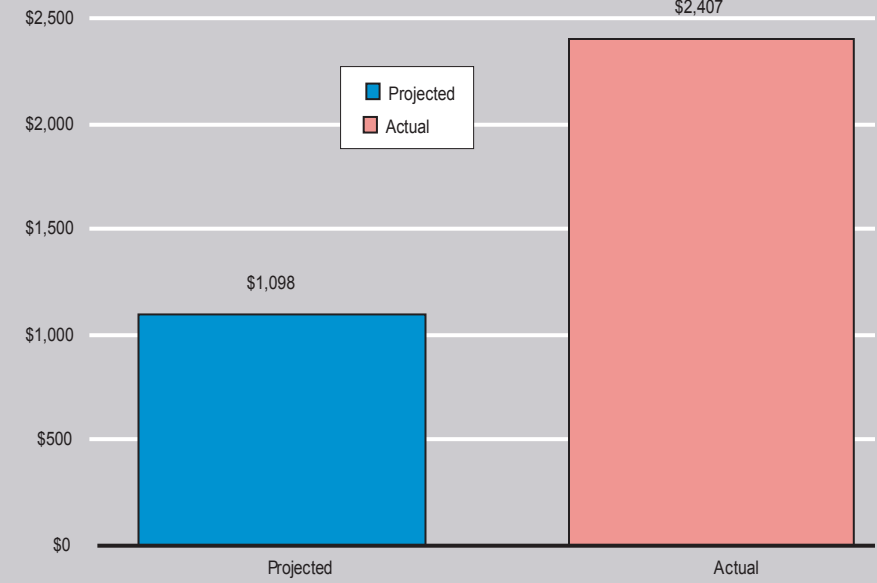
Total MOA

Dollars in millions



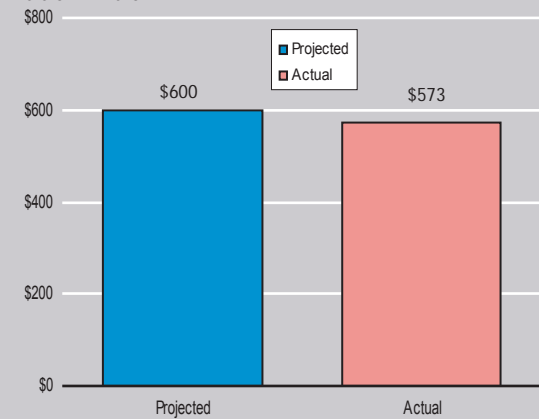
River Operations (Forgone Revenues & Power purchases)

Dollars in millions



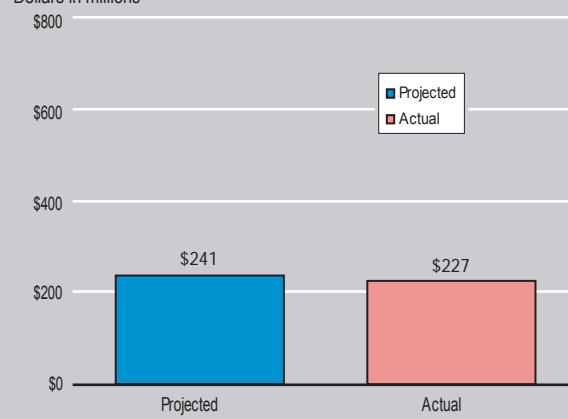
Direct Program

Dollars in millions



Reimbursables

Dollars in millions



Capital Budget

Dollars in millions



Better Data Management is Needed

It took about 18 months to complete the inaugural annual report on Bonneville's fish and wildlife expenditures, which we issued in January 2001. In compiling the information for that report, we were hindered by the confusing state of data storage and availability in the basin. There was universal support among those we contacted at Bonneville, fish and wildlife agencies and others involved in mitigation and recovery activities to improve data collection and management.

It was difficult to compile the information for the current report because of accounting changes at Bonneville, which resulted in changes in

some of the data reporting categories. We hope these accounting changes will improve data access, as Bonneville attempts to improve its fish and wildlife data collection and management. As we reported in 2001, it goes without saying that improving data management will improve the public accountability of the Council's program and Bonneville's expenditures by making results accessible not only to specialists, but also to the public at large.

In response to a May 2000 report to the Council from the Independent Scientific Review Panel, in which the Panel found that no organization is taking responsibility for comprehensive

design of data collection in the basin, the Council, National Marine Fisheries Service, Bonneville and others are working with an independent contractor to develop a comprehensive monitoring program to provide the data needed to ensure progress in meeting the goals of the Council's fish and wildlife program and the federal Biological Opinions.

As noted earlier in this report, 2001 was a record year for Columbia River salmon and steelhead runs and also, ironically, for poor river conditions in the Columbia River Basin. Some of the biggest salmon and steelhead runs on record encountered the second-lowest Columbia River runoff on record. The low flows and resulting loss of hydropower — 4,000 megawatts, nearly enough for four Seattles — combined with market failures and unprecedented prices, forced Bonneville to spend a record amount on power purchases to make up for the lost hydropower.

As we reported last year, Bonneville funds continue to protect, mitigate and enhance fish and wildlife of the Columbia River Basin impacted by the hydrosystem. During the past 21 years, spending has increased, project review has become more scientifically rigorous and financial accounting has been refined. We continue to anticipate that with improvements in data management and more locally based planning processes, Bonneville's fish and wildlife expenditures will become even more efficient and effective in the coming years.



Appendix I: Data Tables

Figure 1 Dow-Jones Mid-Columbia Monthly Average Prices per Megawatt Hour

Year	Month	\$/MWH	Year	Month	\$/MWH	Year	Month	\$/MWH
1999	October	42	2000	July	98	2001	April	289
1999	November	29	2000	August	163	2001	May	223
1999	December	24	2000	September	115	2001	June	61
2000	January	26	2000	October	96	2001	July	52
2000	February	26	2000	November	160	2001	August	39
2000	March	27	2000	December	508	2001	September	23
2000	April	23	2001	January	261	2001	October	24
2000	May	49	2001	February	275			
2000	June	126	2001	March	256			

Figures 2 & 3 Cumulative and Total Annual Expenditures, 1978-2001

"252"	1978-1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
Direct Program	\$2.3	\$2.3	\$4.6	\$9.1	\$19.6	\$15.9	\$19.6	\$22.2	\$18.8	\$23.0	\$32.8	\$33.0	\$67.0	\$49.6	\$55.9	\$71.4	\$68.5	\$82.2	\$104.9	\$108.2	\$108.2	\$101.1	\$1,020.2
Reimbursable	\$15.0	\$6.1	\$11.5	\$14.2	\$16.0	\$19.9	\$23.7	\$29.7	\$19.0	\$23.6	\$23.4	\$24.3	\$28.4	\$30.5	\$34.9	\$36.1	\$35.4	\$35.9	\$36.4	\$38.9	\$37.6	\$42.4	\$582.9
Fixed Expenses 1/	\$24.0	\$8.8	\$12.4	\$15.9	\$16.6	\$19.7	\$22.1	\$28.5	\$31.0	\$31.9	\$34.3	\$38.2	\$41.9	\$53.6	\$61.3	\$63.6	\$73.0	\$76.3	\$74.2	\$76.1	\$77.2	\$77.1	\$957.7
Subtotal	\$41.3	\$17.2	\$28.5	\$39.2	\$52.2	\$55.5	\$65.4	\$80.4	\$68.8	\$78.5	\$90.5	\$95.5	\$137.3	\$133.7	\$152.1	\$171.1	\$176.9	\$194.4	\$215.5	\$223.2	\$223.0	\$220.6	\$2,560.8
1/ Associated with Capital Investments																							"252" MOA Period Sub Total \$1,253.6
"River Ops"	1978-1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
Power Purchases	\$0.0	\$0.0	\$0.0	\$0.0	\$12.0	\$17.0	\$74.0	\$11.0	\$40.0	\$40.0	\$40.0	\$40.0	\$59.0	\$104.0	\$111.7	\$114.0	\$0.0	\$0.0	\$5.4	\$47.6	\$64.8	\$1,389.6	\$2,170.1
Foregone Revenues	\$0.0	\$3.0	\$14.0	\$1.0	\$8.0	\$27.0	\$19.0	\$9.0	\$10.0	\$15.0	\$15.0	\$15.0	\$23.0	\$45.0	\$62.0	\$114.0	\$83.3	\$110.2	\$114.6	\$203.7	\$272.2	\$115.9	\$1,279.9
Subtotal	\$0.0	\$3.0	\$14.0	\$1.0	\$20.0	\$44.0	\$93.0	\$20.0	\$50.0	\$55.0	\$55.0	\$55.0	\$82.0	\$149.0	\$173.7	\$228.0	\$83.3	\$110.2	\$120.0	\$251.3	\$337.0	\$1,505.5	\$3,450.0
																							"River Ops" MOA Period Sub Total \$2,407.3
Grand Total	\$41.3	\$20.2	\$42.5	\$40.2	\$72.2	\$99.5	\$158.4	\$100.4	\$118.8	\$133.5	\$145.5	\$150.5	\$219.3	\$282.7	\$325.8	\$399.1	\$260.2	\$304.6	\$335.5	\$474.5	\$560.0	\$1,726.1	\$6,010.8
																							MOA Period Total \$3,660.9

Dollars are in Millions

Sources: (1978 - 1995) FY 2000 Congressional Budget / page 80
 (1996 - 2001) MOA Reporting Template

Figure 4 Obligations by Species, 1978-2000

FY	Anadromous Fish	Resident Fish	Wildlife	Total
1978	\$400,000	\$0	\$0	\$400,000
1979	\$979,628	\$0	\$0	\$979,628
1980	\$1,232,775	\$0	\$0	\$1,232,775
1981	\$1,512,801	\$251,000	\$0	\$1,763,801
1982	\$5,349,333	\$335,930	\$0	\$5,685,263
1983	\$7,222,161	\$1,441,440	\$789,026	\$9,452,627
1984	\$16,675,925	\$1,263,895	\$589,066	\$18,528,886
1985	\$19,945,958	\$3,571,308	\$553,022	\$24,070,288
1986	\$22,208,357	\$3,779,463	\$1,009,667	\$26,997,487
1987	\$26,560,517	\$591,182	\$1,149,655	\$28,301,354
1988	\$15,848,972	\$6,389,391	\$1,040,601	\$23,278,964
1989	\$25,225,428	\$3,016,827	\$2,053,497	\$30,295,752
1990	\$27,737,779	\$7,795,641	\$1,058,418	\$36,591,838
1991	\$38,973,827	\$2,028,859	\$2,530,970	\$43,533,656
1992	\$53,119,662	\$3,550,209	\$12,847,109	\$69,516,980
1993	\$51,129,495	\$5,457,600	\$8,936,699	\$65,522,794
1994	\$51,044,466	\$7,072,137	\$16,090,951	\$74,207,554
1995	\$49,894,315	\$8,692,253	\$10,206,415	\$68,792,983
1996	\$83,789,352	\$7,962,544	\$14,815,773	\$106,567,669
1997	\$66,524,626	\$12,944,597	\$16,615,431	\$96,084,654
1998	\$85,533,382	\$20,991,620	\$12,675,870	\$119,200,872
1999	\$82,415,426	\$14,850,466	\$13,443,429	\$110,709,321
2000	\$83,662,243	\$19,598,122	\$11,491,168	\$114,751,533
	\$816,986,428	\$131,584,484	\$127,896,767	\$1,076,467,679

Source: Bonneville Power Administration

Contracted Coordination	\$38,034,782
Non-contracted BPA Overhead	\$58,673,691
	\$96,708,473

Figure 5 Breakdown of Expenditures for Mainstem, Production, Habitat and Harvest, FY 2000

General Purpose	Specific Purpose	Amount
Regional Coordination		\$5,777,201
Data Management		\$97,500
Habitat		
	Tributary Passage	\$6,965,939
	Restoration & Enhancement	\$15,833,953
	Acquisition	\$11,089,033
Harvest		\$1,281,630
Mainstem Survival		\$2,622,404
Monitoring		\$16,903,171
Production		
	Supplementation	\$16,702,413
	Restoration & Enhancement	\$849,712
	Production	\$7,324,614
	Captive Propagation	\$5,731,229
Bonneville Program Support		\$5,729,438
Research & Evaluation		\$18,369,483
		\$115,277,720

Source: Bonneville Power Administration

Figure 6 Obligations by Province FY 2000

Province	Sum Of Contract Amount
Systemwide	\$33,331,036
Columbia Plateau	\$30,262,192
Mountain Snake	\$17,870,268
Intermountain	\$7,646,027
Blue Mountain	\$5,928,137
Mountain Columbia	\$3,966,439
Middle Snake	\$3,778,270
Columbia Cascade	\$3,526,780
Columbia Estuary/Ocean	\$3,518,332
Columbia Gorge	\$2,623,651
Lower Columbia	\$2,313,545
Upper Snake	\$513,043
	\$115,277,720

Source: Bonneville Power Administration

Figure 7A Obligations by Prime Contractor 1978-1999

Contractor Type	Prime Contractor	Amount	
FEDERAL	NATIONAL MARINE FISHERIES SERVICE	70,736,586	
	NON-CONTRACTED BPA OVERHEAD	58,183,051	
	FISH AND WILDLIFE SERVICE	53,109,604	
	BUREAU OF RECLAMATION	39,870,334	
	CORPS OF ENGINEERS	25,829,517	
	DEPARTMENT OF ENERGY	23,288,004	
	FOREST SERVICE	20,826,134	
	OTHER	5,687,772	
	TOTAL	297,531,002	
	STATE	OREGON DEPARTMENT OF FISH & WILDLIFE	121,397,049
		OREGON STATE POLICE - FISH AND WILDLIFE	3,480,952
OREGON DEPARTMENT OF ENERGY		131,391	
OREGON DEPARTMENT OF TRANSPORTATION		106,422	
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY		50,334	
OREGON DEPARTMENT OF PARKS & RECREATION		5,000	
Subtotal		125,171,148	
IDAHO SOIL & WATER CONSERVATION COMISSION		3,423,070	
IDAHO DEPARTMENT OF FISH & GAME		71,751,549	
Subtotal		75,174,619	
MONTANA DEPARTMENT OF FISH & WILDLIFE		31,067,533	
Subtotal		31,067,533	
WASHINGTON DEPARTMENT OF FISH & WILDLIFE		52,770,525	
WASHINGTON WILDLIFE COALITION MEMBERS		3,445,738	
WASHINGTON DEPT OF ECOLOGY		2,831,271	
WASHINGTON STATE CONSERVATION COMISSION		694,411	
WASHINGTON STATE ENERGY OFFICE		242,857	
WASHINGTON DEPARTMENT OF TRANSPORTATION		101,700	
WASHINGTON DEPARTMENT OF NATURAL RESOURCES		5,000	
Subtotal	60,091,502		
TOTAL	291,504,802		
TRIBE	YAKAMA INDIAN NATION	43,349,245	
	NEZ PERCE TRIBE	36,253,043	
	UMATILLA CONFEDERATED TRIBES	27,297,098	
	COLVILLE CONFEDERATED TRIBES	21,979,085	
	SHOSHONE-BANNOCK TRIBES	15,222,047	
	SPOKANE TRIBE OF INDIANS	12,410,724	
	KOOTENAI TRIBE OF IDAHO	8,342,330	
	COLUMBIA BASIN FISH & WILDLIFE FOUNDATION	8,239,947	
	COLUMBIA RIVER INTERTRIBAL FISH COMISSION	7,586,035	
	WARM SPRINGS TRIBES	5,971,167	
	SHOSHONE-PAIUTE TRIBES	5,885,222	
	KALISPEL TRIBE OF INDIANS	5,546,899	
	COEUR D'ALENE TRIBE OF IDAHO	4,644,877	
	SALISH-KOOTENAI TRIBES	3,401,810	
	BURNS PAIUTE TRIBE	900,862	
	POINT NO POINT TRIBE	11,960	
	TULALIP TRIBE	4,988	
	KLAMATH TRIBE	4,512	
	CHEHALIS INDIAN TRIBE	2,082	
	SQUAXIN ISLAND TRIBE	1,304	
	TOTAL	207,055,237	
	INTERSTATE COMPACT	PSMFC	99,526,938
	UNIVERSITY	UNIVERSITY	30,812,749
OTHER	LOCAL/SEMI GOVERNMENTAL	17,557,563	
	UTILITY	10,195,863	
	NOT SPECIFIED (LAND)	11,257,473	
	PRIVATE/OTHER	92,476,265	
	TOTAL	131,487,164	
GRAND TOTAL	1,057,917,892		

Source: Bonneville Power Administration

Figure 7B Expenditure of Direct BPA funds by contractor 1996-2000

Contractor	Amount
PACIFIC STATES MARINE FISH COMMISSION	\$58,268,622
OREGON DEPARTMENT OF FISH & WILDLIFE- HQ	\$44,071,981
IDAHO DEPARTMENT OF FISH & GAME	\$36,997,520
YAKAMA NATION	\$36,241,179
NEZ PERCE TRIBE	\$35,333,830
WASHINGTON DEPARTMENT OF FISH & WILDLIFE	\$33,564,385
NATIONAL MARINE FISHERIES SERVICE - SEATTLE OFFICE	\$28,833,857
UMATILLA CONFEDERATED TRIBES	\$19,929,478
NATT MCDUGALL COMPANY	\$15,876,408
BONNEVILLE POWER ADMINISTRATION - TRANSMISSION BUSINESS LINE	\$11,860,217
COLVILLE CONFEDERATED TRIBES	\$11,045,191
IMPERO CONSTRUCTION COMPANY	\$10,716,321
N BIO SERVICE / US F&W SERVICE - N FISH RESEARCH CENTER - SEATTLE	\$9,844,736
COLUMBIA BASIN FISH & WILDLIFE FOUNDATION	\$9,594,211
MONTGOMERY WATSON	\$9,451,970
FISHPRO, INC.	\$9,320,021
SPOKANE TRIBE OF INDIANS	\$8,750,266
US FISH AND WILDLIFE SERVICE - PORTLAND REGION	\$8,719,894
US BUREAU OF RECLAMATION - PACIFIC NW REGION (BOISE)	\$7,716,494
US ARMY CORE OF ENGINEERS - PORTLAND DISTRICT	\$7,367,824
KOOTENAI TRIBE OF IDAHO	\$6,294,000
UNIVERSITY OF WASHINGTON	\$6,161,062
SHOSHONE-BANNOCK TRIBES	\$5,914,723
MONTANA DEPARTMENT OF FISH & WILDLIFE - HELENA	\$5,697,907
SHOSHONE-PAIUTE TRIBES	\$5,482,792
WARM SPRINGS TRIBES	\$5,350,382
NORTHWEST POWER PLANNING COUNCIL	\$5,278,358
KALISPEL TRIBE OF INDIANS	\$5,037,265
CH2M HILL - NORTHWEST INC.	\$5,005,786
COEUR D'ALENE TRIBE OF IDAHO	\$4,492,205
CONCORD CONSTRUCTION, INC	\$3,540,383
CUSTER SOIL & WATER CONSERVATION DISTRICT	\$3,275,771
BURNS PAIUTE TRIBE	\$3,241,866
COLUMBIA RIVER INTERTRIBAL FISH COMMISSION	\$2,929,357
WASHINGTON DEPT OF ECOLOGY	\$2,831,271
IDAHO SOIL & WATER CONSERVATION COMMISSION	\$2,760,301
US D OF ENERGY - BATTELLE PACIFIC NORTHWEST LABORATORY - (RICHLAND)	\$2,650,798
SLAYDEN CONSTRUCTION INC	\$2,582,316
US FISH AND WILDLIFE SERVICE - FISHERIES PROGRAM OFFICE	\$2,307,235
DESTRON - FEARING	\$2,254,524
CONTRACTOR UNKNOWN TO EMIS	\$2,167,074
UMATILLA ELECTRIC COOP ASSOCIATION	\$2,106,150
ESSA TECHNOLOGIES LTD.	\$2,027,236
OREGON STATE UNIVERSITY	\$1,931,337
YAKIMA CO-OP	\$1,479,863
NATIONAL MARINE FISHERIES SERVICE - PORTLAND OFFICE	\$1,341,100

Figure 7B (continued)

Contractor	Amount	Contractor	Amount
UNIVERSITY of IDAHO	\$1,281,748	DEPT OF FISHERIES & OCEANS (CANADIAN)	\$285,600
US BUREAU OF RECLAMATION (WA)	\$1,205,799	WASHINGTON STATE CONSERVATION COMMISSION.	\$284,479
WESTLAND IRRIGATION DISTRICT	\$1,180,312	KITTITAS COUNTY CONSERVATION DISTRICT	\$283,359
USGS - BIOLOGICAL RESOURCES DIVISION - COLUMBIA RIVER RESEARCH LAB	\$1,047,958	BIOMARK INC.	\$278,353
WALLOWA COUNTY SOIL & WATER CONSERVATION DISTRICT	\$994,541	UNION COUNTY	\$249,028
US FISH AND WILDLIFE SERVICE - DENVER REGION	\$978,033	WALLA WALLA COUNTY CONSERVATION DISTRICT	\$242,711
US FISH AND WILDLIFE SERVICE - AHSAHKA	\$937,531	JEFF KUECHLE	\$231,627
PAULSEN ENVIRONMENTAL RESEARCH	\$918,119	EASTERN WASHINGTON UNIVERSITY - ARCHAEOLOGY & HISTORY DEPARTMENT	\$225,719
CLATSOP ECONOMIC DEVELOPMENT COMMITTEE	\$903,765	US FISH AND WILDLIFE SERVICE - (LONGVIEW WA)	\$214,203
USFS - WALLOWA-WHITMAN NATIONAL FOREST - LAGRANDE DISTRICT,	\$838,422	USFS - PACIFIC NW REGION (6) - PORTLAND	\$213,180
USFS - FLATHEAD NATIONAL FOREST	\$837,468	WALLOWA PUBLIC WORKS DEPARTMENT	\$206,426
ASOTIN COUNTY CONSERVATION DISTRICT	\$832,666	US ARMY CORE OF ENGINEERS - NORTHWEST DIVISION	\$204,998
COLUMBIA COUNTY SOIL & WATER CONSERVATION DISTRICT	\$824,631	UNION COUNTY PUBLIC WORKS DEPARTMENT	\$203,650
MOSS-ADAMS ADVISORY SERVICES	\$807,207	RESOURCE CONSERVATION & DEVELOPMENT	\$200,000
UNION COUNTY SOIL & WATER CONSERVATION DISTRICT	\$792,200	CRATE'S POINT	\$200,000
US FISH AND WILDLIFE SERVICE - FISH ASST. VANCOUVER	\$775,613	COLUMBIA SOIL & WATER CONSERVATION DISTRICT	\$196,036
HARZA NORTHWEST INC	\$746,286	MOBRAND BIOMETRIC, INC.	\$193,132
SALISH-KOOTENAI TRIBES	\$722,532	COLE & WEBER	\$188,237
POMEROY SOIL & WATER WATER CONSERVATION DISTRICT	\$621,822	LEMHI IRRIGATION DISTRICT	\$182,938
PORTLAND GENERAL ELECTRIC	\$613,073	USFWS - CRESTON NATIONAL FISH HATCHERY	\$181,088
US BUREAU OF RECLAMATION - YAKIMA	\$580,303	UNIVERSITY of MONTANA	\$180,539
CASCADE PACIFIC RESOURCE	\$552,235	UNDERWOOD CONSERVATION DISTRICT	\$178,018
USFS - UMATILLA NATIONAL FOREST	\$534,198	US ARMY CORE OF ENGINEERS - WALLA WALLA DIST	\$165,938
LEMHI SOIL & WATER CONSERVATION DISTRICT	\$527,835	THE NATURE CONSERVANCY - OR	\$162,458
BIOANALYSTS INC (D. CHAPMAN)	\$518,303	GOLDEN PACIFIC HOMES	\$160,000
LAKE ROOSEVELT DEVELOPMENT ASSOCIATION	\$483,900	KRUGEL & ASSOCIATES	\$152,000
US DEPARTMENT OF ENERGY - OAK RIDGE NATIONAL LABORATORY	\$468,744	OXARC	\$143,340
USFS - PACIFIC NW RESEARCH STATION	\$448,919	USFS - NEZ PERCE NATIONAL FOREST	\$142,878
USFS - GIFF PINNACLES NATIONAL FOREST - MT ADAMS RANGER DIST, WIND RIVER DIVISION	\$444,891	JEAN EDWARDS	\$135,711
WASCO COUNTY SOIL & WATER CONSERVATION DISTRICT	\$433,489	KATHLEEN A CONCANNON	\$135,160
EDUCATIONAL SERVICES DISTRICT #105 (YAKIMA)	\$427,427	NSRI	\$133,000
RESEARCH INTO ACTION	\$414,555	ARCHAEOLOGICAL & HISTORICAL SERVICE	\$127,894
PACIFIC POWER & LIGHT COMPANY	\$412,000	WALLOWA COUNTY	\$118,500
USFS - MT. HOOD NATIONAL FOREST	\$391,000	MONUMENT SOIL & WATER CONSERVATION DISTRICT	\$116,500
LEWIS SOIL & WATER CONSERVATION DISTRICT	\$383,509	ENERGY NEWSDATA INC	\$114,600
MILLER ECOLOGICAL CONSULTANTS	\$369,515	PACIFIC WATERSHED INSTITUTE	\$104,200
NEZ PERCE SOIL & WATER CONSERVATION DISTRICT	\$357,992	FOSTER WHEELER ENVIRONMENTAL CO	\$101,955
EASTERN OREGON STATE COLLEGE	\$355,062	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION	\$101,700
RICHARD HINRICHSEN	\$344,480	JAMES J ANDERSON MD	\$100,000
USFS - INTERMOUNTAIN REGION (4) - OGDEN	\$340,057	US DEPT OF JUSTICE	\$100,000
JEFFERSON COUNTY SOIL & WATER CONSERVATION DISTRICT	\$339,343	AG-WEST SUPPLY	\$99,823
SYNERGY CONSULTING INC	\$330,117	ASOTIN COUNTY LANDFILL	\$97,725
DONNA SILVERBERG	\$328,212	ADVANCED TELEMETRY SYSTEMS INC	\$90,765
INTERMOUNTAIN COMMUNICATIONS	\$301,450	GORDON, THOMAS, ETC., P.L.L.C.	\$89,097
USFS - MT HOOD NATIONAL FOREST - HOOD RIVER RANGER DISTRICT	\$296,082	HI-TECH INDUSTRIAL COATINGS	\$86,368
WASHINGTON TROUT	\$289,421	USFS - WALLOWA-WHITMAN NATIONAL FOREST - WALLOWA VALLEY DISTRICT,	\$82,219

Figure 7B (continued)

Contractor	Amount	Contractor	Amount
AL WRIGHT CONSULTING	\$80,000	GLOBAL SHELTERS	\$10,890
ALLFLEX	\$75,000	CITY OF UNION	\$10,500
S. P. CRAMER & ASSOCIATES	\$72,747	MURREMAID MUSIC BOXES	\$10,424
UMATILLA COUNTY	\$72,000	CHEMICAL WASTE MANAGEMENT, INC.	\$10,422
USFS - PACIFIC NW RESEARCH. STATION	\$64,997	EAST LANE SOIL & WATER CONSERVATION DISTRICT	\$10,000
METRO REGIONAL PARKS AND GREENSPACES	\$64,100	ENVIRONMENTAL SERVICES NW INC	\$9,207
NATIONAL PARK SERVICE - COULEE DAM NATIONAL REC. AREA	\$62,000	HYDROLAB CORP	\$8,735
SHERMAN SOIL & WATER CONSERVATION DISTRICT	\$60,897	DAVID EVANS & ASSOCIATES INC	\$7,800
USFS - WALLOWA-WHITMAN NATIONAL. FOREST	\$58,995	WASHINGTON DEPARTMENT OF NATURAL RESOURCES	\$7,500
NEWSDATA CORP	\$55,000	MUNTERS CORP	\$7,330
LANE COUNTY ORGANIZATION OF GOVERNMENTS	\$55,000	US GEOLOGICAL SURVEY - BIOLOGICAL RESOURCES DIVISION	\$7,100
PUGET SOUND ENERGY	\$54,369	AQUATECNICS INC	\$7,090
OREGON DEPARTMENT of TRANSPORTATION - LA GRANDE	\$51,500	OS SYSTEMS INC	\$5,804
OREGON DEPT OF ENVIRONMENTAL QUALITY - BUSINESS OFFICE	\$50,334	H&L PLUMBING & HEATING	\$5,422
CHRISTOPHER BOEHME	\$50,240	ECOLOGIC UNLIMITED	\$5,040
KITTITAS-YAKIMA RES CONS & DEV	\$49,794	OREGON STATE DEPARTMENT OF PARKS & RECREATION	\$5,000
HERKE ROCK & CONSTRUCTION	\$48,000	SUSTAINABLE FISHERIES FOUNDATION	\$5,000
JD WHITE CO INC THE	\$46,996	CITY OF MILTON-FREEWATER	\$4,500
WALLOWA VALLEY GOLF ASSOC	\$46,200	DR. LYLE CALVIN	\$4,250
OREGON DEPARTMENT of TRANSPORTATION - SALEM	\$46,000	WORKMAN AND SONS INC	\$4,120
RANDY'S BLUE DOT EXCAVATN INC	\$45,947	HERITAGE RESEARCH ASSOCIATES	\$3,954
MAGIC VALLEY INTER INC	\$44,811	MERIDAN INSTRUMENT CO INC	\$3,912
ONSET COMPUTER CORP	\$42,135	TRACY CAMP	\$3,328
USDA - NATURAL RESOURCES CONSERVATION SERVICE	\$40,880	SUE FOSTER	\$3,084
USFS - UMATILLA NATIONAL FOREST - WALLA WALLA DISTRICT	\$40,435	DR STEPHEN W KRESS	\$2,467
INTER-FLUVE INC	\$35,849	ARGENTEA INTERNATIONAL	\$2,330
HIDDEN VALLEY GUEST RANCH	\$35,634	CENTRAL COMMUNICATIONS	\$2,000
US DEPT OF INTR - FORT SIMCOE JOB CORPS CIVILIAN CONSERVATION CTER	\$31,608	US WEST COM SERVICES INC	\$1,886
MIKE WATTERS EXCAVATION	\$25,800	BUSINESS EDUCATION COMPACT	\$1,500
FORESTRY SUPPLIERS	\$25,681	MARC M SPATT CONSULTING HYDRO	\$1,047
JUDITH L. WOODWARD	\$24,005	OREGON TROUT INC	\$1,000
GEOMAX	\$23,730	MARY ANNE BISHOP	\$1,000
NATURE CONSERVANCY - MONTANA	\$21,500	PACIFIC BIOLOGICAL STATION (CANADIAN)	\$1,000
APPLIED POWER CORPORATION	\$21,364	AYRES ASSOCIATES	\$1,000
UNION COUNTY COMMISSIONERS OFFICE	\$20,400	WEST CONSULTANTS INC	\$1,000
OREGON WATER TRUST	\$19,630	PAT E VIVIAN	\$874
WEYERHAEUSER COMPANY	\$18,633	R.S. ANDERSON & ANDERSON, INC.	\$800
MAGIC VALLEY HELI-ARC & MFG	\$18,609	WEAVER ASSOCIATES	\$700
INTERNATIONAL INSTITUTE OF LEARNING	\$17,625	BOB TONSETH	\$650
MAD RIVER DECOYS	\$17,500	THE BRICK KICKER	\$550
BOISE CASCADE CORPORATION	\$16,000	DR. DAVID WELCH	\$500
RICK FRANKLIN CORP	\$15,400	WESTERN / ALLWASTE	\$304
US WEST COM FED SERVICES	\$13,273		
JUDITH H MONTGOMERY	\$12,944		
LUANNA GROW CONSULTING	\$12,500		
GREGORY'S PUMP SERVICE	\$11,411		

Source: Bonneville Power Administration

Figure 8A Salmon and Steelhead passing Bonneville Dam, 1938-1976

These dam counts can not be utilized for year to year comparison of abundance or population size without evaluating and quantifying the effects of facility modifications, dam operations, dam modifications, upstream development, fisheries, hatchery production, counting schedules, counting techniques, between-dam counting discrepancies, counting station modification, fishway modifications, fallback and dam passage efficiencies.

Yearly Totals of all Fish passing Bonneville Dam 1938-1977

Year	Chinook	Steelhead	Sockeye	Coho
1938	271,799	107,003	75,040	15,185
1939	286,236	121,922	73,382	14,383
1940	391,573	185,161	148,805	11,870
1941	461,443	118,087	65,741	17,911
1942	401,998	151,345	55,464	12,401
1943	313,123	92,131	39,845	2,547
1944	240,763	100,521	15,071	4,207
1945	297,488	120,144	9,501	791
1946	445,743	142,548	74,354	3,897
1947	480,377	135,444	171,139	11,174
1948	419,555	139,062	131,541	4,081
1949	277,697	119,285	51,444	1,004
1950***	357,375	114,087	77,993	10,151
1951***	331,788	140,689	169,428	5,201
1952	420,879	260,990	184,645	7,768
1953	332,479	223,914	235,215	13,018
1954 ¹	320,947	176,260	130,107	4,062
1955 ²	359,853	198,411	237,748	3,725
1956 ³	300,917	131,116	156,418	6,127
1957 ⁴	403,286	139,183	82,915	4,675
1958 ⁵	426,419	131,437	122,389	3,673
1959 ⁶	345,028	129,026	86,560	2,695
1960 ⁷	256,049	113,676	59,713	3,268
1961 ⁸	281,980	139,719	17,111	3,456
1962 ⁹	286,625	164,025	28,179	14,788
1963 ¹⁰	278,560	129,418	60,319	12,658
1964 ¹¹	344,422	117,252	99,856	53,602
1965 ¹²	317,957	166,453	55,125	76,032
1966	340,111	143,661	156,661	71,891
1967	366,237	121,872	144,158	96,488
1968	341,154	106,974	108,207	63,488
1969	507,543	140,782	59,636	49,378
1970	384,780	113,510	70,762	80,116
1971	405,702	193,966	87,447	75,989
1972	394,456	185,886	56,323	65,932
1973	398,635	157,823	58,979	54,609
1974	366,759	137,054	43,837	60,955
1975	425,566	85,540	58,212	58,307
1976	507,773	124,177	43,611	53,150

Figure 8A (continued)

* bass, carp, trout, sturgeon, squawfish, dace, perch, shad

**An audit of the hourly Shad counts for 1938-1950 was made in 1950, hence the yearly totals for fish other than Salmon and the yearly totals for all fish appearing in this report differ from those previously published.

*** Fish counting discontinued for annual winter maintenance on November 29, 1950.

- 1 Fish counting initiated Feb.28 1954 and discontinued Nov. 27, 1954
- 2 Fish counting initiated Feb.28 and discontinued Nov. 29, 1955
- 3 Fish counting initiated March 1 and discontinued Dec. 1, 1956
- 4 Fish counting initiated March 1 and discontinued Nov. 30, 1957
- 5 Fish counting initiated March 2, and Nove. 30, 1958.
- 6 Fish counting initiated March 1 and discontinued Nov. 28 1959
- 7 Fish counting initiated March 1 and discontinued on November 30, 1960.
- 8 Fish counting initiated March 1 and discontinued Nov. 30, 1961
- 9 Fish counting initiated on March 1 and discontinued on Nov. 30
- 10 Fish counting initiated on March 1 and discontinued on Nov.30
- 11 Fish counting initiated on March 1 and discontinued on Nov.28
- 12 Fish counting initiated March 28 and discontinued on November 30 1965

Source : Annual Fish passage Reports - Corps of Engineers

Figure 8B Adult Salmon Passage at Bonneville Dam 1977-2001

Year	Chinook	Steelhead	Sockeye	Coho
1977	464,865	193,437	99,829	19,408
1978	394,590	104,431	18,436	52,590
1979	176,292	114,010	52,627	45,328
1980	245,518	129,254	58,882	22,052
1981	285,650	159,270	56,037	30,510
1982	322,809	157,640	50,219	73,832
1983	244,476	218,419	100,542	15,178
1984	323,346	315,795	152,540	29,332
1985	454,753	326,194	165,928	55,529
1986	571,189	376,752	58,099	130,786
1987	547,409	300,335	116,956	27,628
1988	494,028	279,277	79,721	39,617
1989	416,170	287,802	41,884	39,243
1990	340,798	183,011	49,581	24,764
1991	274,644	274,535	76,482	65,508
1992	256,271	314,963	84,993	18,151
1993	277,657	188,377	80,182	11,732
1994	243,450	161,978	12,678	22,795
1995	240,017	202,478	8,771	12,034
1996	296,635	205,213	30,252	18,747
1997	383,133	258,385	47,008	27,267
1998	280,944	185,094	13,218	49,920
1999	343,176	206,488	17,875	45,152
2000	491,928	351,493	93,398	97,127
2001	970,774	748,011	114,946	266,307

Adult Passage (ladder) count data from the Army Corps of Engineers.
Source: Fish Passage Center

Figure 10 Spring and Summer Chinook Passing Bonneville Dam, 1977-2001

Year	Spring Chinook		Summer Chinook	
	Adults	Jacks	Adults	Jacks
1977	115,551	3,957	34,083	6,940
1978	147,680	2,183	39,730	4,593
1979	48,638	2,824	27,742	6,475
1980	53,100	7,887	26,952	4,113
1981	62,827	2,182	22,363	4,566
1982	70,011	6,033	20,129	6,485
1983	54,898	1,940	18,046	5,412
1984	46,870	4,272	22,321	6,127
1985	83,113	7,851	23,898	5,455
1986	118,371	4,963	26,300	4,820
1987	98,573	3,234	33,033	4,674
1988	90,532	4,214	31,315	5,209
1989	81,267	5,992	28,786	4,185
1990	94,014	2,090	24,983	3,038
1991	57,346	3,889	18,897	3,056
1992	88,425	2,157	15,063	4,182
1993	110,820	1,352	22,045	1,571
1994	20,169	397	17,631	1,900
1995	10,194	2,375	15,030	2,030
1996	51,493	4,687	16,034	1,960
1997	114,000	963	27,939	1,926
1998	38,342	775	21,433	2,678
1999	38,669	8,691	26,169	4,022
2000	178,302	21,259	30,598	13,386
2001	391,367	14,172	76,156	14,723

Adult Passage (ladder) count data from the Army Corps of Engineers.
Source: Fish Passage Center

Fig. 11 Estimated Inriver Juvenile Survival through the Hydrosystem, 1966-1980, 1993-2001

Year	Chinook Salmon	Steelhead
1966	0.46	0.56
1967	0.47	0.32
1968	0.45	0.43
1969	0.34	0.20
1970	0.17	0.24 b
1971	0.20	0.17
1972	0.09	0.09 a
1973	0.03	0.01
1974	0.28 b	0.08
1975	0.19 b	0.27
1976	0.10	0.13
1977	<0.01	<0.01
1978	0.23 b	0.08
1979	0.19	0.02
1980	0.15	0.03
1993	0.34	
1994	0.31	0.38 c
1995	0.51	0.53
1996	0.42	0.50
1997	0.43	0.45
1998	0.59	0.45 c
1999	0.53	0.40
2000	0.49	0.39
2001	0.28	0.04

Source: National Marine Fisheries Service

Figure 12 Where do the Fish Go? Fish Counted at Each Mainstem Dam, 2000-2001

Dam	Spring Chinook		Summer Chinook		Fall Chinook		Coho		Sockeye		Steelhead	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Bonneville	199,561	405,539	44,170	90,879	247,421	470,805	99,898	258,438	93,398	114,934	274,682	628,630
The Dalles	117,749	312,325	35,580	83,388	162,277	231,720	29,360	63,146	73,383	102,562	204,504	492,515
John Day	98,710	268,402	31,136	74,235	138,974	165,348	23,720	45,567	88,372	107,869	218,434	459,299
McNary	75,483	265,372	27,696	77,514	87,193	145,698	12,018	21,234	60,242	97,188	128,537	389,802
Ice Harbor	48,296	174,199	7,420	17,667	16,134	23,459	1,079	1,098	216	28	117,551	246,357
Lower Monumental	45,856	182,541	7,957	20,899	14,936	21,540	695	807	291	32	110,228	245,627
Little Goose	44,482	177,813	7,992	18,732	10,600	17,485	278	433	296	74	98,755	224,925
Lower Granite	44,140	175,094	7,695	17,539	10,252	16,637	772	457	299	36	104,656	218,457
Priest Rapids	3,100	51,366	24,810	56,377	43,803	29,455	338	7,376	89,547	111,320	11,162	29,120
Rock Island	16,408	41,546	32,307	61,930	11,050	16,153	1,600	5,307	76,515	104,849	10,396	27,893
Rocky Reach	5,728	16,438	18,831	44,722	6,309	11,920	510	704	57,428	66,223	8,125	21,410
Wells	2,587	10,871	10,156	38,126	3,196	8,530	0	186	59,944	74,490	3,868	6,111

Source: Fish Passage Center, Page 10 of the report at this location (the final FPC report for 2001): <http://www.fpc.org/weekrprt/wr2001/WR-01-30.pdf>.

Figure 13 Wild Fish Passing Bonneville Dam, 1990-2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Spring Chinook	22,326	15,941	33,748	26,947	8,757	4,034	16,389	14,694	16,285	11,853	51,765
Snake River Wild Spring Chinook	5,747	5,212	15,938	7,678	1,976	1,812	3,887	4,746	9,683	2,533	12,396
Upper Columbia Wild Spring Chinook	5,458	2,543	4,772	5,084	1,381	256	329	1,123	426	672	1,645
Summer Chinook @Bonn	21,323	16,876	9,726	16,423	12,521	10,717	11,763	17,700	15,371	17,102	15,525
Snake River Wild Summer Chinook @Bonn	4,352	3,546	530	4,140	245	495	2,705	5,526	4,159	1,999	885
Priest Rapids Dam count summ chin	15,576	14,811	8,523	16,377	14,859	12,162	10,995	13,107	13,387	20,898	22,306
Upper Columbia Wild Summer Chinook @PR	14,018	13,330	7,671	12,283	11,144	9,122	8,246	9,830	10,040	15,674	16,730
Upper Columbia Wild Summer Chinook @Bonn	16,971	13,330	9,196	12,283	12,276	10,222	9,058	12,174	11,212	15,103	14,640
Fall Chinook @Bonn	150,334	114,335	71,403	65,219	85,449	68,259	84,640	106,504	83,183	79,147	77,574
Snake River Wild Fall Chinook @Bonn	569	1,899	1,412	1,490	1,054	1,205	1,849	1,929	835	2,539	1,833
Hanford Reach	56,204	50,773	41,255	30,555	48,295	38,381	37,548	37,685	29,682	26,898	35,319
Deschutes River	2,224	3,532	2,776	8,239	5,801	7,588	8,763	20,687	10,925	6,527	3,981
Wind, Klick, BWS	4,960	4,230	5,090	4,291	7,114	4,129	7,569	10,556	12,510	16,067	10,651
Umatilla	0	203	181	100	785	697	175	65	96	279	70
Hanford Reach @Bonn	142,581	104,471	61,944	51,099	70,695	54,640	66,284	73,267	58,817	53,735	61,039
Summer Steelhead	41,700	63,500	54,900	35,800	30,500	30,800	34,800	37,200	39,800	65,600	132,300
Sockeye	49,581	76,481	84,992	80,178	12,678	8,773	30,255	46,927	13,218	17,877	93,391
Coho - Bonn dam count	11,600	58,900	17,800	10,600	20,300	10,400	15,700	24,200	46,300	40,700	85,800
Coho @Bonn dam (10% wild)	1,160	5,890	1,780	1,060	2,030	1,040	1,570	2,420	4,630	4,070	8,580

Source: Washington Dept. of Fish and Wildlife

Figure 14 Commercial Landings of Salmon and Steelhead from the Columba River, 1866-1999

(Non-Indian and Treaty Indian combined)
Zone 1-6

1866	0.2720	1883	42.7992	1900	25.7990	1917	40.4480	1934	27.9019	1951	12.9132\	1968	5.5862	1985	5.3825
1867	1.2240	1884	42.1600	1901	29.8324	1918	44.1254	1935	25.7560	1952	10.7243	1969	8.0427	1986	12.2769
1868	1.9040	1885	37.6584	1902	26.2000	1919	44.9345	1936	23.5286	1953	9.7178	1970	12.5828	1987	11.3547
1869	6.8000	1886	30.4980	1903	30.4887	1920	36.3115	1937	24.6735	1954	7.6303	1971	9.0041	1988	14.1987
1870	10.2000	1887	24.2080	1904	36.8639	1921	26.7125	1938	18.8339	1955	10.8267	1972	7.8827	1989	9.4118
1871	13.6000	1888	25.3284	1905	37.8001	1922	30.1527	1939	17.9112	1956	9.7863	1973	11.1252	1990	3.9369
1872	17.0000	1889	21.0722	1906	35.6531	1923	35.6673	1940	19.3201	1957	7.3229	1974	6.2666	1991	5.0364
1873	17.0000	1890	29.6326	1907	28.7206	1924	38.1671	1941	31.6027	1958	8.1144	1975	8.2431	1992	1.7282
1874	23.8000	1891	27.1288	1908	24.3409	1925	42.3334	1942	26.5462	1959	6.0212	1976	7.0193	1993	1.4127
1875	25.5000	1892	33.1390	1909	24.5353	1926	35.5667	1943	14.7533	1960	5.1539	1977	5.4335	1994	1.2203
1876	30.6000	1893	28.2796	1910	35.3304	1927	37.6884	1944	17.6432	1961	5.3304	1978	5.0410	1995	0.8985
1877	25.8400	1894	33.3268	1911	49.4800	1928	33.1271	1945	17.3686	1962	6.8824	1979	4.3933	1996	1.3349
1878	31.2800	1895	43.1593	1912	27.5302	1929	32.3213	1946	18.0781	1963	5.8842	1980	4.2635	1997	1.1596
1879	32.6400	1896	32.7554	1913	26.5562	1930	31.9234	1947	21.6640	1964	6.9606	1981	2.3291	1998	0.9012
1880	36.0400	1897	38.0250	1914	38.5013	1931	27.0318	1948	21.2466	1965	8.5838	1982	4.7556	1999	1.6181
1881	37.4000	1898	33.9502	1915	43.8387	1932	23.3302	1949	13.0507	1966	8.4225	1983	1.2495	2000	2.7605
1882	36.8084	1899	24.0036	1916	42.7463	1933	26.8468	1950	13.2843	1967	9.4424	1984	4.7313		

Source: Status Report: Columbia River Fish Runs and Fisheries, 1938-1998, Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife.

Figure 15A Wildlife Habitat Units: Lost & Acquired

Dam	Wildlife Species	HUs Lost	HUs Acquired	HUs Remaining	Percent Completed	Dam	Wildlife Species	HUs Lost	HUs Acquired	HUs Remaining	Percent Completed
Albeni Falls	Bald Eagle (breeding)	4,508	301	4,207	6.7%	Bonneville WA	Black-capped Chickadee	511	429	82	84.0%
Albeni Falls	Bald Eagle (wintering)	4,365	314	4,051	7.2%	Bonneville WA	Canada Goose	1,222	1,112	110	91.0%
Albeni Falls	Black-capped Chickadee	2,286	117	2,169	5.1%	Bonneville WA	Great Blue Heron	2,150	607	1,543	28.2%
Albeni Falls	Canada Goose	4,699	1,161	3,538	24.7%	Bonneville WA	Lesser Scaup	0	0	0	0.0%
Albeni Falls	Mallard	5,985	227	5,758	3.8%	Bonneville WA	Mink	811	1,687	-876	208.0%
Albeni Falls	Muskrat	1,756	82	1,674	4.7%	Bonneville WA	Spotted Sandpiper	1,383	0	1,383	0.0%
Albeni Falls	Redhead Duck	3,379	0	3,379	0.0%	Bonneville WA	Yellow Warbler	82	40	42	48.8%
Albeni Falls	White-tailed Deer	1,680	30	1,650	1.8%	Bonneville WA	All Species	6159	3875	2,284	62.9%
Albeni Falls	Yellow Warbler	0	59	-59	0.0%	Chief Joseph	Bobcat	401	132	269	32.9%
Albeni Falls	All Species	28,658	2291	26,367	8.0%	Chief Joseph	Canada Goose	213	10	203	4.7%
Anderson Ranch	Black-capped Chickadee	890	0	890	0.0%	Chief Joseph	Lesser Scaup	0	0	0	0.0%
Anderson Ranch	Blue Grouse	1,980	0	1,980	0.0%	Chief Joseph	Lewis Woodpecker	286	141	145	49.3%
Anderson Ranch	Mallard	1,048	0	1,048	0.0%	Chief Joseph	Mink	920	137	783	14.9%
Anderson Ranch	Mink	1,732	0	1,732	0.0%	Chief Joseph	Mule Deer	1,992	409	1,583	20.5%
Anderson Ranch	Mule Deer	2,689	0	2,689	0.0%	Chief Joseph	Ring-necked Pheasant	239	0	239	0.0%
Anderson Ranch	Peregrine Falcon	0	0	0	0.0%	Chief Joseph	Sage Grouse	1,179	554	625	47.0%
Anderson Ranch	Ruffed Grouse	919	0	919	0.0%	Chief Joseph	Sharp-tailed Grouse	2,290	14	2,276	0.6%
Anderson Ranch	Yellow Warbler	361	0	361	0.0%	Chief Joseph	Spotted Sandpiper	1,255	10	1,245	0.8%
Anderson Ranch	All Species	9619	0	9,619	0.0%	Chief Joseph	Yellow Warbler	58	26	32	44.8%
Big Cliff	Bald Eagle	0	0	0	0.0%	Chief Joseph	All Species	8833	1433	7,400	16.2%
Big Cliff	Beaver	50	0	50	0.0%	Cougar	American Dipper	285	0	285	0.0%
Big Cliff	Black-tailed Deer	81	0	81	0.0%	Cougar	Bald Eagle	0	0	0	0.0%
Big Cliff	Common Merganser	11	0	11	0.0%	Cougar	Beaver	189	182	7	96.3%
Big Cliff	Osprey	0	0	0	0.0%	Cougar	Black Bear	1,856	0	1,856	0.0%
Big Cliff	Pileated Woodpecker	71	0	71	0.0%	Cougar	Black-tailed Deer	1,192	0	1,192	0.0%
Big Cliff	River Otter	38	0	38	0.0%	Cougar	Cougar	1,472	0	1,472	0.0%
Big Cliff	Roosevelt Elk	81	0	81	0.0%	Cougar	Harlequin duck	282	0	282	0.0%
Big Cliff	Ruffed Grouse	81	0	81	0.0%	Cougar	Osprey	0	0	0	0.0%
Big Cliff	All Species	413	0	413	0.0%	Cougar	Pileated Woodpecker	1,938	0	1,938	0.0%
Black Canyon	Black-capped Chickadee	0	0	0	0.0%	Cougar	River Otter	189	0	189	0.0%
Black Canyon	Canada Goose	214	0	214	0.0%	Cougar	Roosevelt Elk	1,484	0	1,484	0.0%
Black Canyon	Mallard	270	0	270	0.0%	Cougar	Ruffed Grouse	293	0	293	0.0%
Black Canyon	Mink	652	0	652	0.0%	Cougar	Spotted Owl	1,774	0	1,774	0.0%
Black Canyon	Mule Deer	242	0	242	0.0%	Cougar	Waterfowl	0	0	0	0.0%
Black Canyon	Ring-necked Pheasant	260	0	260	0.0%	Cougar	Yellow Warbler	170	25	145	14.7%
Black Canyon	Sharp-tailed Grouse	532	0	532	0.0%	Cougar	All Species	11124	207	10,917	1.9%
Black Canyon	Yellow Warbler	0	0	0	0.0%	Detroit	Bald Eagle	0	0	0	0.0%
Black Canyon	All Species	2170	0	2,170	0.0%	Detroit	Beaver	715	0	715	0.0%
Bonneville OR	Black-capped Chickadee	511	189	322	37.0%	Detroit	Black-tailed Deer	3,061	0	3,061	0.0%
Bonneville OR	Canada Goose	1,222	0	1,222	0.0%	Detroit	Common Merganser	0	0	0	0.0%
Bonneville OR	Great Blue Heron	2,150	388	1,762	18.1%	Detroit	Osprey	0	0	0	0.0%
Bonneville OR	Lesser Scaup	0	0	0	0.0%	Detroit	Pileated Woodpecker	1,156	0	1,156	0.0%
Bonneville OR	Mink	811	0	811	0.0%	Detroit	River Otter	882	0	882	0.0%
Bonneville OR	Spotted Sandpiper	1,383	2	1,381	0.1%	Detroit	Roosevelt Elk	2,210	0	2,210	0.0%
Bonneville OR	Yellow Warbler	82	11	71	13.4%	Detroit	Ruffed Grouse	3,028	0	3,028	0.0%
Bonneville OR	All Species	6159	590	5,569	9.6%	Detroit	Spotted Owl	246	0	246	0.0%
						Detroit	All Species	11298	0	11,298	0.0%

Figure 15A Wildlife Habitat Units: Lost & Acquired (continued)

Dam	Wildlife Species	HUs Lost	HUs Acquired	HUs Remaining	Percent Completed	Dam	Wildlife Species	HUs Lost	HUs Acquired	HUs Remaining	Percent Completed
Dexter	American Dipper	119	0	119	0.0%	Green Peter	Beaver	381	0	381	0.0%
Dexter	Bald Eagle	0	0	0	0.0%	Green Peter	Black-tailed Deer	3,997	0	3,997	0.0%
Dexter	Beaver	832	0	832	0.0%	Green Peter	Common Merganser	21	0	21	0.0%
Dexter	Black-tailed Deer	1,078	0	1,078	0.0%	Green Peter	Osprey	0	0	0	0.0%
Dexter	California quail	664	0	664	0.0%	Green Peter	Pileated Woodpecker	710	0	710	0.0%
Dexter	Greater Scaup	0	0	0	0.0%	Green Peter	River Otter	575	0	575	0.0%
Dexter	Mink	832	0	832	0.0%	Green Peter	Roosevelt Elk	3,997	0	3,997	0.0%
Dexter	Osprey	0	0	0	0.0%	Green Peter	Ruffed Grouse	3,264	0	3,264	0.0%
Dexter	Red Fox	508	0	508	0.0%	Green Peter	All Species	16,432	0	16,432	0.0%
Dexter	Ring-necked Pheasant	332	0	332	0.0%	Hills Creek	American Dipper	200	0	200	0.0%
Dexter	Ruffed Grouse	701	0	701	0.0%	Hills Creek	Bald Eagle	0	0	0	0.0%
Dexter	Western Gray Squirrel	284	0	284	0.0%	Hills Creek	Beaver	326	955	-629	292.9%
Dexter	Wood Duck	644	0	644	0.0%	Hills Creek	Black Bear	2,958	66	2,892	2.2%
Dexter	Yellow Warbler	654	0	654	0.0%	Hills Creek	Black-tailed Deer	2,912	259	2,653	8.9%
Dexter	All Species	6648	0	6,648	0.0%	Hills Creek	Cougar	2,381	110	2,271	4.6%
Foster	Bald Eagle	0	0	0	0.0%	Hills Creek	Harlequin duck	269	0	269	0.0%
Foster	Beaver	245	0	245	0.0%	Hills Creek	Osprey	0	0	0	0.0%
Foster	Black-tailed Deer	890	0	890	0.0%	Hills Creek	Pileated Woodpecker	3,201	0	3,201	0.0%
Foster	Osprey	0	0	0	0.0%	Hills Creek	River Otter	384	0	384	0.0%
Foster	Ring-necked Pheasant	385	0	385	0.0%	Hills Creek	Roosevelt Elk	3,203	106	3,097	3.3%
Foster	River Otter	340	0	340	0.0%	Hills Creek	Ruffed Grouse	468	0	468	0.0%
Foster	Roosevelt Elk	652	0	652	0.0%	Hills Creek	Spotted Owl	2,977	0	2,977	0.0%
Foster	Ruffed Grouse	853	0	853	0.0%	Hills Creek	Waterfowl	0	0	0	0.0%
Foster	Wood Duck	179	0	179	0.0%	Hills Creek	Yellow Warbler	210	0	210	0.0%
Foster	All Species	3544	0	3,544	0.0%	Hills Creek	All Species	19489	1496	17,993	7.7%
Grand Coulee	Black-capped Chickadee	0	2	-2	0.0%	John Day OR	Black-capped Chickadee	435	0	435	0.0%
Grand Coulee	Blue Grouse	0	954	-954	0.0%	John Day OR	California quail	3,162	0	3,162	0.0%
Grand Coulee	Bobcat	0	8	-8	0.0%	John Day OR	Canada Goose	4,005	0	4,005	0.0%
Grand Coulee	Canada Goose (nesting)	74	0	74	0.0%	John Day OR	Great Blue Heron	1,593	0	1,593	0.0%
Grand Coulee	Downy Woodpecker	0	1,495	-1,495	0.0%	John Day OR	Lesser Scaup	0	0	0	0.0%
Grand Coulee	Great Blue Heron	0	4,500	-4,500	0.0%	John Day OR	Mallard	3,700	0	3,700	0.0%
Grand Coulee	Mallard	0	2	-2	0.0%	John Day OR	Mink	719	7	712	1.0%
Grand Coulee	Mink	0	24	-24	0.0%	John Day OR	Mule Deer	0	5,966	-5,966	0.0%
Grand Coulee	Mourning Dove	9,316	1,001	8,315	10.7%	John Day OR	Spotted Sandpiper	1,593	0	1,593	0.0%
Grand Coulee	Mule Deer	27,133	17,172	9,961	63.3%	John Day OR	Western Meadowlark	2,530	8,070	-5,540	319.0%
Grand Coulee	Pigmy Rabbit	0	1,246	-1,246	0.0%	John Day OR	Yellow Warbler	543	14	529	2.6%
Grand Coulee	Riparian Forest	1,632	200	1,432	12.3%	John Day OR	All Species	18280	14057	4,223	76.9%
Grand Coulee	Riparian Shrub	27	0	27	0.0%	John Day WA	Black-capped Chickadee	435	677	-242	155.6%
Grand Coulee	Ruffed Grouse	16,502	2,908	13,594	17.6%	John Day WA	California quail	3,162	4,581	-1,419	144.9%
Grand Coulee	Sage Grouse	2,746	7,432	-4,686	270.7%	John Day WA	Canada Goose	4,005	2,742	1,263	68.5%
Grand Coulee	Sharp-tailed Grouse	32,723	14,789	17,934	45.2%	John Day WA	Great Blue Heron	1,593	1,691	-98	106.2%
Grand Coulee	Western Meadowlark	0	286	-286	0.0%	John Day WA	Lesser Scaup	0	0	0	0.0%
Grand Coulee	White-tailed Deer	21,632	9,064	12,568	41.9%	John Day WA	Mallard	3,700	3,083	617	83.3%
Grand Coulee	Yellow Warbler	0	129	-129	0.0%	John Day WA	Mink	719	1,430	-711	198.9%
Grand Coulee	All Species	111785	61212	50,573	54.8%	John Day WA	Spotted Sandpiper	1,593	0	1,593	0.0%
Green Peter	Bald Eagle	0	0	0	0.0%	John Day WA	Western Meadowlark	2,530	1,927	603	76.2%
Green Peter	Band-tailed Pigeon	3,487	0	3,487	0.0%	John Day WA	Yellow Warbler	543	667	-124	122.8%
						John Day WA	All Species	18280	16798	1,482	91.9%

Figure 15A Wildlife Habitat Units: Lost & Acquired (continued)

Dam	Wildlife Species	HUs Lost	HUs Acquired	HUs Remaining	Percent Completed	Wildlife Dam	HUs Species	HUs Lost	HUs Acquired	Percent Remaining	Completed
Lookout Point	American Dipper	350	0	350	0.0%	McNary WA	Spotted Sandpiper	1,090	0	1,090	0.0%
Lookout Point	Bald Eagle	0	0	0	0.0%	McNary WA	Western Meadowlark	2,775	976	1,799	35.2%
Lookout Point	Beaver	1,739	0	1,739	0.0%	McNary WA	Yellow Warbler	263	368	-105	139.9%
Lookout Point	Black-tailed Deer	4,043	0	4,043	0.0%	McNary WA	All Species	18,834	16,880	1,954	89.6%
Lookout Point	California quail	1,937	0	1,937	0.0%	Minidoka	Mallard	0	0	0	0.0%
Lookout Point	Common Merganser	95	0	95	0.0%	Minidoka	Marsh Wren	0	0	0	0.0%
Lookout Point	Mink	1,586	0	1,586	0.0%	Minidoka	Mule Deer	3,413	0	3,413	0.0%
Lookout Point	Osprey	0	0	0	0.0%	Minidoka	Redhead Duck	0	0	0	0.0%
Lookout Point	Pileated Woodpecker	1,614	0	1,614	0.0%	Minidoka	River Otter	2,993	0	2,993	0.0%
Lookout Point	Red Fox	2,082	0	2,082	0.0%	Minidoka	Sage Grouse	3,755	0	3,755	0.0%
Lookout Point	Ring-necked Pheasant	1,654	0	1,654	0.0%	Minidoka	Western Grebe	0	0	0	0.0%
Lookout Point	Roosevelt Elk	3,668	0	3,668	0.0%	Minidoka	Yellow Warbler	342	0	342	0.0%
Lookout Point	Ruffed Grouse	2,457	0	2,457	0.0%	Minidoka	All Species	10503	0	10,503	0.0%
Lookout Point	Spotted Owl	714	0	714	0.0%	Palisades	Bald Eagle (breeding)	5,941	715	5,226	12.0%
Lookout Point	Western Gray Squirrel	1,070	0	1,070	0.0%	Palisades	Bald Eagle (wintering)	18,565	4,089	14,476	22.0%
Lookout Point	Wood Duck	1,124	0	1,124	0.0%	Palisades	Black-capped Chickadee	1,358	18	1,340	1.3%
Lookout Point	Yellow Warbler	1,321	0	1,321	0.0%	Palisades	Canada Goose	805	33	772	4.1%
Lookout Point	All Species	25,454	0	25,454	0.0%	Palisades	Mallard	2,622	172	2,450	6.6%
Lower Snake	Black-capped Chickadee	0	1,014	-1,014*	0.0%	Palisades	Mink	2,276	167	2,109	7.3%
Lower Snake	California quail	20,508	1,936	18,572	9.4%	Palisades	Mule Deer	2,454	2,093	361	85.3%
Lower Snake	Canada Goose	2,040	7	2,033	0.3%	Palisades	Peregrine Falcon	0	0	0	0.0%
Lower Snake	Downy Woodpecker	365	238	127	65.2%	Palisades	Ruffed Grouse	2,331	197	2,134	8.5%
Lower Snake	Mallard (nesting)	0	365	-365*	0.0%	Palisades	Yellow Warbler	718	82	636	11.4%
Lower Snake	Mink	0	48	-48	0.0%	Palisades	All Species	37,070	7566	29,504	20.4%
Lower Snake	Mule Deer	0	1,456	-1,456*	0.0%	The Dalles OR	Black-capped Chickadee	91	0	91	0.0%
Lower Snake	Ring-necked Pheasant	2,647	49	2,598	1.9%	The Dalles OR	Canada Goose	220	0	220	0.0%
Lower Snake	Sage Grouse	0	45	-45	0.0%	The Dalles OR	Great Blue Heron	213	0	213	0.0%
Lower Snake	Song Sparrow	288	1,060	-772*	368.1%	The Dalles OR	Lesser Scaup	0	0	0	0.0%
Lower Snake	Western Meadowlark	0	2,207	-2,207*	0.0%	The Dalles OR	Mink	165	0	165	0.0%
Lower Snake	Yellow Warbler	927	436	491	47.0%	The Dalles OR	Spotted Sandpiper	267	0	267	0.0%
Lower Snake	All Species	26775	8,861	17,914	33.1%	The Dalles OR	Western Meadowlark	124	0	124	0.0%
McNary OR	California quail	1,263	1,448	-185*	114.7%	The Dalles OR	Yellow Warbler	85	0	85	0.0%
McNary OR	Canada Goose	697	0	697	0.0%	The Dalles OR	All Species	1165	0	1,165	0.0%
McNary OR	Downy Woodpecker	75	1	74	1.3%	The Dalles WA	Black-capped Chickadee	91	272	-181*	298.9%
McNary OR	Mallard (nesting)	1,392	93	1,299	6.7%	The Dalles WA	Canada Goose	220	734	-514*	333.6%
McNary OR	Mallard (wintering)	0	0	0	0.0%	The Dalles WA	Great Blue Heron	213	111	102	52.1%
McNary OR	Mink	250	83	167	33.2%	The Dalles WA	Lesser Scaup	0	0	0	0.0%
McNary OR	Spotted Sandpiper	273	20	253	7.3%	The Dalles WA	Mink	165	410	-245*	248.5%
McNary OR	Western Meadowlark	694	686	8	98.9%	The Dalles WA	Spotted Sandpiper	267	158	109	59.2%
McNary OR	Yellow Warbler	66	3	63	4.6%	The Dalles WA	Western Meadowlark	124	58	66	46.8%
McNary OR	All Species	4,710	2,334	2,376	49.6%	The Dalles WA	Yellow Warbler	85	156	-71	183.5%
McNary WA	California quail	5,051	10,275	-5,224*	203.4%	The Dalles WA	All Species	1165	1899	-734*	163.0%
McNary WA	Canada Goose	2,787	2,323	464	83.4%	Grand Total	All Species	404,567	139,499	265,068	34.5%
McNary WA	Downy Woodpecker	301	657	-356	218.3%	Source: Bonneville Power Administration					
McNary WA	Mallard (nesting)	5,567	1,803	3,764	32.4%						
McNary WA	Mallard (wintering)	0	0	0	0.0%						
McNary WA	Mink	1,000	478	522	47.8%						

Figure 15B Wildlife Habitat Units Lost and Acquired & Estimated, by Dam Group

Dam Group	Dam	HUs Lost	HUs Acquired & Estimated*	Percent Completed
Lower Columbia	Bonneville	12318	6187	50.2%
Lower Columbia	John Day	36560	32734	89.5%
Lower Columbia	McNary	23544	26233	111.4%
Lower Columbia	The Dalles	2330	1899	81.5%
		74752	67053	89.7%
Lower Snake	Four Lower Snake Dams	26775	8861	33.1%
Upper Columbia	Albeni Falls	28658	3921	13.7%
Upper Columbia	Chief Joseph	8833	1433	16.2%
Upper Columbia	Grand Coulee	111785	61553	55.1%
		149276	66907	44.8%
Upper Snake	Anderson Ranch	9619	0	0.0%
Upper Snake	Black Canyon	2170	57	2.6%
Upper Snake	Minidoka	10503	1708	16.3%
Upper Snake	Palisades	37070	14890	40.2%
		59362	16655	28.1%
Willamette	Big Cliff	413	32	7.7%
Willamette	Cougar	11124	307	2.8%
Willamette	Detroit	11298	58	0.5%
Willamette	Dexter	6648	150	2.3%
Willamette	Foster	3544	96	2.7%
Willamette	Green Peter	16432	0	0.0%
Willamette	Hills Creek	19489	1496	7.7%
Willamette	Lookout Point	25454	0	0.0%
		94402	2139	2.3%
	Grand Total	404567	314369	77.7%

* Estimated HUs are those not yet credited by Bonneville against losses.

Source: Bonneville Power Administration

Figure 15C Wildlife Habitat Units (HUs) Lost, Gained, Acquired, Estimated***, Total, and Percent Complete Ordered by Dam or Area

Dam	HUs Lost	HUs Gained	HUs Acquired	HUs Estimated***	Total Acquired & Estimated*** HUs
Albeni Falls	28,658	171	2,306	1,615	3,921
Anderson Ranch	9,619	0	0	0	0
Big Cliff	413	40	0	32	32
Black Canyon	2,170	76	0	57	57
Bonneville OR	6,159	1,335	590	0	590
Bonneville WA	6,159	1,335	3,875	1,722	5,597
Chief Joseph	8,833	1,440	1,433	0	1,433
Cougar	11,124	1,637	207	100	307
Detroit	11,298	3,233	0	58	58
Dexter	6,648	1,214	0	150	150
Foster	3,544	926	0	96	96
Grand Coulee	111,785	0	61,212	341	61,553
Green Peter	16,432	4,742	0	0	0
Hills Creek	19,489	853	1,496	0	1,496
John Day OR	18,280	7,199	14,057	1,879	15,936
John Day WA	18,280	7,199	16,798	0	16,798
Lookout Point	25,454	2,636	0	0	0
Lower Snake **	26,775	0	8,861	0	8,861
McNary OR	4,710	2,749	2,334	1,954	4,288
McNary WA	18,834	10,995	16,880	5,065	21,945
Minidoka	10,503	5,129	0	1,708	1,708
Palisades	37,070	0	7,566	7,324	14,890
The Dalles OR	1,165	289	0	0	0
The Dalles WA	1,165	289	1,899	0	1,899
Total	404,567	53,487	139,514	22,101	161,615

** Mitigation Projects where credits have not been accounted:

* Denny Jones BLM allotment: 34,022 acres

* Denny Jones State allotment: 4,355 acres

* NE Oregon Project acquisition: 1,175 acres

* Enhancement Potential on 24,350 acres acquired to date

*** Estimated HUs are those not yet credited by Bonneville against losses.

Source: Bonneville Power Administration

Figure 15D BPA Expenditures for Individual Wildlife Tracts

WL Site	Tract	Acres Protected	Purchase Cost	Purchase Type	WL Site	Tract	Acres Protected	Purchase Cost	Purchase Type
Blue Creek Winter Range	Abrahamson Property (A 322)	78	\$42,237	Fee Title	McCoy Lake Watershed	People Living God Prop.	440	\$498,000	Fee Title
Blue Creek Winter Range	Blue Creek Land Swap	701	\$812,000	Exchange	Muddy Cr / Marys River	Muddy Cr / Marys River	222	\$387,500	Fee Title
Boise River WMA	Krueger	166	\$332,500	Fee Title	Pend Oreille Wetlands	Pend Oreille Wetlands I	436	\$427,185	Fee Title
Boundary Creek WMA	Boundary Creek	1,405	\$672,885	Fee Title	Pend Oreille Wetlands	Pend Oreille Wetlands II	164	\$199,500	Fee Title
Burlington Bottoms	Burlington Bottoms	417	\$700,000	Fee Title	Perkins Lake	Perkins Lake Tract	98	\$200,000	Fee Title
Canby Landing	Canby Property	23	\$250,000	Fee Title	Pine Creek	Pine Creek	24,304	\$3,200,000	Purchase in process
Deer Parks WMU	BeaverDick (Kinghorn 1)	310	\$465,000	Fee Title					
Deer Parks WMU	Boyle Ranch	2,556	\$5,200,000	Fee Title	Precious Lands WMA	Precious Lands	15,325	\$4,250,524	Fee Title
Deer Parks WMU	Menan (Kinghorn 2)	140	\$220,350	Fee Title	Rainwater Ranch	Rainwater Ranch	8,678	\$4,085,550	Fee Title
Denny Jones	Denny Jones Ranch	6,385	\$1,700,000	Fee Title	Rudeen	Rudeen	2,450	\$1,700,000	Fee Title
Fox Creek	Kieffer Property	40	\$64,000	Fee Title	Sage Flat WA	Sage Flat	8,380	\$1,526,057	Mix
Fox Creek	Smith Property	160	\$320,000	Fee Title	Scotch Creek WA	Chesaw	4,290	\$9,000	Fee Title
Hellsgate	Berg	6,300	\$2,000,000	Fee Title	Scotch Creek WA	Scotch Creek	7,300	\$295,291	Fee Title
Hellsgate	Bill Kuenhe	4,814	\$2,275,000	Fee Title	Scotch Creek WA	Tunk	320	\$158,665	Fee Title
Hellsgate	Colville Allotments	80	\$21,746	Fee Title	Soda Hills WHMA	Soda Hills	2,563	\$1,282,000	Fee Title
Hellsgate	Covington	129	\$68,000	Fee Title	Sorenson	Sorenson	42	\$172,955	Fee Title
Hellsgate	Friedlander	60	\$47,116	Fee Title	Squaw Creek WA	Squaw Creek	5,937	\$2,260,625	Fee Title
Hellsgate	Graves	2,700	\$657,403	Fee Title	Steigerwald Lake NWR	Bliss	9	\$110,000	Fee Title
Hellsgate	Henry Kuehne	4,860	\$3,000,000	Fee Title	Steigerwald Lake NWR	Burlington Northern	27	\$139,000	Fee Title
Hellsgate	Hinman	770	\$139,608	Fee Title	Steigerwald Lake NWR	James	90	\$594,000	Fee Title
Hellsgate	Nespelem Bend	517	\$95,000	Fee Title	Steigerwald Lake NWR	Straub	191	\$872,852	Fee Title
Hellsgate	Redford Canyon	221	\$175,000	Fee Title	Swanson Lakes	Nelson	792	\$191,889	Exchange
Hellsgate	Sand Hills	1,394	\$575,000	Fee Title	Swanson Lakes	Swanson Lakes	14,939	\$3,071,856	Fee Title
Kruse Pine Creek Esmnt	Pine Creek (Kruse)	800	\$310,000	Easement	Tacoma/Trimble WMA	Lower Trimble Creek	450	\$506,000	Fee Title
Ladd Marsh	Ladd Marsh	940	\$265,000	Mix	Tacoma/Trimble WMA	Tacoma Creek	437	\$535,000	Fee Title
Little Pend Oreille NWR	Kaniksu Addition	716	\$313,000	Mix	Tacoma/Trimble WMA	Upper Trimble Creek	303	\$304,500	Fee Title
Little Pend Oreille NWR	Weir	200	\$275,707	Fee Title	Tex Creek WMA	Quarter Circle	2,135	\$260,000	Fee Title
Logan Valley	Logan Valley	1,700	\$2,000,000	Fee Title	The Pend Oreille WMA	Albeni Cove	70	\$126,208	Fee Title
Lower Yakima Wetlands	Buena	92	\$102,200	Lease	The Pend Oreille WMA	Carter Island	96	\$288,000	Fee Title
Lower Yakima Wetlands	Knight Property	80	\$79,000	Easement	The Pend Oreille WMA	Cocolalla Lake	98	\$290,500	Fee Title
Lower Yakima Wetlands	Lateral A	417	\$830,000	Easement	The Pend Oreille WMA	Denton Slough	17	\$44,000	Fee Title
Lower Yakima Wetlands	Lower Satus	1,791	\$393,000	Mix	The Pend Oreille WMA	Derr Creek (Henderson Ranch)	240	\$511,000	Fee Title
Lower Yakima Wetlands	Mosebar	733	\$167,725	Mix	The Pend Oreille WMA	Pack River (McMahon)	30	\$42,500	Fee Title
Lower Yakima Wetlands	North Satus	1,110	\$331,150	Mix	The Pend Oreille WMA	Rapid Lightening (Ginter)	110	\$219,900	Fee Title
Lower Yakima Wetlands	Old Goldendale	193	\$89,250	Easement	The Pend Oreille WMA	Trout Creek (Hunter Ranch)	216	\$875,500	Fee Title
Lower Yakima Wetlands	S Barkes Rd.	81	\$91,000	Lease	The Pend Oreille WMA	Westmond Lake	65	\$118,000	Fee Title
Lower Yakima Wetlands	Satus	4,474	\$975,750	Mix	Thurston	Thurston	54	\$121,275	Easement
Lower Yakima Wetlands	South Campbell	280	\$229,875	Lease	Trout Creek Peninsula	Wheeler Peninsula Tract	112	\$155,000	Fee Title
Lower Yakima Wetlands	Toppenish	1,600	\$809,925	Mix	Tualatin River NWR	Oleson Tract 1	132	\$577,908	Mix
Lower Yakima Wetlands	Wanity	361	\$120,000	Mix	Tualatin River NWR	Oleson Tract 2	100	\$859,210	Mix
Lower Yakima Wetlands	Wapato	770	\$395,750	Easement	Vancouver Lowlands	Vancouver Lowlands (Shillapoo)	612	\$1,740,657	Fee Title
Lower Yakima Wetlands	West Satus	160	\$147,175	Lease	Wanaket	Wanaket (Conforth Ranch)	2,817	\$1,042,976	Fee Title
McCoy Lake Watershed	Etue Property	74	\$148,720	Fee Title	Wellpinit Mtn WA	Wynecoop (A 67B)	80	\$83,000	Fee Title
McCoy Lake Watershed	Harris Property	180	\$194,940	Fee Title	Whitney	Whitney	54	\$121,680	Easement
McCoy Lake Watershed	Kenworthy Property	40	\$60,000	Fee Title	Willow Creek	Willow Creek	329	\$1,058,000	Easement
McCoy Lake Watershed	McCrea Property (A 401 A)	35	\$19,530	Fee Title	Winterfeld Easement	Winterfeld	422	\$225,000	Easement

Source: Bonneville Power Administration

Figure 16 Wildlife Habitat Units Lost and Acquired, Species Most Affected

Wildlife Species	HUs Lost	HUs Acquired	HUs Net	Percent Completed	Wildlife Species	HUs Lost	HUs Acquired	HUs Remaining	Percent Completed
Mule Deer	37,923	27,096	10,827	71.5%	Band-tailed Pigeon	3,487	0	3,487	0.0%
California Quail	35,747	18,240	17,507	51.0%	Redhead Duck	3,379	0	3,379	0.0%
Sharp-tailed Grouse	35,545	14,803	20,742	41.6%	Red Fox	2,590	0	2,590	0.0%
Bald Eagle	33,379	5,419	27,960	16.2%	Blue Grouse	1,980	954	1,026	48.2%
Ruffed Grouse	30,897	3,105	27,792	10.0%	Wood Duck	1,947	0	1,947	0.0%
Mallard	24,284	5,745	18,539	23.7%	Muskrat	1,756	82	1,674	4.7%
White-tailed Deer	23,312	9,094	14,218	39.0%	Riparian Forest	1,632	200	1,432	12.3%
Canada Goose	22,423	8,122	14,301	36.2%	Western Gray Squirrel	1,354	0	1,354	0.0%
Black-tailed Deer	17,254	259	16,995	1.5%	American Dipper	954	0	954	0.0%
Roosevelt Elk	15,295	106	15,189	0.7%	Downy Woodpecker	741	2,391	-1,650*	322.7%
Mink	12,638	4,471	8,167	35.4%	Harlequin duck	551	0	551	0.0%
Mourning Dove	9,316	1,001	8,315	10.7%	Bobcat	401	140	261	34.9%
Spotted Sandpiper	9,104	190	8,914	2.1%	Song Sparrow	288	1,060	-772*	368.1%
Western Meadowlark	8,777	14,210	-5,433*	161.9%	Lewis Woodpecker	286	141	145	49.3%
Pileated Woodpecker	8,690	0	8,690	0.0%	Common Merganser	127	0	127	0.0%
Great Blue Heron	7,912	7,297	615	92.2%	Riparian Shrub	27	0	27	0.0%
Sage Grouse	7,680	8,031	-351*	104.6%	Greater Scaup	0	0	0	-
Black-capped Chickadee	6,608	2,718	3,890	41.1%	Lesser Scaup	0	0	0	-
Yellow Warbler	6,510	2,016	4,494	31.0%	Marsh Wren	0	0	0	-
Spotted Owl	5,711	0	5,711	0.0%	Osprey	0	0	0	-
Ring-necked Pheasant	5,517	49	5,468	0.9%	Peregrine Falcon	0	0	0	-
River Otter	5,401	0	5,401	0.0%	Pygmy Rabbit	0	1,246	-1,246*	-
Black Bear	4,814	66	4,748	1.4%	Waterfowl	0	0	0	-
Beaver	4,477	1,137	3,340	25.4%	Western Grebe	0	0	0	-
Cougar	3,853	110	3,743	2.9%	Totals	404,567	139,499	265,068	34.5%

* HU acquisitions exceed losses for these species. Therefore, negative numbers represent excess habitat units.

Source: Bonneville Power Administration

Figure 17A BPA Wildlife Acres Protected by Agency

Agency Name	Acres Protected
Montana Department of Fish & Wildlife - Helena	70386
Washington Department of Fish & Wildlife	69540
Idaho Department of Fish & Game	68934
Burns Paiute Tribe	46462
Warm Springs Tribes	24304
Colville Confederated Tribes	21845
Nez Perce Tribe	20198
Umatilla Confederated Tribes	17432
Yakama Nation	12142
Montana Land Reliance	5041
Shoshone-Bannock Tribes	5013
USFS - Flathead National Forest	2383
Kalispel Tribe of Indians	1970
Spokane Tribe of Indians	1828
Oregon Department of Fish & Wildlife- Hq	1752
US Fish and Wildlife Service - Portland Region	1465
The Nature Conservancy - OR	329
Kootenai Tribe of Idaho	109
The Nature Conservancy - MT	107
US Fish and Wildlife Service - Denver Region	80
Flathead Land Trust	60
Total	371,380

Source: Bonneville Power Administration

Figure 17B BPA wildlife acquisition costs by agencies

Agency Name	Cost
Idaho Department of Fish & Game	17,844,110
Colville Confederated Tribes	9,053,873
Umatilla Confederated Tribes	7,389,151
Washington Department of Fish & Wildlife	6,993,415
Nez Perce Tribe	6,721,939
Yakama Nation	4,761,800
US Fish and Wildlife Service - Portland Region	3,741,677
Montana Department of Fish & Wildlife - Helena	3,728,583
Burns Paiute Tribe	3,700,000
Warm Springs Tribes	3,200,000
Shoshone-Bannock Tribes	2,982,000
Kalispel Tribe of Indians	2,472,185
Spokane Tribe of Indians	2,242,427
Oregon Department of Fish & Wildlife- Hq	2,018,410
Kootenai Tribe of Idaho	1,750,000
The Nature Conservancy - OR	1,058,000
USFS - Flathead National Forest	416,000
Montana Land Reliance	100,059
US Fish and Wildlife Service - Denver Region	5,000
Flathead Land Trust	3,598
The Nature Conservancy - MT	2,200
Total	80,184,427

Source: Bonneville Power Administration

Fig. 18 Location of BPA Wildlife Projects by Province and Subbasin*

Province	Subbasin	Site	Acres Protected	Purchase Type	Province	Subbasin	Site	Protected	Type	
Blue Mountain	Grande Ronde	Ladd Marsh	940	Mix	Lower Columbia	Willamette	Burlington Bottoms	417	Fee Title	
	Grande Ronde	Precious Lands WMA	15325	Fee Title		Willamette	Canby Landing	23	Fee Title	
Cascade Columbia	Columbia Upper Middle	Sage Flat WA	8380	Mix		Willamette	Muddy Cr / Marys River	222	Fee Title	
	Okanogan	Scotch Creek WA	11910	Fee Title		Willamette	Sorenson	42	Fee Title	
Columbia Plateau	Columbia Lower Middle	Columbia Basin Wetlands	100	Fee Title		Columbia Lower	Steigerwald Lake NWR	317	Fee Title	
	Yakima	Lower Yakima Wetlands	12142	All		Willamette	Thurston	54	Easement	
	John Day	Pine Creek	24304	Fee Title		Willamette	Tualatin River NWR	232	Mix	
	Walla Walla	Rainwater Ranch	8678	Fee Title		Columbia Lower	Vancouver Lowlands	612	Fee Title	
	Umatilla	Squaw Creek WA	5937	Fee Title		Willamette	Whitney	54	Easement	
	Yakima	Sunnyside	1280	Lease		Willamette	Willow Creek	329	Easement	
	Crab	Swanson Lakes	15791	All		Middle Snake	Snake Upper Middle	Boise River WMA	166	Fee Title
	Columbia Lower Middle	Wanaket	2817	Fee Title			Malheur	Denny Jones	44762	Fee Title
	Yakima	Wenas WA	30053	Lease			Malheur	Logan Valley	1700	Fee Title
	Intermountain	Spokane	Blue Creek Winter Range	779		Exchange	Mountain Columbia	Kootenai	Boundary Creek WMA	1405
Pend Oreille		Carey Creek	117	Fee Title	Flathead	Hungry Horse Mitigation		44605	All	
Spokane		Fox Creek	200	Fee Title	Clark Fork	The Pend Oreille WMA		942	Fee Title	
Columbia Upper		Hellsgate	21845	Fee Title	Mountain Snake	Clearwater	Buck Creek Old Growth	67	Fee Title	
San Poil		Libby Dam Mitigation	33452	Easement		Clearwater	Dworshak Mitigation	59991	Fee Title	
Pend Oreille		Little Pend Oreille NWR	916	All	Clearwater	Dworshak Tribal	4873	Fee Title		
Spokane		McCoy Lake Watershed	769	Fee Title	Upper Snake	Snake Upper	Camas Prairie	1364	Fee Title	
Pend Oreille		Pend Oreille Wetlands	600	Fee Title		Snake Upper	Deer Parks WMU	3006	Fee Title	
Pend Oreille		Perkins Lake	98	Fee Title		Snake Upper	Kruse Pine Crk Easement	800	Easement	
Pend Oreille		Priest River	63	Fee Title		Snake Upper	Rudeen	2450	Fee Title	
Pend Oreille		Tacoma/Trimble WMA	1190	Fee Title		Snake Upper	Soda Hills WHMA	2563	Fee Title	
Pend Oreille		Trout Creek Peninsula	112	Fee Title		Snake Upper	Tex Creek WMA	2135	Fee Title	
Spokane	Wellpinit Mtn WA	80	Fee Title	Snake Upper	Winterfeld Easement	422	Easement			
					Total			371431		

*Note a site may be in more than one Province or Subbasin

Source: Bonneville Power Administration

Figure 19 BPA MOA funding, Actual Expenditures, 1996-2001

	FY	Actual 1996	Actual 1997	Actual 1998	Actual 1999	Actual 2000	Actual 2001	96-01 Total	96-01 Avg
Direct Program Expenses									
MOA Plan		100.0	100.0	100.0	100.0	100.0	100.0	600.0	100.0
Avg Expenditure Amount Available 1/		100.0	133.1	153.5	150.6	144.6	138.6		
Actual (FY 1996-2001) 2/		68.5	82.2	104.9	108.2	108.2	101.1	573.0	95.5
Carry Forward Balance 3/ 4/		31.5	50.9	48.6	42.5	36.4	37.5		
Reimbursable F&W Expenses of Other Agencies									
MOA Plan		38.4	40.5	40.5	40.5	40.5	40.5	240.9	40.2
Avg Expenditure Amount Available		40.2	45.3	50.0	54.4	56.6	60.4		
Actual (FY 1996-2001)		35.4	35.9	36.4	38.9	37.6	42.4	226.6	37.8
Carry Forward Balance 4/		4.8	9.4	13.6	15.5	19.0	18.0		
Capital Investments Fixed Expenses									
MOA Plan		73.1	87.2	105.7	117.7	129.3	129.3	642.3	107.1
Avg Expenditure Amount Available 1/		111.5	151.9	190.3	233.4	278.6	325.4		
Actual (FY 1996-2001)		73.1	76.3	74.1	76.1	77.2	77.1	453.8	75.6
Carry Forward Balance 4/		38.4	75.6	116.2	157.3	201.4	248.3		
Total									
MOA Plan		211.5	227.7	246.2	258.2	269.8	269.8	1,483.2	247.2
Avg Expenditure Amount Available 1/		251.7	330.3	393.8	438.4	479.8	524.4		
Actual Expenditures		176.9	194.3	215.4	223.2	222.9	220.6		
Carry Forward Balance 4/		74.8	136.0	178.4	215.3	256.8	303.8		
River Operations									
Power Purchases		0.0	0.0	5.4	47.6	64.8	1,389.6	1,507.4	251.2
Foregone Revenues		81.7	107.8	116.5	197.8	193.1	115.9	812.8	135.5
Other 6/		1.6	2.4	-1.9	5.9	79.1	0.0	87.1	14.5
Total		83.3	110.2	120.0	251.3	337.0	1,505.5	2,407.3	401.2
Actual Expenditures Grand Total		\$260.2	\$304.5	\$335.4	\$474.5	\$559.9	\$1,726.1	\$3,660.7	\$610.1
ESA Related Transmission Enhancements		0.0	12.7	1.6	0.1	0.9	1.9	17.2	2.9

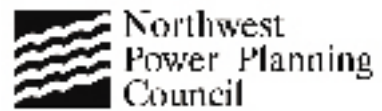
Assumptions:

Expenditure Plan and River Operations equal display in BPA's FY 2003 Congressional Budget. Actual Expenditures for all expenses and capital investments reflect FY 1996 - 2001 actual results. This funding stream shows the most likely accruals related to Obligations from the NWPPC prioritization process. Actual accruals may be more or less during a given year within the 6 year MOA period.

Notes:

- 1/ In addition, \$27 million per year in capital funding (borrowing) will be provided by BPA for the Direct Program through 2001. The Interest and Amortization for this is reflected in the Expenditures Plan for the Capital Investment category.
- 2/ This information is reported on an accrual basis. For Direct Program management purposes, BPA also reports these expenditures on an obligations basis. Typically the accruals lag the obligations, since not all funds are expended in the year in which they are obligated.
- 3/ BPA's FY 1996 - 2001 Fish and Wildlife Program Expense Budget is \$100 million per year. Actual expenses for FY 1996 - 2001 were approximately \$37.5 million less than what was available.
- 4/ Original MOA Plan included interest at 5.093 percent for FY 1999 - 2001. The actual interest rate is determined annually (10/1). The interest rate for FY 1996 is 5.083%, 1997 is 5.093%, 1998 is 4.221%, 1999 is 4.864%, 2000 is 6.193%.
- 5/ During the initial discussions when developing the MOA, the "96-01 Avg" was estimated to be about \$435 million.
- 6/ These estimated costs are related to limitations placed on operating ranges (forebay levels and generator efficiency) and other operations for fish which produce effects on power production not identified in Hydro regulation models.

Source: Bonneville Power Administration



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