United States General Accounting Office

GAO

Report to the Ranking Minority Member, Subcommittee on Fisheries, Wildlife, and Water, Committee on Environment and Public Works, U.S. Senate

July 2002

COLUMBIA RIVER BASIN SALMON AND STEELHEAD

Federal Agencies' Recovery Responsibilities, Expenditures and Actions

GAO-02-612

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Abbreviations

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FCRPS	Federal Columbia River Power System
FWS	Fish and Wildlife Service
GAO	General Accounting Office
GPRA	Government Performance Results Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Agency
NRCS	Natural Resources Conservation Service
USGS	United States Geological Survey

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United States General Accounting Office
Washington, D.C. 20548

July 26, 2002

The Honorable Mike Crapo
Ranking Minority Member
Subcommittee on Fisheries, Wildlife, and Water
Committee on Environment and Public Works
United States Senate

Dear Senator Crapo:

Columbia River Basin salmon and steelhead populations were once the world's largest. Before 1850, an estimated 16 million salmon and steelhead returned to the basin annually to spawn. Over the past 25 years, however, the number of salmon and steelhead returning to the Columbia River Basin has averaged around 660,000 per year, although annual population levels have varied widely. Various factors have contributed to the long-term decline including over-harvesting, the construction and operation of dams, the degradation of spawning habitat, increased human population, and unfavorable weather and ocean conditions. The population decline has resulted in the listing of 12 salmon and steelhead populations in the basin as threatened or endangered under the Endangered Species Act (ESA). Once a species is listed as threatened or endangered, the ESA requires that efforts be taken to allow the species to recover.

The Department of Commerce's National Marine Fisheries Service (NMFS) is the lead agency responsible for the recovery of the threatened or endangered populations of Columbia River Basin salmon and steelhead. The recovery of a species entails the development and implementation of a plan for the species' conservation and survival. The ESA also requires other federal agencies to consult with NMFS before they take any action that may jeopardize the continued existence of listed salmon or steelhead populations in the Columbia River Basin.

You asked us to (1) identify the roles and responsibilities of the federal agencies involved with the recovery of Columbia River Basin salmon and steelhead, (2) determine how much they have spent collectively on recovery efforts, and (3) determine what recovery actions they have undertaken and what they have accomplished. In conducting our work, agency officials and others brought to our attention two issues that may affect the recovery effort: the development of a strategic recovery plan to direct overall recovery efforts along with annual performance plans to implement the strategic plan, and the development of a system to track

ESA consultations to ensure that recovery projects are not unnecessarily delayed by the consultation process. A discussion of these issues is presented in appendix I. Appendix II provides details on the scope and methodology we employed in this review.

Results in Brief

Eleven federal agencies are involved with salmon and steelhead recovery efforts in the Columbia River Basin. NMFS, as the lead agency, is responsible for preparing a recovery plan and consulting with other federal agencies to determine whether the agencies' planned actions will jeopardize listed salmon and steelhead populations. In addition to NMFS, the federal agencies involved in the recovery effort include the following:

- The U.S. Army Corps of Engineers and the Bureau of Reclamation, which operate the Columbia River Basin dams that salmon and steelhead must pass, and the Bonneville Power Administration, which markets the electric power created by water flowing through the dams' turbines.

- The U.S. Forest Service, Bureau of Land Management, and U.S. Fish and Wildlife Service manage natural resources, which include habitat for salmon and steelhead, for multiple purposes, such as timber, grazing, fish, wildlife, and recreation.

- The Environmental Protection Agency, U.S. Geological Survey, Natural Resources Conservation Service, and Bureau of Indian Affairs, which carry out various actions, such as setting water quality standards, performing research, working with landowners, and protecting tribal fishing rights, all of which, directly affect salmon and steelhead populations.

At least 65 groups, such as committees and task forces, have been formed to coordinate recovery efforts between the federal agencies, as well as with states, tribes, local governments, and other interested entities.

The 11 federal agencies estimate they expended almost $1.8 billion (unadjusted for inflation) from fiscal year 1982 through fiscal 1996 and about $1.5 billion (in 2001 dollars) from fiscal year 1997 through fiscal 2001 on efforts specifically designed to recover Columbia River Basin

salmon and steelhead.[1] The $1.5 billion expended in the last 5 fiscal years consists of $968 million that federal agencies spent directly and $537 million that the federal agencies received and then provided to nonfederal entities, such as states and Indian tribes. Four federal agencies accounted for about 88 percent of the $968 million that the federal agencies expended in the last 5 fiscal years.

- The U.S. Army Corps of Engineers expended about $590 million primarily on projects such as improving the passage of juvenile salmon and steelhead at the dams.

- The U.S. Forest Service expended about $106 million primarily on ESA consultations and projects, such as habitat improvement, land acquisition, watershed restoration, in-stream habitat improvement, and improving passage at culverts and small dams that block salmon and steelhead passage.

- The Fish and Wildlife Service expended about $97 million primarily on salmon and steelhead hatcheries.

- The U.S. Bureau of Reclamation expended about $62 million primarily on recovery projects such as water acquisition, augmenting existing water sources, and habitat acquisition.

In addition to the $1.5 billion, the 11 federal agencies estimated that they expended $302 million (in 2001 dollars) in the last 5 fiscal years on modifications to mission-related projects that benefited, but were not specifically directed at, salmon and steelhead, such as erosion control to improve crop productivity and wildlife habitat, which also improves stream flows and reduces sedimentation in spawning habitat.

Federal agencies have undertaken many types of recovery actions and, although these actions are generally viewed as resulting in higher numbers of returning adult salmon and steelhead, there is little conclusive evidence

[1]Funds used for salmon and steelhead recovery are seldom specifically identified and, because each agency has a different accounting system, we asked agency officials to provide actual numbers whenever possible and estimates when specific numbers were not available. Because the 11 agencies provided us with a combined dollar estimate of expenditures for fiscal years 1982 through 1996, we did not adjust these estimates to account for inflation. The remaining data supplied for individual fiscal years 1997 through 2001 have been adjusted to the constant base of 2001 dollars.

to quantify the extent of their effects on returning fish populations. Recovery actions that have been taken include projects such as constructing fish passage facilities at dams; research studies, such as determining the presence or absence of toxic substances that cause diseases in fish; monitoring actions, such as surveying spawning grounds; and others, such as ESA-required consultations. The data to quantify the effects of these actions on fish populations are generally not available because of a number of factors, including large yearly natural fluctuations in returning adult salmon and steelhead, changing weather and ocean conditions, and the length of time it takes for project benefits to materialize. However, federal agency officials are confident that their recovery actions are having positive effects and have resulted in higher numbers of returning adult salmon and steelhead than would have occurred otherwise.

We provided the agencies involved in salmon and steelhead recovery efforts with a draft of this report. The agencies, with the exception of Bonneville, generally agreed with the information in the report. Bonneville raised concerns about the completeness of our report asserting that it did not discuss the source of funds used to cover salmon and steelhead recovery efforts. We revised our report to reflect Bonneville's concerns.

Background

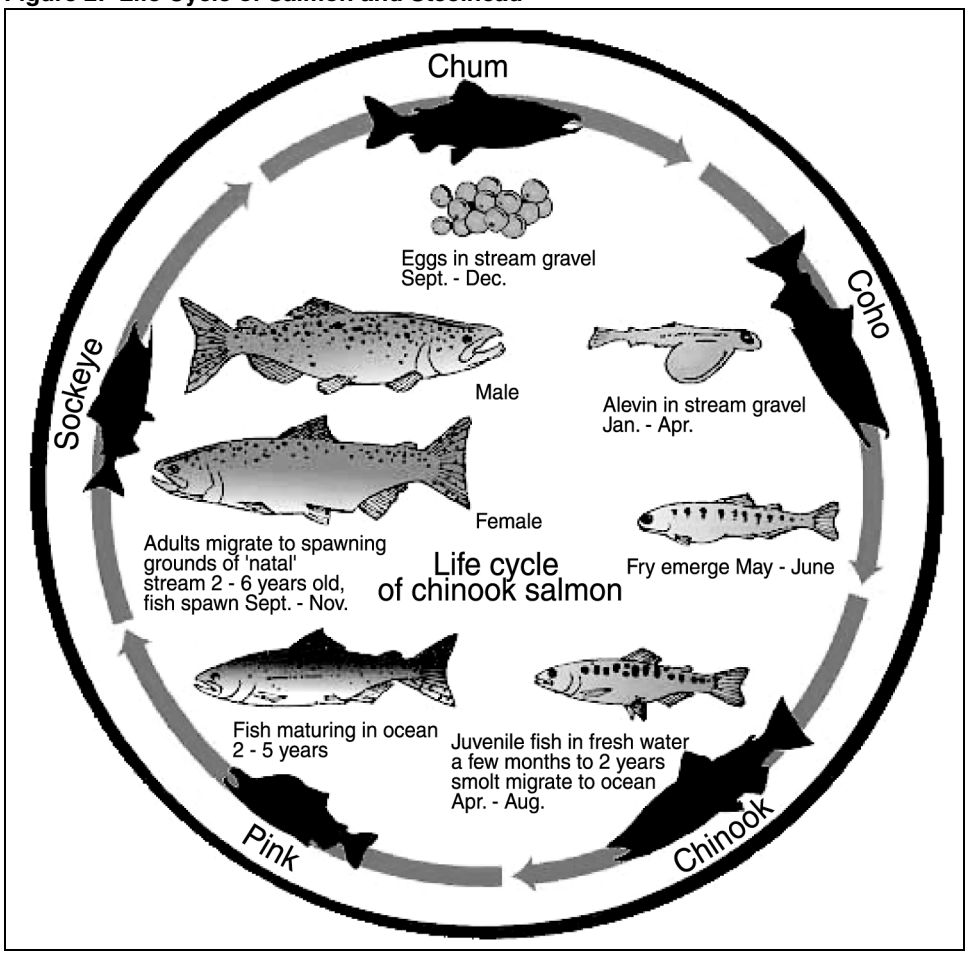
The Columbia River Basin is North America's fourth largest, draining about 258,000 square miles and extending predominantly through the states of Washington, Oregon, Idaho, and Montana and into Canada. (See fig. 1.) It contains over 250 reservoirs and about 150 hydroelectric projects, including 18 dams on the Columbia River and its primary tributary, the Snake River. The Columbia River Basin provides habitat for many species including steelhead and four species of salmon: Chinook, Chum, Coho, and Sockeye.

Figure 1: Map of the Columbia River Basin

Source: U.S. Army Corps of Engineers.

One of the most prominent features of the Columbia River Basin is its population of anadromous fish, such as salmon and steelhead, which are born in freshwater streams, live there for 1 to 2 years, migrate to the ocean to mature for 2 to 5 years, and then return to the freshwater streams to spawn. (See fig. 2.)

Figure 2: Life Cycle of Salmon and Steelhead



Source: Bonneville Power Administration.

Salmon and steelhead face numerous obstacles in their efforts to complete their life cycle. For example, to migrate past dams, juvenile fish must either go through the dams' turbines, go over the dams' spillways, use the installed juvenile bypass systems, or be transported around the dams in

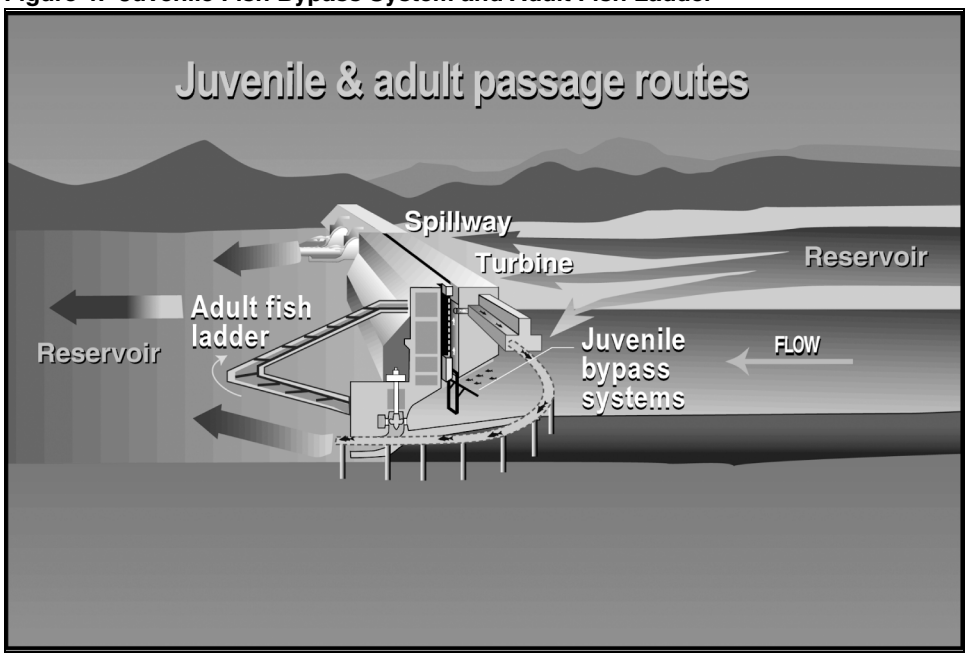
trucks and barges. Each passage alternative has associated risks and contributes to the mortality of juvenile fish. Figure 3 shows one of the trucks used to transport juvenile fish around the dams.

Figure 3: Juvenile Fish Transport Truck

Source: U.S. Army Corps of Engineers.

To return upstream to spawn, adults must locate and use the fish ladders provided at the dams. Once adults make it past the dams, they often have to spawn in habitat adversely affected by farming, mining, cattle grazing, logging, road construction, and industrial pollution. Figure 4 shows a bypass system for juvenile fish migrating downstream and a fish ladder for adult fish returning upstream.

Figure 4: Juvenile Fish Bypass System and Adult Fish Ladder



Source: U.S. Army Corps of Engineers.

Reservoirs formed behind the dams cause problems for both juvenile and adult passage because they slow water flows, alter river temperatures, and provide habitat for predators, all of which may result in increased mortality. Other impacts, such as ocean conditions and snow pack levels, also affect both juvenile and adult mortality. For example, an abundant snow pack aids juvenile passage to the ocean by increasing water flows as it melts.

Given the geographic range and historical importance of salmon and steelhead in the Columbia River Basin, local governments, industries, and private citizens are concerned about the species' recovery. For example, some Indian tribes living in the basin consider salmon to be part of their spiritual and cultural identity, and fishing is still the preferred livelihood of many tribal members. Treaties between individual tribes and the federal government acknowledge the importance of salmon and steelhead to the tribes and guarantee tribes certain fishing rights.

Efforts to increase salmon and steelhead stocks in the Columbia River Basin began as early as 1877 with the construction of the first fish hatchery.

Now, states, tribes, and the federal government operate a series of fish hatcheries located in the Columbia River Basin. Historically, hatcheries were operated to mitigate the impacts of hydropower and other development and had a primary goal of producing fish for commercial, recreational, and tribal harvest. However, hatcheries are now adjusting their operations to ensure that they support recovery or at least do not impede the recovery of listed species.

As dams were built in the 1900s, attempts were made to minimize their impacts by installing fish ladders and bypass systems to help salmon and steelhead migrate up and down the rivers. In the 1980s, several other actions were taken to increase salmon and steelhead populations, including: (1) a treaty between the United States and Canada limiting the ocean harvesting of salmon; (2) the passage of the Pacific Northwest Electric Power Planning and Conservation Act (P.L. 96-501), which called for the creation of an interstate compact to develop a program to protect, and enhance fish and wildlife affected by hydropower development in the Columbia River Basin and mitigate the effects of development; and (3) the beginning of major state, local, and tribal efforts to address habitat restoration through watershed plans. None of these efforts proved to be enough, however, and in the 1990s, 12 salmon and steelhead populations were listed as threatened or endangered under the ESA, resulting in the advent of intensified recovery actions. The 12 listed populations are

- Snake River Fall-run Chinook salmon,
- Snake River Spring/Summer-run Chinook salmon,
- Lower Columbia River Chinook salmon,
- Upper Willamette River Chinook salmon,
- Upper Columbia River Spring-run Chinook salmon,
- Snake River Sockeye salmon,
- Middle Columbia River steelhead,
- Upper Willamette River steelhead;
- Upper Columbia River steelhead

- Snake River steelhead,
- Lower Columbia River steelhead, and
- Columbia River Chum salmon.

Multiple Agencies Participate in Salmon and Steelhead Recovery Efforts

Eleven federal agencies are involved in the recovery of salmon and steelhead in the Columbia River Basin. The federal agencies must comply with the missions and responsibilities set out in their authorizing legislation while also protecting salmon and steelhead under the ESA. Other entities, such as states, tribes, local governments, and private interest groups are also involved in the recovery effort. To facilitate communication and coordination between the federal agencies and other entities, a network of over 65 groups has been formed.

Federal Agency Responsibilities

NMFS is responsible for leading the recovery effort for salmon and steelhead in the Columbia River Basin. NMFS, among other things, is responsible for (1) identifying and listing threatened and endangered salmon and steelhead populations, (2) preparing recovery plans for listed salmon and steelhead populations, and (3) consulting with other agencies to ensure that their planned actions do not further jeopardize the listed populations of salmon and steelhead.

The other 10 agencies involved in the recovery are the 3 that are responsible for operating the dams and selling the electric power they produce (action agencies), the 3 that manage natural resources in the Columbia River Basin (natural resource agencies), and the 4 that carry out various other actions that affect the resources of the basin (other agencies).

The U.S. Army's Corps of Engineers (Corps), the Department of the Interior's Bureau of Reclamation (BOR), and the Department of Energy's Bonneville Power Administration (Bonneville) are the 3 action agencies involved in recovery efforts.

- The Corps is responsible for designing, building, and operating civil works projects to provide electric power, navigation, flood control, and environmental protection. The Corps operates 12 major dams on the Columbia and Snake Rivers that have direct relevance to salmon and

steelhead (Bonneville, The Dalles, John Day, McNary, Ice Harbor, Lower Monumental, Little Goose, Lower Granite, Chief Joseph, Dworshak, Albeni Falls, and Libby).

- BOR is responsible for designing, constructing, and operating water projects in the 17 western states for multiple purposes, including irrigation, hydropower production, municipal and industrial water supplies, flood control, recreation, and fish and wildlife. BOR operates two major dams (Grand Coulee and Hungry Horse), as well as over 50 smaller dams in the Columbia River Basin and is responsible for reducing any detrimental effects that such operations may have on the survival of salmon and steelhead. For example, BOR dams store water for irrigation, and BOR installs screens over irrigation canal entrances to prevent salmon and steelhead from entering and later dying when the water is used and the canals dry up.

- Bonneville is responsible for providing transmission services and marketing the electric power generated by the Corps and BOR dams in the Federal Columbia River Power System (FCRPS). In doing so, it is also obligated by the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act) of 1980 to provide equitable treatment to fish and wildlife along with the other purposes for which FCRPS is operated.

The Department of the Interior's Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (FWS) and the Department of Agriculture's U.S. Forest Service are the natural resource agencies involved in recovery efforts. The overall mission of the natural resource agencies is to manage their lands for multiple purposes, such as grazing, timber, recreation, and fish and wildlife conservation.

- BLM administers 262 million acres of public lands, primarily in 12 western states, and about 300 million additional acres of subsurface mineral resources. Its mission is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. BLM manages a wide variety of resources, including energy and minerals, timber and forage, wild horse and burro populations, fish and wildlife habitat, wilderness areas, and archaeological and other natural heritage values. While conducting its activities, BLM is required by the ESA to avoid actions that would jeopardize the continued existence of listed salmon and steelhead or adversely modify or destroy critical habitat. Consequently, projects are

designed and operated to comply with the ESA. An example is planting trees and vegetation to reduce erosion and to provide shade to cool streams.

- FWS works with other entities to conserve, protect, and enhance fish, wildlife, and plants. It is chiefly responsible for implementing the ESA for terrestrial species, migratory birds, certain marine mammals, and certain fish. FWS operates or funds 37 hatchery facilities in the basin which, along with other purposes, assist in the recovery of listed populations of salmon and steelhead. It also operates three fish health centers and one fish technology center in the basin, which provide the hatcheries with technical support and health screenings of fish. Other conservation efforts include habitat protection and restoration, harvest management, and recommending hydropower operations that will benefit salmon and steelhead.

- The Forest Service manages 191 million acres of national forests and grasslands nationwide under the principles of multiple use and sustained yield, ensuring that lands will be available for future generations. The multiple uses include outdoor recreation, rangeland, timber, watershed, and fish and wildlife. Like BLM, under the ESA, the Forest Service must ensure that its actions, such as timber harvesting and road construction, are not likely to jeopardize the continued existence of listed species or degrade their critical habitat.

The Environmental Protection Agency (EPA), the Department of Agriculture's Natural Resources Conservation Service (NRCS), the Department of the Interior's U.S. Geological Survey (USGS) and Bureau of Indian Affairs (BIA) are the four other agencies involved in recovery efforts. Collectively, these agencies are responsible for a variety of actions and endeavors to incorporate the needs of salmon and steelhead into the requirements of their primary missions.

- EPA protects human health and safeguards the natural environment by protecting the air, water, and land. Under the Clean Water Act, EPA, among other things, works with the states to develop water quality standards that accommodate the needs of salmon and steelhead.

- NRCS is responsible for helping farmers, ranchers, and other landowners develop and carry out voluntary efforts to protect the nation's natural resources. NRCS works with landowners to promote

better land use management and resource conservation, which helps improve water quality and habitat for salmon and steelhead.

- USGS is responsible for conducting objective scientific studies and providing information to address problems dealing with natural resources, geologic hazards, and the effects of environmental conditions on human and wildlife health. It provides research on various issues, such as fish diseases and fish passage, which benefit salmon and steelhead.

- BIA's principal responsibilities are to encourage and assist Native Americans to manage their own affairs under the trust relationship with the federal government. Conserving fish and wildlife and maintaining traditional fishing rights are among the trust responsibilities that BIA has with the Indian tribes.

In addition, all agencies are responsible for furthering the purposes of the ESA by carrying out programs for the conservation of listed species. Selected major laws affecting the operations of the 11 agencies are listed in appendix III.

In fulfilling their responsibilities, agencies sometimes encounter competing priorities that involve making trade-offs. For example, the Northwest Power Act requires the protection, mitigation, and enhancement of fish and wildlife while ensuring an adequate, efficient, economical, and reliable power supply for the Pacific Northwest. During the drought of 2001, Bonneville found it difficult to meet its responsibilities under both the ESA and the Northwest Power Act. As a result, Bonneville, in consultation with other federal agencies, determined that in order to maintain an adequate and reliable power supply during the declared power emergencies, available water had to be sent through the turbines to generate electricity and as such could not be spilled (released) over the dams to aid juvenile fish passage. Significantly reducing the amount of water spilled over the dams may affect the survival rates of some juvenile populations, which may in turn ultimately affect the number of adult salmon and steelhead returning to spawn in the future. Figure 5 shows water being released at Bonneville Dam to aid fish passage.

Figure 5: Water Being Released at Bonneville Dam

Source: U.S. Army Corps of Engineers.

Nonfederal Entities Are Involved in Recovery Effort

In addition to federal agencies, many state and local governments, Indian tribes, private interest groups, and private citizens are involved in the recovery effort. For example, to guide state recovery efforts, Idaho, Montana, Oregon, and Washington have jointly prepared a salmon and steelhead recovery plan referred to as the Governors' Plan. Other participants in the recovery efforts include local governments, such as the cities of Portland, Oregon, and Yakima, Washington; and local conservation districts like the Asotin County Conservation District in Washington. Tribal entities—the Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, Confederated Tribes of the Warm Springs Reservation, Shoshone-Bannock Tribes of the Fort Hall Reservation, Confederated Tribes of the Colville Reservation, and Yakama Indian Nation—and private interest groups/organizations like American Rivers, Columbia River Alliance, Ducks Unlimited, and Save Our Wild Salmon, also participate in recovery efforts.

Over 65 groups have been formed to help facilitate communication and coordination between the various entities involved in salmon and steelhead

recovery. The size and purpose of the groups range from large groups that deal with basinwide concerns to smaller, more narrowly focused ones that deal with local issues. For example, the Federal Caucus,[2] comprising 10 federal agencies having natural resource responsibilities under the ESA, meets to discuss issues and make policy decisions on the implementation of the basinwide strategy that it developed to help recover salmon and steelhead populations. Local groups, such as the Asotin County Conservation District, meet to develop watershed plans and to secure funding for landowners to make water quality and habitat improvements on their property. (See appendix IV for the names, purpose, and meeting frequency of the various groups involved in the recovery effort.)

Agencies Estimate Recovery Expenditures in the Billions

The 11 federal agencies estimate that they expended almost $1.8 billion (unadjusted for inflation) from fiscal year 1982 through fiscal 1996 and about $1.5 billion (in 2001 dollars) from fiscal year 1997 through fiscal 2001 on efforts specifically designed to recover Columbia River Basin salmon and steelhead. The $1.5 billion expended in the last 5 fiscal years consisted of $968.0 million that federal agencies expended directly and $537.2 million that the federal agencies received and then provided to nonfederal entities, such as states and Indian tribes. The four agencies listed below accounted for $854.0 million (about 88 percent) of the $968.0 million spent by the federal agencies in the last 5 fiscal years.

- The Corps expended about $589.7 million primarily on projects such as improving juvenile bypass systems and adult fish ladders at the dams.
- The Forest Service expended about $105.7 million primarily on ESA consultations and projects such as habitat improvement, land acquisition, watershed restoration, in-stream habitat improvement, and improving passage at culverts and small dams that block salmon and steelhead passage.
- FWS expended about $96.7 million primarily on salmon and steelhead hatcheries.

[2] Original members of the Federal Caucus include NMFS, FWS, the Corps, BOR, Bonneville, the Forest Service, BLM, EPA, and BIA. In 2001, the Federal Caucus added the National Park Service as its 10th agency.

- BOR expended about $61.9 million, primarily on Columbia and Snake River salmon and steelhead recovery projects on several segments of the Yakima River Basin water enhancement project—including its tributary, water acquisition, water augmentation, and habitat acquisition programs.

The other seven agencies expended the remaining $114 million. Table 1 shows each agencies' total salmon- and steelhead-specific expenditures for each fiscal year from 1997 through fiscal 2001. (Detailed expenditure data for each agency are provided in appendix V.)

Table 1: Estimated Total Salmon- and Steelhead-Specific Expenditures, by Agency and Fiscal Year

Dollars in thousands

Agency[a]	1997	1998	1999	2000	2001	Total
Corps	$114,616	$131,469	$109,818	$104,370	$129,434	**$589,707**
Forest Service	25,219	20,025	18,498	19,844	22,100	**105,686**
FWS	18,525	18,058	18,481	19,074	22,593	**96,731**
BOR	15,482	12,787	10,577	14,574	8,465	**61,885**
NMFS	5,803	8,698	9,236	11,656	13,150	**48,543**
Bonneville	5,533	4,913	5,608	4,507	5,444	**26,005**
USGS	4,577	4,298	3,558	3,359	3,713	**19,505**
BLM	2,009	2,261	2,315	2,321	2,850	**11,756**
NRCS	1,912	1,119	1,359	1,653	1,697	**7,740**
BIA	59	70	68	66	99	**362**
EPA	10	15	14	14	14	**67**
Total	**$193,745**	**$203,713**	**$179,532**	**$181,438**	**$209,559**	**$967,987**

Note: Dollars are adjusted to 2001 dollars.

[a] To avoid double counting, all costs are included in the totals of the agency that actually expended them and not by the agency that provided the funding. For example, although Bonneville uses funds derived from power generation revenues to reimburse the U.S. Treasury for the hydroelectric share of operation and maintenance and capital project costs incurred for salmon and steelhead at Corps and BOR dams in the Columbia River Basin and for operation and maintenance costs at FWS Lower Snake River Compensation Plan hatcheries, these costs are included in the totals for the Corps, BOR, and FWS, and not Bonneville.

Source: GAO's analysis of agency-provided data.

In addition to the $968.0 million in specific federal expenditures, five federal agencies provided nonfederal entities with about $537.2 million for specific salmon and steelhead recovery efforts. These funds were either federally appropriated or, in the case of Bonneville, came from revenues

received from the sale of electricity. For example, as shown in table 2, Bonneville provided nonfederal entities with over $378 million in power receipts during the 5-year period. Federal funds provided to nonfederal entities may contain certain requirements or restrictions. For example, federal funds provided by NMFS under the Pacific Salmon Recovery Fund require a 25 percent state or local matching contribution.

Table 2: Federal Funds Provided to Nonfederal Entities, by Agency and Fiscal Year

Dollars in thousands

Agency	1997	1998	1999	2000	2001	Total
Bonneville	$62,228	$81,814	$78,668	$68,419	$87,563	**$378,692**
NMFS	14,715	19,390	17,068	14,208	15,929	**81,310**
FWS	375	1,244	22,944	9,679	13,167	**47,409**
BIA	5,744	5,674	6,053	5,918	6,263	**29,652**
BLM	34	0	52	0	50	**136**
Total	**$83,096**	**$108,122**	**$124,785**	**$98,224**	**$122,972**	**$537,199**

Note: Dollars are adjusted to 2001 dollars.

Source: GAO's analysis of agency-provided data.

The nonfederal entities receiving the federally provided funds include the states of Idaho, Montana, Oregon, and Washington; tribes, such as the Nez Perce and Yakama; government consortium groups, such as the Columbia Basin Fish and Wildlife Authority and the Northwest Power Planning Council (an interstate compact with two representatives from each of the states of Idaho, Montana, Oregon and Washington); and fish conservation organizations, such as Long Live the Kings. About two-thirds or $353.7 million of the $537.2 million, was provided to the states and tribes. (See table 3.)

Table 3: Nonfederal Recipients of Federal Funds, by Fiscal Year

Dollars in thousands						
Recipient	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
States	$30,964	$42,427	$58,752	$39,077	$45,423	**$216,643**
Tribes	27,796	27,139	25,581	25,226	31,302	**137,044**
Other	14,018	27,560	27,425	23,070	33,178	**125,251**
Government consortium	10,318	10,996	13,027	10,851	13,069	**58,261**
Total	**$83,096**	**$108,122**	**$124,785**	**$98,224**	**$122,972**	**$537,199**

Note: Dollars are adjusted to 2001 dollars.

Source: GAO's analysis of agency-provided data.

In addition to the almost $1.5 billion that federal agencies expended or provided nonfederal entities with for specific salmon and steelhead recovery actions, federal agencies estimated that they expended $302 million (in 2001 dollars) in the last 5 fiscal years on actions that benefited, but were not specifically directed at, salmon and steelhead—that is, nonspecific salmon and steelhead expenditures. For example, NRCS provides technical assistance and funding for private land conservation. Collectively, these actions improve stream flows, habitat, and water quality, which has a positive effect on fish. Also, USGS performs research that evaluates the effect of diet, growth regime, and environment on the development of salmon. This research, however, is for all salmon species, not just those in the Columbia River Basin. Agencies' estimates of nonspecific salmon and steelhead expenditures are included in table 4.

Table 4: Estimate of Nonspecific Salmon and Steelhead Expenditures, by Agency and Fiscal Year

Dollars in thousands						
Agency	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Forest Service	$27,855	$24,132	$19,829	$26,020	$33,500	**$131,336**
NRCS	24,916	28,006	21,975	26,503	22,197	**123,597**
BLM	2,576	2,930	2,804	2,717	3,330	**14,357**
BOR	955	2,137	2,411	2,165	2,551	**10,219**
Corps	1,072	1,086	2,721	2,206	1,500	**8,585**
NMFS	894	995	2,279	1,089	1,142	**6,399**
FWS	485	958	753	1,010	1,239	**4,445**
USGS	432	604	608	724	904	**3,272**

(Continued From Previous Page)

Dollars in thousands

Agency	1997	1998	1999	2000	2001	Total
BIA	5	5	5	5	5	**25**
Bonneville	0	0	0	0	0	**0**
EPA	0	0	0	0	0	**0**
Total	**$59,190**	**$60,853**	**$53,385**	**$62,439**	**$66,368**	**$302,235**

Note: Dollars are adjusted to 2001 dollars.

Source: GAO's analysis of agency-provided data.

Recovery Actions Are Many, but Data on Their Effects on Salmon and Steelhead Populations Are Generally Not Available

Federal agencies have taken many actions to recover salmon and steelhead. Although agency officials generally view these actions as resulting in higher numbers of returning adult populations and improving the conditions for recovery, the precise extent of their effects on salmon and steelhead are not well understood. A number of factors make it difficult to isolate and quantify the effects of these actions, including large natural yearly fluctuations in the salmon and steelhead populations, weather and ocean conditions, and the length of time it takes for some project benefits to materialize. However, federal agencies are confident that recovery actions are having positive effects and have resulted in higher numbers of returning adult salmon and steelhead than would have occurred otherwise.

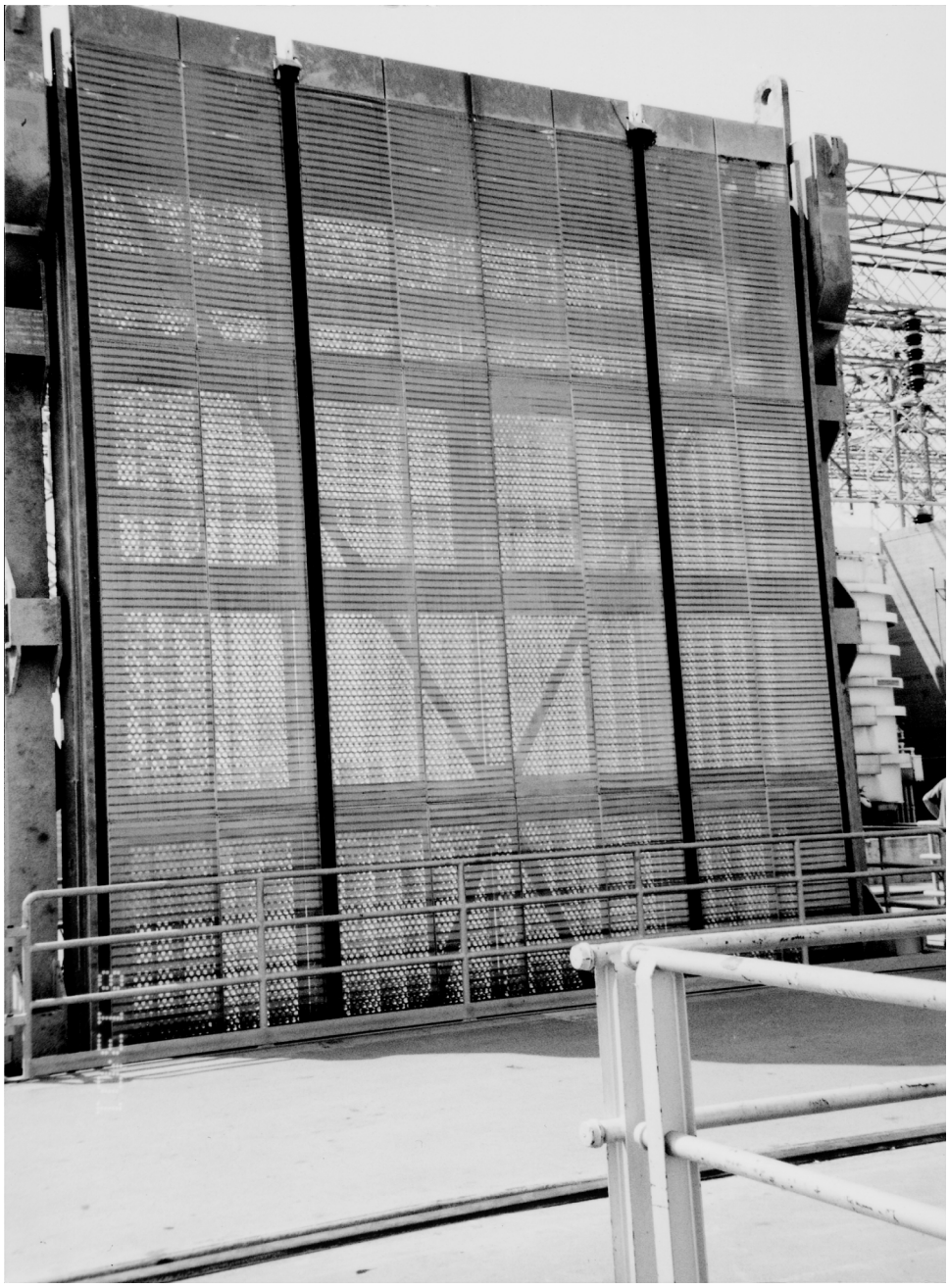
Actions Taken to Recover Salmon and Steelhead

Federal agencies have taken many actions aimed at salmon and steelhead recovery. For example, NMFS listed 12 populations of salmon and steelhead under the ESA and issued numerous final biological opinions covering the operation of FCRPS and forest and land management; sport, commercial, and tribal harvest; hatchery operations; and irrigation operations in the Yakima, Umatilla, and Snake River basins. In conjunction with the Federal Caucus, NMFS helped develop the All-H Strategy (hydropower, hatcheries, harvest, habitat) for the recovery of salmon and steelhead. NMFS has also engaged in extensive public outreach efforts, conducted salmon and steelhead studies, and discussed management strategies with other agencies on factors affecting salmon and steelhead mortality.

The action agencies' (the Corps, BOR, and Bonneville) recovery efforts have been primarily focused on the dams and water projects. For example, the Corps constructed a new bypass system at Bonneville Dam's second

powerhouse that Corps officials expect will increase juvenile survival by 6 to 13 percent. The Corps has also installed fish screens to guide juvenile fish to the bypass systems and away from the turbines. Figure 6 shows a fish screen at John Day Dam in Oregon.

Figure 6: Fish Screen at John Day Dam



BOR officials stated that it has begun implementing and will implement all of those actions that apply to it in the FCRPS biological opinion. For example, among other things, it has designed and constructed fish screens and fish passage facilities for irrigation diversions on its projects.

Bonneville contracts directly with federal, state, tribal and other entities to protect, mitigate, and enhance fish and wildlife in the Columbia River Basin in addition to managing FCRPS for fish as well as power. For example, Bonneville has provided the Yakama Indian Nation with funding to construct and operate a tribal hatchery and has provided federal, state, tribal, and nonfederal entities with funding to monitor juvenile fish populations; and to improve and acquire additional salmon and steelhead habitat.

The natural resource agencies' (Forest Service, FWS and BLM) recovery actions have been primarily aimed at implementing an aquatic conservation strategy that consists of aquatic and riparian habitat protection; fish distribution; watershed restoration; land acquisition; coordination with other agencies, tribal governments, and so forth; and monitoring and evaluation. For example, in the past 5 years, the Forest Service improved over 2,000 miles of stream banks and 9,000 acres of riparian area using various methods, such as plantings to reduce erosion and placing logs in streams to provide deeper pools. FWS, in conjunction with the Confederated Tribes of the Umatilla Indian Reservation and the Oregon Department of Fish and Wildlife, transferred 350,000 salmon from a hatchery to the Umatilla River to increase local returns. BLM habitat improvement projects include riparian plantings, such as 50 acres in the Grande Ronde River Basin, and erosion control activity, such as the Hayden Creek road sediment reduction project.

The other agencies (EPA, NRCS, USGS and BIA) have initiated a wide range of recovery actions. For example, EPA developed a temperature model for the Columbia and Snake rivers that provides a foundation for making decisions on hydroelectric operations. During the last 5 years, NRCS worked with over 23,000 individual landowners to develop resource management plans for 4.8 million acres of land and to restore over 10,000 acres of wetlands. USGS prepared an annual report quantifying juvenile salmon and steelhead predation by the Northern Pikeminnow. BIA provided tribal fish commissions, including the Columbia River Inter-Tribal Fish Commission, with funding to address certain provisions of the Pacific Salmon Treaty. Additional examples of salmon and steelhead recovery

actions taken by NMFS, the action agencies, the natural resource agencies, and the other agencies are listed in appendix VI.

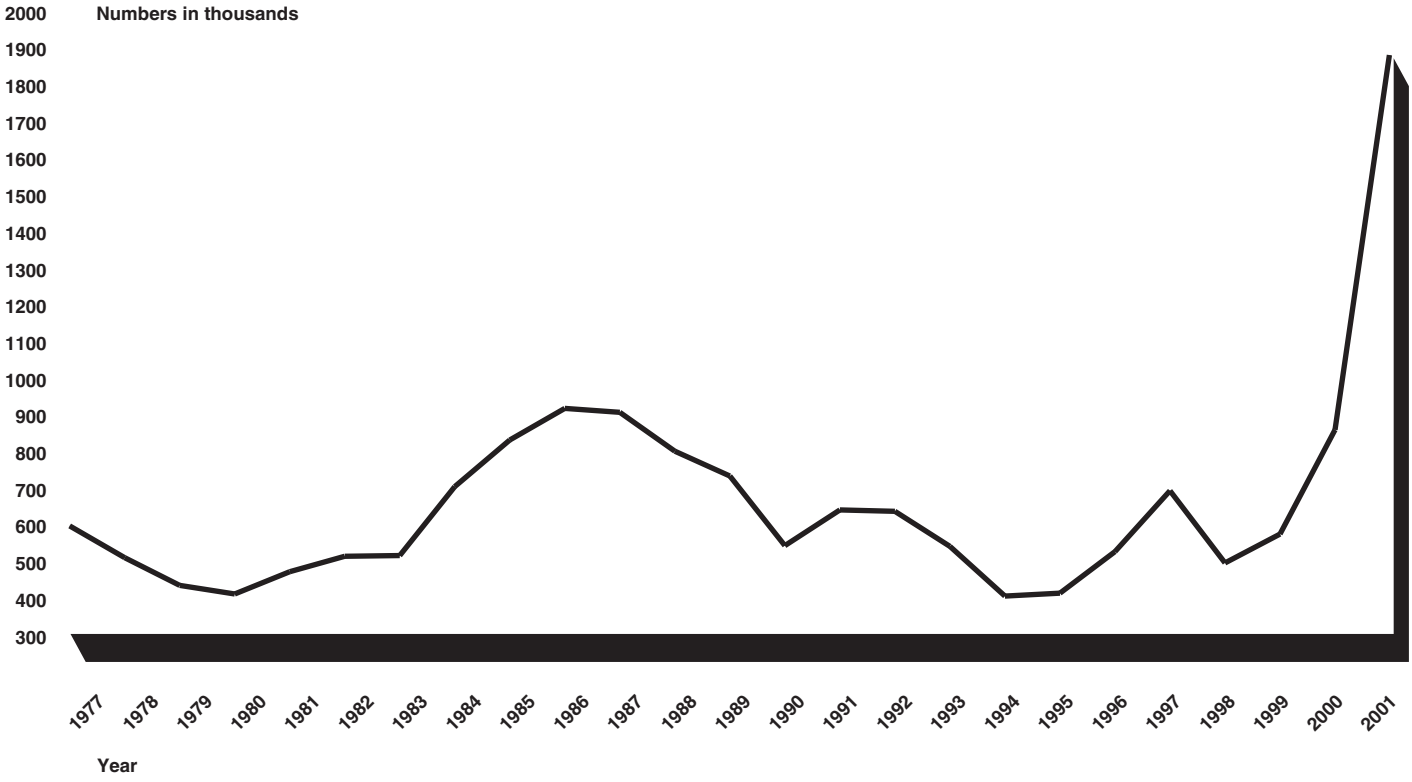
Data Generally Not Available to Quantify Effects of Recovery Actions

The data to isolate and quantify the effects of recovery efforts on returning fish populations are generally not available because of numerous factors. These factors include large natural yearly fluctuations in salmon and steelhead populations, changing weather and ocean conditions, the length of time it takes for project benefits to materialize, and the multiyear life cycles of the fish.

Returning salmon and steelhead populations have fluctuated widely from year to year. For example, over the past 25 years, annual adult returns for all ESA listed and unlisted salmon and steelhead counted at Bonneville Dam, the first dam on the Columbia River, averaged 660,000, but counts for individual years varied widely. As shown in figure 7, the number of returning adults went from 638,000 in 1991, down to 411,000 in 1995, and up to 1,877,000 in 2001.[3]

[3] Returning salmon and steelhead also migrate up rivers, like the Willamette, that flow into the Columbia below Bonneville Dam and are harvested before reaching Bonneville Dam and these numbers are not included in the 25-year average.

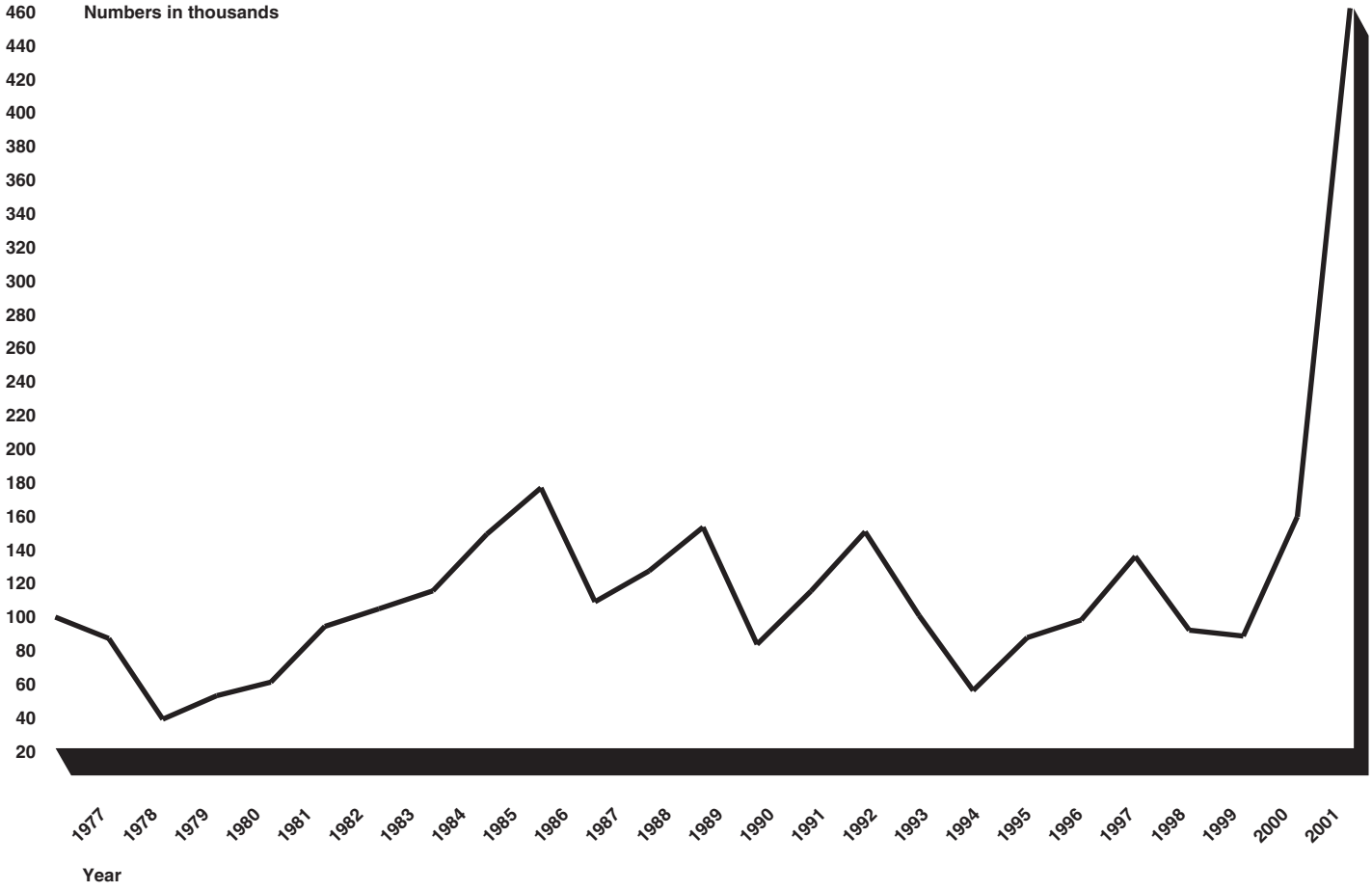
Figure 7: Returning Adult Salmon and Steelhead Counted at Bonneville Dam, 1977 through 2001



Source: Fish Passage Center.

During the same time period, total ESA listed and unlisted adult salmon and steelhead returns counted at Lower Granite Dam, the last dam that adult fish encounter on the Snake River before entering Idaho, averaged about 116,000. But like counts at Bonneville, the counts at Lower Granite for all salmon and steelhead fluctuated widely, as shown in figure 8.

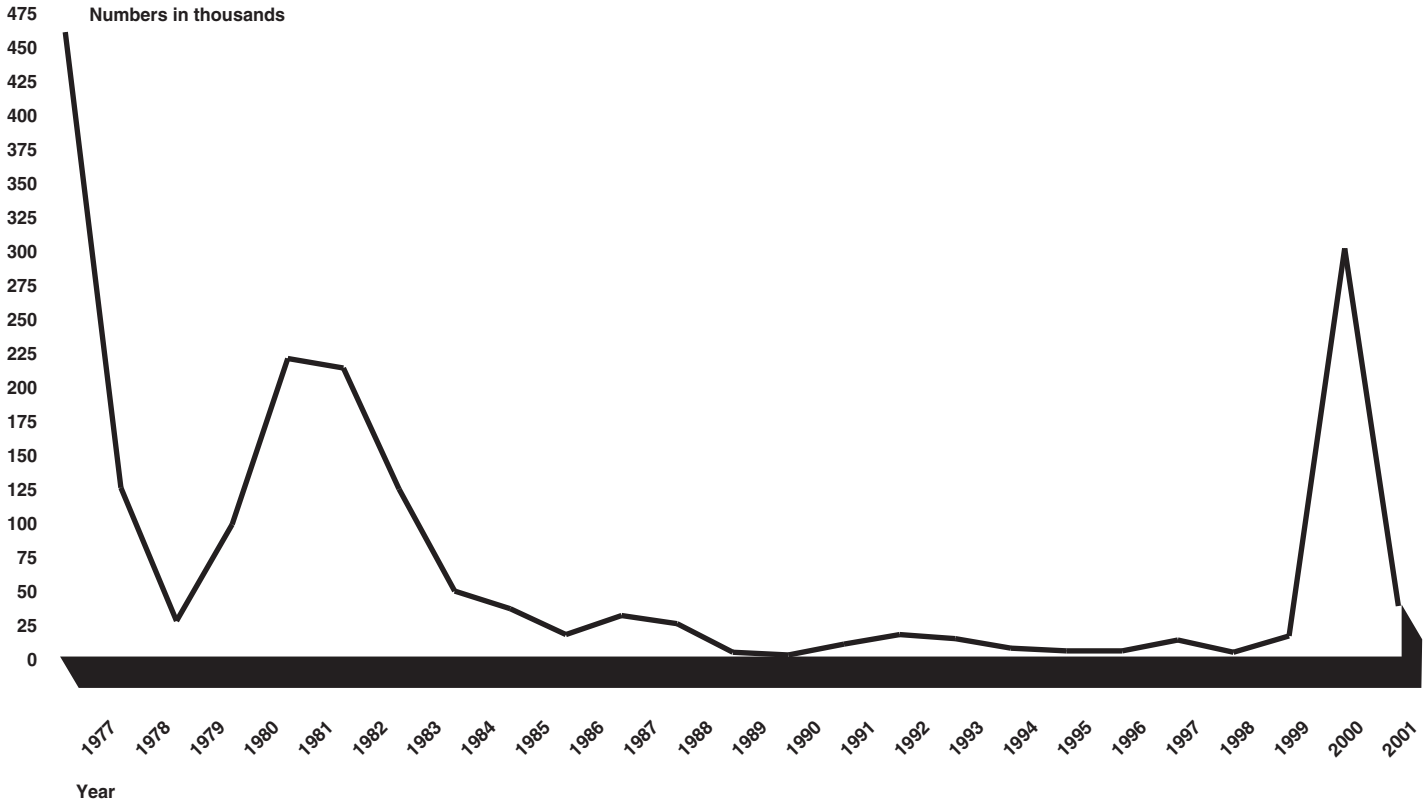
Figure 8: Returning Adult Salmon and Steelhead Counted at Lower Granite Dam, 1977 through 2001



Source: Fish Passage Center.

Similar fluctuations occurred for individual ESA—listed salmon and steelhead populations. For example, at Lower Granite Dam, an average of 72—ESA listed Snake River Sockeye salmon have returned annually for the past 25 years, but actual counts varied from 8 returning in 1991, down to 3 returning in 1995, up to 299 returning in 2000, and down to 36 returning in 2001. Figure 9 shows the counts of returning adult Snake River Sockeye salmon at Lower Granite Dam.

Figure 9: Returning Adult Snake River Sockeye Salmon Counted at Lower Granite Dam, 1977 through 2001



Source: Fish Passage Center.

The 25-year averages for Bonneville, Lower Granite, and Snake River Sockeye were greatly influenced by the relatively higher numbers of adults returning to the basin in 2000 and 2001. For example, adult returns in 2000 and 2001 represented 17 percent of all returning adults counted at Bonneville Dam over the past 25 years and 21 percent of returning adults counted at Lower Granite Dam in the same time period. Similarly, adult returns in 2000 and 2001 represented 18 percent of returning adult Snake River Sockeye. (Actual counts for listed and unlisted salmon and steelhead at Bonneville and lower Granite and listed Snake River Sockeye at Lower Granite are displayed in appendix VII.)

Although the precise reasons for the large number of adult returns in 2000 and 2001 are unknown, federal officials stated that the relatively high returns might be largely attributable to favorable ocean conditions, which

mask the benefit of actions they have taken. Additionally, they believe the above–average snow pack in 1996, 1997, 1998 and 1999, may have contributed to higher juvenile survival rates in the freshwater during those years because the runoff increased water flows in tributaries and the mainstem Columbia and Snake rivers. Depending on the species, many of these juveniles would have returned as adults in 2000 and 2001.

Cyclical changes in ocean temperatures also affect salmon and steelhead survival. For example, cooler ocean temperatures off the West Coast from 1999 through 2001 increased the number of small fish that salmon feed upon and have likely increased salmon and steelhead survival and contributed to higher returns. The length of the ocean temperature cycle and its relationship to salmon and steelhead survival, however, is not clear.

Finally, salmon and steelhead generally have a 3- to 5-year spawning, rearing, and maturation cycle, so it takes years before the benefits of some actions materialize. For example, improving bypass facilities at the dams reduces juvenile salmon and steelhead mortality, but their ultimate ability to return to spawn depends on many other factors, such as the availability of food in the ocean to allow them to mature; the avoidance of predators such as birds, marine mammals, other fish, fishermen; and favorable passage conditions when they return upriver to spawn.

However, actions that increase reproduction, improve passage and habitat conditions, reduce erosion and pollution, use hatcheries for recovery, ensure careful harvest management, and educate the public all improve salmon and steelhead survival rates. While they cannot quantify or isolate the benefits of individual actions, agencies' officials are confident that the composite recovery actions taken to date are having positive effects, generally improving the conditions for freshwater survival and ultimately resulting in higher numbers of returning adult salmon and steelhead than would have occurred otherwise. For example, NMFS estimates that juvenile survival rates for Snake River spring/summer Chinook salmon increased from 10 to 13 percent during the 1970s to 31 to 59 percent after fish passage improvements were made at the dams during the 1990s. These are estimates, however, with no quantification of the actual number of returning adult salmon and steelhead. The number of returning adults is important because other studies have shown that even after successfully passing the dams, using bypass facilities increases fish mortality downstream.

Agency Comments and GAO's Evaluation

We provided the Department of Agriculture (Forest Service and NRCS), the Department of Commerce (NMFS), the Department of Defense (Corps), the Department of the Interior (BIA, BOR, BLM, FWS, and USGS), Bonneville, and EPA with a draft of this report for review and comment. We received written comments from all agencies except the Corps and EPA, and are including these comments in appendies VIII through XI in this report. The Corps provided oral comments chiefly of an editorial nature, which we have incorporated into the report as appropriate. EPA reviewed the report and had no comments.

The responding agencies, with the exception of Bonneville, commented that the report accurately portrayed the roles of the agencies, their expenditures, and recovery actions. These agencies also provided clarifications on several technical points that have been included in the report as appropriate.

Bonneville took issue with three points regarding our report. First, Bonneville commented that the report does not fully reflect its role in funding salmon and steelhead recovery efforts. For example, Bonneville stated that the report does not explain that it reimburses the U.S. Treasury for most of the expenditures for capital improvements at the Corps' and BOR's hydroelectric projects as well as operation and maintenance costs at these projects and at FWS's Lower Snake River Compensation Plan hatcheries. We agree that Bonneville is a major supplier of salmon and steelhead recovery moneys and clarifications were made in the report to reflect its role. However, we were not asked to provide information on the source of funds for salmon and steelhead recovery efforts but rather how much the agencies expended on such efforts. Therefore, the report reflects the funds Bonneville is referring to as expenditures by other federal agencies, such as, the Corps, BOR, and FWS.

Second, Bonneville commented that the report does not fully describe that the funds it provides other agencies with are from ratepayer receipts and, as a result, much of the salmon and steelhead recovery expenditures shown in the report are paid for by those that buy the electric power the dams generate. While the report notes that ratepayer receipts fund these expenditures, we have added additional details on the source of the funds that Bonneville uses to cover agencies' expenditures and how Bonneville reimburses the U.S. Treasury for agencies' expenditures for capital and operation and maintenance costs.

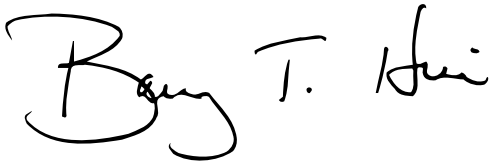
Finally, Bonneville expressed concern that we did not include the cost of replacement power and lost power revenues in our expenditure totals. We did not include these costs because these costs do not reflect expenditures for actual recovery actions and determining these costs is difficult to derive, since replacement power and lost revenues could result from other management decisions that are not related to salmon and steelhead recovery.

We conducted our work from July 2001 through June 2002 in accordance with generally accepted government auditing standards. Appendix II contains the details of our scope and methodology.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Defense, the Secretary of the Interior, the Administrator of EPA, the Administrator of Bonneville, and interested congressional committees. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you have any questions about this report, you can contact me on (202) 512-3841. Key contributors to this report are listed in appendix XII.

Sincerely yours,



Barry T. Hill
Director, Natural Resources
and Environment

Two Issues That May Affect the Recovery Effort

During the course of our work, agency officials and others brought to our attention two issues that may affect the salmon and steelhead recovery effort: (1) development of a Columbia River basinwide strategic salmon and steelhead recovery plan and annual performance plans to facilitate and track recovery efforts and (2) an Endangered Species Act (ESA) consultation-tracking system to identify and eliminate unnecessary delays to projects that are specifically designed to benefit fish, including salmon, steelhead, and other threatened or endangered species. Although we have not conducted detailed work on these issues, they are summarized as follows.

Basinwide Strategic Recovery Plan and Annual Performance Plans

A basinwide strategic recovery plan that identifies overall recovery goals, estimated total costs, and specific agencies' actions and an annual performance plan that identifies annual funds available and projects to be completed would help the agencies to focus their actions and provide a means to assess overall recovery efforts. The ESA requires that the National Marine Fisheries Service (NMFS) develop and implement a recovery plan for each listed salmon and steelhead species.[4] The ESA requires that this plan include (1) site-specific management actions; (2) objective and measurable criteria that, when met, will result in the species' delisting; and (3) estimates of the time and cost required to implement the measures and achieve the goal of delisting the species.

Because NMFS has not yet developed a recovery plan, the agencies use a variety of plans, strategies, and guidance to direct their recovery efforts. Among others, the guidance that each agency uses includes its own mission plans, NMFS's biological opinion for its actions that may adversely affect or jeopardize listed species, and the Federal Caucus' All-H (hydropower, hatcheries, harvest, and habitat) recovery strategy. However, two recent publications, one prepared by a scientific team and the other by a private organization, have raised concerns about the potential success of recovery efforts that follow these plans and strategies,[5] whether they are used individually or combined. The agencies' officials have also stated that a

[4] Unless the appropriate Secretary determines that a recovery plan will not promote conservation of the species.

[5] See Independent Scientific Advisory Board, "A Review of Salmon and Steelhead Recovery Strategies for the Columbia River Basin" (Aug. 22, 2001) and Save Our Wild Salmon Coalition, "Salmon Report Card" (Feb. 27, 2002).

recovery plan that all entities recognize is needed to help direct their efforts toward those watersheds and actions that can do the most for recovery.

NMFS is in the process of developing a basinwide recovery plan for ESA-listed salmon and steelhead, but that plan is several years away from completion. According to NMFS officials, the plan is being developed in phases. The first phase is to identify, among other things, target populations and delisting criteria. The second phase is to identify the actions needed to meet the target populations and delisting criteria. In 2004, NMFS expects a plan of action to be in place for the ESA-listed salmon and steelhead on the lower Columbia River. The plans for the middle and upper Columbia River salmon and steelhead populations are to be completed after 2004, but no specific completion dates have been set.

Once a basinwide recovery plan is completed, annual performance plans will be needed to implement it. The Government Performance Results Act of 1993 (GPRA) requires agencies to prepare and monitor annual performance plans to successfully implement their long-range strategic plans. Under GPRA, the annual performance plan serves as the basis for setting annual program goals and for measuring program performance in achieving those goals. The annual performance plan provides a direct link between long-term goals and day-to-day operations. The annual performance plan should contain, among other things, annual goals that can be used to gauge progress toward achieving strategic long-term goals, standards that will be used to assess progress, and information on the funds available to implement the annual performance plan. The Federal Caucus and the President's Council on Environmental Quality recently started identifying federal appropriations and Bonneville's power receipts that are available annually for salmon and steelhead recovery.

ESA Consultation-Tracking System

Under the consultation requirements of the ESA, federal agencies must consult with NMFS to determine whether a proposed action that is federally authorized, carried out, or funded is likely to jeopardize the continued existence of any threatened or endangered salmon or steelhead species, or adversely modify or destroy its critical habitat. Unless a longer time period is mutually agreed to by both NMFS and the consulting agency, NMFS has 135 days to make this determination and issue a biological opinion that summarizes its findings.

Officials of several other federal agencies have said that the ESA consultation process with NMFS sometimes takes too long and that projects designed to benefit fish, including salmon and steelhead, are delayed or prevented from being completed. For example, Forest Service officials reported that, because of the lengthy ESA consultation process, funding had to be turned back for two road culvert projects. In each case, Forest Service officials concluded that replacing the culverts would open up miles of blocked habitat to fish. After submitting the project consultation packages to NMFS, however, Forest Service officials stated that they waited over a year for a response. Because these projects were to be funded with "one year" money, the long delay resulted in the return of the money without the completion of the projects. BOR officials reported similar problems, stating that a delay in completing consultation risks not only the loss of funds, but can delay projects designed to save fish by at least a year.

NMFS officials in the Pacific Northwest stated they were aware of the agencies' concerns about untimely ESA consultations and provided several reasons why delays may occur, including the recent hiring of a number of NMFS staff who were inexperienced with the consultation process and an increase in the number of consultations. According to NMFS officials, over the past 5 years, in its Habitat Conservation Division, where many consultations occur, the number of staff has increased from 6 to 120. As the new staff acquire experience, officials said the timeliness of consultation should improve. Furthermore, NMFS officials stated that the number of formal consultations involving salmon and steelhead in the basin has almost doubled from 46 in 1997 to 88 in 2001.

NMFS officials also said that the agencies' concerns might be somewhat overstated because agencies often mistakenly assume that the time spent on informal consultation is part of the formal consultation process. Informal consultations, which ranged from 203 in 1997, to 359 in 1999, to 232 in 2001 in the Pacific Northwest, are discussions that take place while NMFS reviews the biological assessment package submitted by an agency for completeness—i.e., inclusion of all the information needed to issue a biological opinion.

Because NMFS does not track ESA consultations, we could not verify the magnitude, frequency, and/or causes of any such delays. However, NMFS recognizes the need to track the number, status, and timeliness of consultations and plans to implement a consultation-tracking system in 2002. NMFS officials said they and other agency officials need to know

how well the consultation process is working and whether the process is taking so long that federal projects, even those beneficial to salmon and steelhead, are being delayed.

Objectives, Scope, and Methodology

We were asked to (1) identify the roles and responsibilities of the federal agencies involved with the recovery of Columbia River Basin salmon and steelhead, (2) determine how much they have spent collectively on recovery efforts, and (3) determine what actions they have undertaken and what they have accomplished. In conducting our work, agency officials and others brought to our attention two issues that may affect the recovery effort: the development of a strategic recovery plan to direct overall recovery efforts along with annual performance plans to implement the strategic plan, and the development of a system to track Endangered Species Act consultations to ensure that recovery projects are not unnecessarily delayed by the consultation process.

To identify the roles and responsibilities of the federal agencies involved in salmon and steelhead recovery, we identified 11 federal agencies with significant responsibility for salmon and steelhead recovery in the Pacific Northwest. These agencies were either members of the Federal Caucus or were referred to us by members of the Federal Caucus. We interviewed 123 officials from the 11 agencies, including officials across the various management levels, to determine

- the role that each agency plays in the recovery effort;
- the laws and mandates with which each agency must comply while also complying with the ESA;
- the plans that each agency uses to guide its recovery efforts;
- the entities with which they coordinate;
- their membership in groups, such as committees and task forces;
- agencies' experiences with the ESA consultation process; and
- each agency's opinion of the overall recovery effort to date.

We also interviewed officials from the states of Idaho, Oregon, and Washington; the Columbia River Inter-Tribal Fish Commission; individual Indian tribes, and the Northwest Power Planning Council. These interviews were primarily conducted in Seattle, Washington; Portland, Oregon; and Boise, Idaho, but also included smaller communities in eastern Oregon and Washington. In addition to interviews, we reviewed the

recovery plans cited in the interviews, previous GAO reports, and other studies and reports either referred to us or discovered during our research.

To determine the amount of federal funds the agencies collectively expended on salmon and steelhead mitigation, restoration, and recovery in the Columbia River Basin, we asked each of the 11 agencies to provide us with an estimate of overall salmon and steelhead expenditures for fiscal year 1982 through fiscal 1996 and for detailed expenditure information for fiscal year 1997 through fiscal 2001. We requested that the agencies provide expenditure data in two main categories: (1) expenditures made specifically to benefit salmon and steelhead (specific expenditures) and (2) those that were made for another purpose but also benefited salmon and steelhead (nonspecific expenditures). Within each of these categories, we requested that further detail be provided on how the money was spent. For example, we asked the agencies to identify expenditures by type—projects, research, monitoring, consultation/coordination, litigation or administration. Because the 11 agencies provided us with a combined dollar estimate of expenditures for fiscal year 1982 through fiscal 1996, we did not adjust these estimates to account for inflation. The remaining data supplied for individual fiscal year 1997 through fiscal 2001 have been adjusted to the constant base of 2001 dollars.

Because funds used for salmon and steelhead recovery are seldom specifically identified as such, and because each agency has a different accounting system, agency officials were asked to provide actual numbers whenever possible and estimates when specific numbers were not available. In conducting our analysis, we did not independently verify or test the reliability of the expenditure data provided by the agencies.

To identify the actions that the agencies have taken and what they have accomplished to recover salmon and steelhead, we obtained fish count data from the Fish Passage Center on the number of adult salmon and steelhead returns to Bonneville and Lower Granite Dams for the past 25 years. In addition, we sent the agencies a data-collection instrument asking them to furnish us with a list of representative actions that they had taken to assist in the recovery effort. We also reviewed accomplishment reports that some of the agencies are required to prepare and compared the data in the reports with what they provided us.

In the course of our work, agencies' officials and others brought to our attention two issues that may affect the recovery effort: the development of a strategic recovery plan to direct overall recovery efforts along with

annual performance plans to implement the strategic plan and the development of a system to track ESA consultations to ensure that recovery projects are not unnecessarily delayed by the consultation process. To obtain additional information on these issues, we reviewed (1) the Government Performance Results Act and the ESA; (2) the agencies' various mission-related mandates and salmon and steelhead recovery strategies and critiques of those plans and strategies; (3) the cross-cutting budget prepared by the Federal Caucus and President's Council on Environmental Quality; (4) previous GAO reports on restoring the Florida Everglades, GPRA, and ESA consultations; and (5) data requested from the National Marine Fisheries Service on the number and timeliness of consultations conducted in the past 5 years.

We performed our work at various locations in the states of Idaho, Oregon, and Washington from August 2001 through June 2002 in accordance with generally accepted government auditing standards.

Selected Laws Affecting Agency Operations

Federal agencies must comply with the requirements of numerous laws, treaties, executive orders, and court decisions while recovering salmon and steelhead. Table 5 lists the selected laws that federal agencies reported as guiding their actions.

Table 5: Selected Laws Affecting Agency Operations

Anadromous Fish Conservation Act	Authorizes the Secretaries of Commerce and of the Interior to enter into cooperative agreements for the development, conservation, and enhancement of anadromous fish resources.
Bonneville Project Act	Creates the Bonneville Power Administration (Bonneville) and authorizes it to market power produced by the Bonneville Project and to construct transmission lines to transmit electric energy. Requires Bonneville to set its rates to recover the cost of producing and transmitting electric energy from the Federal Columbia River Power System, including the amortization of the capital investment. These rates must be based on the cost allocations among the project's purposes that Congress authorized—typically power, navigation, flood control, and irrigation.
Clean Water Act	Authorizes the Environmental Protection Agency (EPA) to establish water quality standards and to issue permits for the discharge of pollutants from a point source to navigable waters. Authorizes EPA to approve total maximum daily load standards established by states and tribes. These standards are determined by the maximum amount of a pollutant that a water body can receive and still meet water quality standards for specified uses, including fish and wildlife.
Coastal Zone Management Act	Directs federal agencies to cooperate with state and local governments to control polluted runoff in coastal areas.
Columbia Basin Project Act	Authorizes mitigation for fish and wildlife resources affected by the construction of Grand Coulee Dam.
Columbia River Treaty	Defines the relationship between the United States and Canada concerning the operation of Columbia River dams and reservoirs.
Endangered Species Act	Directs the National Marine Fisheries Service and the U.S. Fish and Wildlife Service (FWS) to return endangered and threatened species to the point where they no longer need special protection measures by protecting threatened or endangered species and the ecosystems upon which they depend.
Energy Policy Act of 1992	Authorizes the transfer of Bonneville Power Administration funds to the Secretaries of the Army and of the Interior to fund nonroutine maintenance at hydroelectric projects.
Executive Order 11988	Directs federal agencies to evaluate the potential effects of any actions they may take in a floodplain and to take action to reduce the risk of flood loss and to preserve the beneficial values served by floodplains.
Executive Order 11990	Directs federal agencies to minimize the destruction, loss, or degradation of wetlands in carrying out their responsibilities on federal land.
Executive Order 13186	Directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act for the conservation of migratory birds and their habitats.
Federal Land Policy and Management Act	Along with the Classification and Multiple Use Act, established a multiple-use mandate for lands managed by the Bureau of Land Management (BLM). Directs the Secretary of the Interior to develop and maintain land use plans using a systematic interdisciplinary approach to achieve the integrated consideration of physical, biological, and economic factors.

(Continued From Previous Page)	
Federal Power Act	Authorizes the Federal Energy Regulatory Commission (FERC) to issue licenses to construct and operate certain nonfederal hydroelectric projects. For projects using lands within federal land reservations, such as national forests, licenses are subject to conditions established by the relevant land management agency for protection of the lands. The act requires FERC to include license conditions requiring fish passage as prescribed by the Secretaries of the Interior and Commerce. The license must also include conditions for the protection, mitigation, and enhancement of fish and wildlife, which FERC must generally base on recommendations made by federal and state fish and wildlife agencies.
Fish and Wildlife Conservation Act	Directs FWS to identify species, subspecies and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA and to identify and implement conservation actions to ensure that ESA listing does not become necessary for those species.
Fish and Wildlife Coordination Act	Provides that fish and wildlife conservation receive equal consideration and coordination with other project purposes.
Fisheries Restoration and Irrigation Mitigation Act of 2000	Directs the Department of the Interior to establish a program to implement projects to mitigate impacts on fisheries associated with irrigation system water diversions in Pacific Ocean drainages located in Idaho, Montana, Oregon, and Washington. Eligible projects include the development, improvement, or installation of fish screens and fish passage devices.
Flood Control Act	Provides that the federal government should improve or participate in the improvement of navigable waters for flood control purposes if the benefits are in excess of the estimated costs.
Indian Self Determination and Education Assistance Act	Provides for maximum Indian participation in government and education of Indian people through the participation of Indian tribes in programs and services conducted by the federal government for Indians. Authorizes funding for the development and implementation of management plans to preserve and enhance natural resources on tribal trust lands and shared off-reservation resources.
Individual project authorization acts	Projects operated by the U.S. Army Corps of Engineers (the Corps) may be authorized for specific purposes including flood control, navigation, power production, water supply, fish and wildlife, and recreation. The Bureau of Reclamation (BOR) must construct and operate each individual project in accordance with its specific authorizing statute, which usually addresses project purposes, facilities, operations, and the fiscal relationships between the United States and water users.
Magnuson-Stevens Fishery Conservation and Management Act	Requires federal agencies, in consultation with NMFS, to promote the protection of essential fish habitat. NMFS shall provide conservation recommendations for any federal or state activity that may adversely affect essential fish habitat.
Marine Mammal Protection Act	Prohibits the take of marine mammals except under specified conditions, including as an incidental take during commercial fishing operations. Requires NMFS to study the effect of growing sea lion and harbor seal populations on salmonids in the Pacific Northwest. Allows states to apply to NMFS for a permit to take sea lions and harbor seals under certain conditions.
Migratory Bird Treaty Act	Implements various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the act, taking, killing, or possessing migratory birds is unlawful.
Mitchell Act	Authorizes the Secretary of Commerce to carry on activities for the conservation of fishery resources in the Columbia River Basin. Authorizes federal funds for hatchery construction and operation within the Columbia River Basin for the conservation of fish.
National Environmental Policy Act	Procedural act requiring federal agencies to examine the impacts of proposed federal actions that may significantly affect the environment.

(Continued From Previous Page)	
National Forest Management Act	Along with the Organic Act and the Multiple-Use Sustained-Yield Act, establishes multiple-use mandate for lands managed by the Forest Service to include outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness purposes. Regulations adopted pursuant to the National Forest Management Act requires the Forest Service to manage habitat to maintain viable and well-distributed populations of native fish and wildlife.
Natural Resources Conservation Service Organic Act	Authorizes the Natural Resources Conservation Service to provide technical assistance, conduct surveys, and support conservation-planning efforts.
North American Wetlands Conservation Act	Authorizes grants to public-private partnerships to protect, enhance, and restore wetland ecosystems. Federal grants require nonfederal matching funds.
Northwest Forest Plan	Amends the Forest Service's and BLM's management plans within the range of the Northern Spotted Owl. Addresses agency actions, such as timber harvesting and salmon and steelhead issues.
Pacific Northwest Electric Power Planning and Conservation Act	Authorizes the formation of the Pacific Northwest Electric Power and Conservation Planning Council (Council) and directs it to develop a program to protect, mitigate, and enhance the fish and wildlife of the Columbia River Basin. Requires Bonneville's Administrator to use Bonneville's funding authorities to protect, mitigate, and enhance fish and wildlife affected by the development and operation of the Federal Columbia River Power System and to do so in a manner consistent with the Council's program while ensuring the Pacific Northwest an adequate, efficient, economical, and reliable power supply. Limits Bonneville's share of mitigation costs to those necessary to deal with adverse effects caused by the development and operation of the dams' electric power facilities only. Requires federal agencies responsible for managing, operating, or regulating hydroelectric facilities in the Columbia River Basin to provide equitable treatment for fish and wildlife with the other purposes for which these facilities are operated and managed. These agencies must, at every relevant stage of their decision-making process, also consider, to the fullest extent practicable, the Council's fish and wildlife program.
Pacific Salmon Treaty	Treaty signed by the United States and Canada in 1985 governing the harvest of certain salmon stocks in the fisheries of the Northwest states (including Alaska) and Canada.
Reclamation Act	Requires the BOR to obtain water permits and operate projects in accordance with state water law.
Rivers and Harbors Act	Requires permits for the construction, excavation, or deposition of materials in, over, or under navigable waters of the United States, such as piers, wharfs, breakwaters, bulkheads, jetties, weirs, dams, and dikes.
Sikes Act	Establishes a program for fish and wildlife conservation and rehabilitation at each military reservation in accordance with a cooperative plan determined by the Secretaries of Defense and the Interior, and the appropriate agency designated by the state in which the reservation is located.
Transmission System Act	Designates Bonneville as the marketing agent of all electric power generated by federal plants constructed by the Army Corps of Engineers or BOR in the Pacific Northwest, except for power required for the operation of such projects and the power from BOR's Green Springs project. Authorizes Bonneville to operate and maintain the federal transmission system within the Pacific Northwest and to construct appropriate additions and improvements. Establishes the Bonneville Fund within the U.S. Treasury, a revolving fund that consists of all of Bonneville's receipts and proceeds, and from which Bonneville's Administrator may make expenditures determined to be necessary or appropriate.
Treaties between individual Indian tribes and the United States	Establish federal agency responsibilities for trust assets, hatchery and harvest issues, and tribal water rights.
Tualatin Project Act	Authorizes funding to mitigate for lost fish and wildlife habitat resulting from construction of the Tualatin Project.
U.S. v. Oregon, U.S. v. Washington	Court decisions affirming the right of certain Indian tribes to 50 percent of the harvestable surplus of salmon.

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Umatilla Basin Project Act	Authorizes the construction of a water exchange project between the Umatilla and Columbia Rivers to mitigate anadromous fish losses resulting from the Umatilla Project.
Water Resources Development Acts	Various Water Resources Development Acts authorize the Corps to construct environmental restoration projects; to restore degraded ecosystems resulting from the construction or operation of a project; to restore, protect, and create aquatic and wetlands habitat in connection with a project; and to assist tribal, state, and local governments in preparing comprehensive development plans. Authorizes compensation for fish and wildlife losses caused by power generation at the four dams on the lower Snake River.
Watershed Protection and Flood Prevention Act	Authorizes federal assistance to local groups to plan and carry out projects in watersheds for conservation and use of land and water, and flood prevention.
Wild and Scenic Rivers Act	Declares that certain rivers with outstanding values be preserved in a free-flowing state.
Wyden Amendment	Authorizes BLM to enter into cooperative agreements with federal agencies, tribal, state, and local governments; private and nonprofit entities; and landowners for the protection, restoration, and enhancement of fish and wildlife habitat and other resources on public and private land.
Yakima River Basin Water Enhancement Project	Authorizes BOR to protect, mitigate, and enhance fish and wildlife through improved water management; improved in-stream flows; improved water quality; and the protection, creation, and enhancement of wetlands; and provides for the Yakama Indian Nation, at its sole discretion, to implement an enhancement project integrating agricultural, fish, wildlife, and cultural resources.

Groups Involved in Salmon and Steelhead Recovery

This appendix shows the committees, task forces, and groups that the federal agencies reported belonging to or whose meetings they attend. Table 6 shows the main committees, task forces, and groups that collaborate on salmon and steelhead recovery, along with their purpose and the frequency of meetings. Table 7 shows the purpose and meeting frequency for other groups with limited functional or geographic roles in salmon and steelhead recovery.

Table 6: Major Groups Involved in Salmon and Steelhead Recovery Efforts

Group	Description	Frequency
Columbia Basin Fish and Wildlife Authority	Coordinates input and makes recommendations to the Northwest Power Planning Council on budgets, strategic direction, and analytical criteria for projects. Contains subgroups that meet two or three times a month to make final project recommendations.	Monthly.
	Technical Management Committee on Fish Marking.	
	Technical Management Committee on Harvest.	
	Fish Passage Advisory Committee.	Weekly, during migration season.
	Fish Screen Oversight Committee. Designs fish screens and prioritizes locations to receive them.	
Federal Caucus	Members include federal agencies with natural resource responsibilities. The Caucus provides guidance and policy on the implementation and coordination of the All-H Strategy and Federal Columbia River Power System (FCRPS) biological opinion. It also discusses hatchery and Interior Columbia Basin Ecosystem Management Team issues.	Monthly, more frequently if needed.
	Executive Committee. Develops and coordinates policy-level decisions regarding salmon and steelhead recovery between federal, state, and tribal leaders.	Irregularly.
	Caucus Staff Team. Conducts staff work for Executive Committee.	Monthly.
	Biological Opinion Implementation Coordination Team. Coordinates the implementation of the FCRPS biological opinion and determines the operation and configuration of FCRPS.	
	Salmon Policy Group. Washington, D.C., group consisting of the Council on Environmental Quality and political appointees for the departments and federal agencies.	
	Federal Habitat Team. Develops the implementation plan and guides Recovery Team discussions on actions undertaken by federal agencies in the All-H Strategy. Three subgroups have been established.	Monthly. Subgroups also meet monthly.
	Research, Monitoring and Evaluation Team. Monitors the status and effectiveness of Biological Opinion actions and develops databases.	Weekly and monthly.
Lower Columbia River Estuary Partnership	Voluntary plan for actions to improve the ecology of the Columbia River estuary.	

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Group	Description	Frequency
	ESA Executive Committee. Integrates ESA with Lower Columbia Partnership actions.	Quarterly.
	Foundation Board. Assists the Lower Columbia Partnership with implementation and seeks to broaden the program's funding base beyond federal and state funds.	
	Implementation Committee. Develops and implements the Lower Columbia Partnership's Management Plan.	
Northwest Forest Plan Regional Ecosystem Office	Implements the Northwest Forest Plan.	
	Aquatic Effectiveness Management Team. Assesses the actions taken to reach plan's aquatic objectives.	Every 2 months.
	Water Demonstration Work Group. Discusses reasonable and prudent actions included in the plan.	Twice monthly.
	Regional Interagency Executive Committee. Senior regional entity that coordinates and implements the Northwest Forest Plan.	
Northwest Power Planning Council (Power Council)	Council of representatives appointed by the governors of Idaho, Montana, Oregon, and Washington established by the Pacific Northwest Electric Power Planning and Conservation Act. Operates a program to protect, mitigate, and enhance the fish and wildlife, including related spawning grounds and habitat of the Columbia River and its tributaries. Requires federal agencies to operate the Federal Columbia River Power System projects in a manner that provides equitable treatment for fish and wildlife and to consider, to the fullest extent practicable, the Power Council's fish and wildlife program.	Monthly.
	Fish 4 Group. Power Council representatives focused on fish issues.	Monthly.
	Power 4 Group. Power Council representatives focused on power issues.	Monthly.
	Provincial Review and Sub-Basin Planning Process. Identifies fish, wildlife, and habitat goals, and reviews projects for funding in each of the 11 provinces and 62 river subbasins.	As needed.
	Artificial Production Review Committee. Power Council's hatchery-planning group.	Monthly.
	Hatchery Genetic Management Planning Group. Identifies hatchery improvements through off-site actions.	
	Independent Science Advisory Board.	
NMFS Regional Implementation Forum	An intergovernmental forum for discussing and implementing NMFS's FCRPS biological opinion and related funding matters. Coordinates actions taken under the biological opinion with other related plans and forums in the basin.	
	System Configuration Team. Plans and prioritizes dam configuration actions.	Monthly.
	Executive Committee. Resolves Implementation Team disputes. Policy-level forum for hydroelectric operations in the Columbia River Basin.	

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Group	Description	Frequency
	Implementation Team. Resolves Technical Management Team disputes. Policy-level forum for hydroelectric operations and configurations in the Columbia River Basin.	Monthly.
	Technical Management Team. Determines operations of the hydropower system under criteria set by the FCRPS Biological Opinion.	Weekly.
	Water Quality Team. Reports to the Implementation Team on water quality issues.	
	Fish Passage Operations and Maintenance Coordination Team. Coordinates fish passage facility operation and maintenance activities and adult counting.	Monthly.
	Fish Facility Design Review Workgroup. Develops and implements fish passage improvements at dams operated by the Corps.	Quarterly.
Technical Recovery Teams	Established by the National Marine Fisheries Service to develop recovery plans for all listed salmon and steelhead as required under the Endangered Species Act, including identifying (1) population and delisting goals; (2) habitat/fish abundance relationships; (3) the factors for decline and limiting factors for each listing; and (4) research, evaluation, and monitoring needs. Includes regional subteams.	
U.S. v. Oregon	Production Advisory Committee. Develops stock status information, reviews harvest impacts and production proposals, and coordinates the implementation of the court decision.	As needed.
	Policy Committee. Resolves disputes on production and harvest issues.	As needed.
Willamette and Lower Columbia River Team	Coordinates federal agency review and comments on the biological opinion for federal Willamette River Basin hydroelectric facilities.	As needed.

Table 7: Other Groups That Federal Agencies Coordinate with on Salmon and Steelhead Recovery

Group	Description	Frequency
Anadromous Fish Evaluation Program	Identifies and coordinates research needs.	As needed.
Captive Brood Oversight Committee	Provides oversight on managing captive brood stocks.	Monthly.
Caspian Tern Working Group	Developing a plan to reduce smolt predation by Caspian terns nesting in the Columbia River estuary.	As needed.
Federal Regulatory Energy Commission workgroups	Addresses impacts to fish and wildlife for each dam being relicensed under the Federal Power Act.	Two to four times monthly.
Habitat Conservation Plan Committee for Chelan and Douglas Counties	Develops Habitat Conservation Plans for three hydroelectric projects.	Weekly.

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Group	Description	Frequency
Interagency Aquatic Monitoring Team	Coordinates aquatic-monitoring actions and data for a portion of Oregon and Washington.	
Interagency Implementation Team for PACFISH and INFISH Biological Opinion	Implements PACFISH and INFISH, interim strategies for the management of anadromous and resident fish on federal lands in the interior Columbia River Basin.	Monthly, plus quarterly executive meetings.
Interagency Salmon Science Team	Coordinates salmon research.	Semiannually.
International Joint Commission	Oversees treaty between the United States and Canada regarding operation of hydroelectric projects in the Columbia River Basin.	
Lower Columbia Fish Recovery Board	A regional board to evaluate project funding.	
Mid-Columbia Coordinating Committee	Coordinates mitigation efforts and designs fish passage facilities.	
Oregon Water Trust Board	Purchases water rights and converts them to in-stream flows.	Quarterly.
Pacific Fishery Management Council	Exercises authority over the fisheries in the Pacific Ocean off the California, Oregon, and Washington coasts under the Magnuson-Stevens Fishery Conservation and Management Act.	
	Salmon Technical Team. Analyzes salmon stock status and impacts of fishery options.	
Pacific Northwest Fish Health Protection Committee	Develops research priorities; technical, diagnostic, prophylactic, and therapeutic procedures; fish cultural practices; and practical fishery management policies to prevent the introduction and spread of diseased fish and pathogens, to minimize the impact of diseases, and promote the production of healthy fish.	Semiannually.
Pacific Salmon Commission	Provides the United States and Canada with regulatory advice and recommendations. Addresses international aspects, including harvest. Established by treaty in 1985.	Four times per year.
	Chum Technical Committee. Evaluates management actions, the status of salmon stocks, and the progress of rebuilding programs required under treaty.	
	Coho Technical Committee. Evaluates management actions, status of salmon stocks, and the progress of rebuilding programs required under treaty.	
	Joint Chinook Technical Committee. Evaluates management actions, status of salmon stocks, and the progress of rebuilding programs required under treaty.	
	Southern Panel. Makes recommendations to the Pacific Salmon Commission.	
Salmon Memorandum of Understanding	Coordinates ESA and Clean Water Act requirements.	As necessary.

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Group	Description	Frequency
Streamlining Consultation Teams	Includes BLM, the Forest Service, NMFS, FWS. Reviews proposed projects to determine if analyses required under the Endangered Species Act are complete. Disagreements are referred to a manager-level team for resolution.	
Technical Working Groups in Sub-Basin	Coordinates projects developed by various fish and natural resources managers.	
Transboundary Gas Group	Addresses international water quality issues.	Quarterly.
Various Watershed and State Level Efforts	Federal agencies provide planning assistance, technical expertise, or otherwise serve on numerous watershed councils or similar locally based organizations. Federal agencies also coordinate their actions with the appropriate state agencies. These groups are too numerous to list separately, but several examples are included below:	
	Oregon Plan for Salmon and Watersheds. State effort to restore and protect salmon and watersheds through local, voluntary, and cooperative efforts.	
	Salmon Recovery Funding Board. State of Washington effort to select restoration projects for funding.	
	Snake River Salmon Recovery Board. Develops recovery projects and submits them to the Salmon Recovery Funding Board.	

Agency Expenditures

During fiscal year 1982 through fiscal 1996, the 11 federal agencies estimated they expended almost $1.8 billion (unadjusted for inflation) in federal funds and Bonneville ratepayer revenues to recover salmon and steelhead in the Columbia River Basin. These agencies also estimate they expended another almost $1.5 billion (in 2001 dollars) from fiscal year 1997 through fiscal 2001. The $1.5 billion consists of $968.0 million expended directly by federal agencies and $537.2 million that the federal agencies received and then provided to nonfederal agencies, such as the states and Indian tribes. The $968.0 million was expended on projects, research studies, monitoring actions, Endangered Species Act consultations, non-ESA consultations on salmon and steelhead issues, litigation involving salmon and steelhead issues, and program administration costs.

In addition to the $1.5 billion expended by federal agencies or provided by federal agencies to nonfederal agencies for specific salmon and steelhead recovery actions, federal agencies also estimated that they expended $302 million (in 2001 dollars) in the last 5 fiscal years on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead, such as road improvements that reduce erosion.

For the period covering fiscal year 1997 through fiscal 2001, each agency's expenditures follow. The agencies are listed in alphabetical order.

Army Corps of Engineers

The U.S. Army Corps of Engineers estimated it expended about $769 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. The Corps estimated it expended, for fiscal year 1997 through fiscal 2001, approximately $590 million (in 2001 constant dollars) specifically for salmon and steelhead recovery efforts, as shown in table 8. Of the $590 million, more than $430 million was expended on such projects as construction of juvenile fish bypass facilities, the operation and maintenance of juvenile and adult passage facilities and fish—hauling actions, and the development and installation of fish screens to steer juvenile fish away from the turbines at Bonneville and John Day dams.

Table 8: Army Corps of Engineers' Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands						
Salmon and steelhead specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$91,783	$95,523	$84,999	$68,711	$90,674	**$431,690**
Research expenditures	21,254	34,223	22,646	33,112	36,889	**148,124**
Monitoring expenditures	5	5	626	840	190	**1,666**
ESA consultation expenditures	164	218	258	342	342	**1,324**
Other consultation expenditures[b]	97	109	204	236	219	**865**
Litigation[c]	107	105	107	108	110	**537**
Administration[d]	1,206	1,286	978	1,021	1,010	**5,501**
Total salmon- and steelhead-specific expenditures	114,616	131,469	109,818	104,370	129,434	**589,707**
Funds provided to nonfederal entities	0	0	0	0	0	**0**
Nonspecific salmon and steelhead expenditures	1,072	1,086	2,721	2,206	1,500	**8,585**
Total expenditures	**$115,688**	**$132,555**	**$112,539**	**$106,576**	**$130,934**	**$598,292**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation, and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts, including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

The Corps also expended over $8.6 million (adjusted to 2001 dollars) on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead. The Corps did not report providing nonfederal entities with any funds.

Bonneville Power Administration

The Bonneville Power Administration estimated that it expended over $487 million (in unadjusted dollars) in power receipts during fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. Bonneville estimated that it expended, for fiscal

year 1997 through 2001, over $26 million (in 2001 constant dollars) specifically for salmon and steelhead restoration efforts, as shown in table 9. Of the $26 million, almost $22 million was for contract administration actions. Because Bonneville provides other entities with power receipts for projects, research, and monitoring, it has no expenditures in these categories.

Table 9: Bonneville Power Administration's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands						
Salmon- and steelhead-specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$0	$0	$0	$0	$0	**$0**
Research expenditures	0	0	0	0	0	**0**
Monitoring expenditures	0	0	0	0	0	**0**
ESA consultation expenditures	46	48	49	49	50	**242**
Other consultation expenditures[b]	418	429	437	441	450	**2,175**
Litigation[c]	316	402	378	370	340	**1,806**
Administration[d]	4,753	4,034	4,744	3,647	4,604	**21,782**
Total salmon- and steelhead-specific expenditures	5,533	4,913	5,608	4,507	5,444	**26,005**
Funds provided to nonfederal entities	62,228	81,814	78,668	68,419	87,563	**378,692**
Nonspecific salmon and steelhead expenditures	0	0	0	0	0	**0**
Total expenditures	**$67,761**	**$86,727**	**$84,276**	**$72,926**	**$93,007**	**$404,697**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

The costs shown above include the direct program costs that Bonneville itself has expended on salmon- and steelhead-related activities. In addition to their direct program costs, however, Bonneville uses ratepayer revenues

to (1) reimburse the U.S. Treasury for the hydroelectric share of Corps, BOR, and Fish and Wildlife operation and maintenance costs and other noncapital expenditures for fish and wildlife and (2) fund the hydroelectric share of capital investment costs of the Corps' and BOR's fish and wildlife projects. Bonneville estimates that its operation and maintenance reimbursements from fiscal year 1997 through fiscal 2001 were $215.1 million and its funding of capital investment for the same time period were $453.9 million. These costs have been included in the totals of the agencies that originally expended them.

Bonneville officials indicated that they have also incurred significant nonspecific salmon and steelhead recovery costs. Examples it cited of nonspecific salmon and steelhead costs included a portion of its electricity rate justification case that includes fish protection and programmatic National Environmental Policy Act documents for watersheds. While Bonneville officials stated that these costs are quite extensive, they did not furnish us with any estimates.

Finally, Bonneville estimated that it provided state, tribal, and private entities with approximately $379 million (adjusted to 2001 dollars) from fiscal year 1997 through fiscal 2001. The states, tribes, and other entities used these funds for many actions, including habitat restoration and support of the Northwest Power Planning Council's fish and wildlife program.

Bureau of Indian Affairs

The Bureau of Indian Affairs (BIA) estimated that it expended more than $41 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. BIA estimated that it expended, for fiscal year 1997 through fiscal 2001, over $360,000 (in 2001 constant dollars) specifically for salmon- and steelhead-recovery efforts, as shown in table 10. Of the $360,000, more than $300,000 was expended on consultation actions, such as attending meetings, other coordination actions, and contract administration. Because BIA provides other entities with funds for projects, research, and monitoring, it did not report any expenditures in these categories.

Table 10: Bureau of Indian Affairs' Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands						
Salmon- and steelhead-specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$0	$0	$0	$0	$0	**$0**
Research expenditures	0	0	0	0	0	**0**
Monitoring expenditures	0	0	0	0	0	**0**
ESA consultation expenditures	2	13	13	12	12	**52**
Other consultation expenditures[b]	32	32	31	30	30	**155**
Litigation[c]	0	0	0	0	0	**0**
Administration[d]	25	25	24	24	57	**155**
Total salmon- and steelhead-specific expenditures	59	70	68	66	99	**362**
Funds provided to nonfederal entities	5,744	5,674	6,053	5,918	6,263	**29,652**
Nonspecific salmon and steelhead expenditures	5	5	5	5	5	**25**
Total expenditures	**$5,808**	**$5,749**	**$6,126**	**$5,989**	**$6,367**	**$30,039**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

BIA estimated it provided tribal organizations and individual tribes, including the Columbia River Inter-Tribal Fish Commission, the Confederated Tribes of the Warm Springs Reservation, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Reservation, the Yakama Indian Nation, the Colville Tribe, the Fort Hall Shoshone, the Upper Columbia United Tribes, and the Spokane Tribe, with over $29 million (adjusted to 2001 dollars) during fiscal year 1997 through fiscal 2001. BIA also expended more than $25,000 (adjusted to 2001 dollars) on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead.

Bureau of Land Management

The Bureau of Land Management estimated it expended that more than $22 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996, on actions in the Columbia River Basin to benefit salmon and steelhead. BLM estimated that it expended, for fiscal year 1997 through fiscal 2001, approximately $12 million (in 2001 constant dollars) specifically for salmon- and steelhead-recovery efforts, as shown in table 12. Of the $12 million, more than $7.5 million was expended on such projects as the Fishermen's Bend, Eaton, and Sandy River Corridor land purchases; Hill's Creek road decommissioning and culvert removal; Lemhi riparian habitat conservation, and the Hayden Creek road sediment reduction project and other monitoring activities.

Table 11: Bureau of Land Management's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands						
Salmon- and steelhead-specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$865	$891	$914	$947	$1,244	**$4,861**
Research expenditures	0	42	0	0	40	**82**
Monitoring expenditures	601	619	634	400	583	**2,837**
ESA consultation expenditures	270	381	416	340	276	**1,683**
Other consultation expenditures[b]	32	48	65	276	260	**681**
Litigation[c]	0	0	0	0	25	**25**
Administration[d]	241	280	286	358	422	**1,587**
Total salmon- and steelhead-specific expenditures	2,009	2,261	2,315	2,321	2,850	**11,756**
Funds provided to nonfederal entities	34	0	52	0	50	**136**
Nonspecific salmon and steelhead expenditures	2,576	2,930	2,804	2,717	3,330	**14,357**
Total expenditures	**$4,619**	**$5,191**	**$5,171**	**$5,038**	**$6,230**	**$26,249**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

BLM also expended over $14 million (adjusted to 2001 dollars) on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead. BLM provided nonfederal entities with $136,000.

Bureau of Reclamation

The Bureau of Reclamation estimated that it expended over $144 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. BOR estimated that it expended, for fiscal year 1997 through fiscal 2001, almost $62 million (in 2001 constant dollars) specifically for salmon- and steelhead-recovery efforts, as shown in table 12. Of the $62 million, more than $58 million was expended on Columbia and Snake River salmon- and steelhead-recovery projects and on several segments of the Yakima River Basin water enhancement project—including its tributary program, water acquisition program, water augmentation program, and habitat acquisition program. Of the $58 million, approximately $27 million was expended on operations and maintenance of fish screen facilities in the Yakima River Basin.

Table 12: Bureau of Reclamation's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands

Salmon- and steelhead-specific expenditures[a]	1997	1998	1999	2000	2001	Total
Project expenditures	$15,345	$12,246	$9,933	$13,361	$7,809	**$58,694**
Research expenditures	0	0	0	0	0	**0**
Monitoring expenditures	0	0	0	0	0	**0**
ESA consultation expenditures	96	529	617	946	589	**2,777**
Other consultation expenditures[b]	0	0	24	128	44	**196**
Litigation[c]	41	12	3	139	23	**218**
Administration[d]	0	0	0	0	0	**0**
Total salmon- and steelhead-specific expenditures	15,482	12,787	10,577	14,574	8,465	**61,885**

(Continued From Previous Page)

Dollars in thousands

Salmon- and steelhead-specific expenditures[a]	1997	1998	1999	2000	2001	Total
Funds provided to nonfederal entities	0	0	0	0	0	**0**
Nonspecific salmon- and steelhead-expenditures	955	2,137	2,411	2,165	2,551	**10,219**
Total expenditures	**$16,437**	**$14,924**	**$12,988**	**$16,739**	**$11,016**	**$72,104**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

BOR also expended over $10 million (adjusted to 2001 dollars) on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead. BOR did not report providing nonfederal entities with any funds.

Environmental Protection Agency

The Environmental Protection Agency estimated that it expended no funds from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. EPA estimated that it expended, for fiscal year 1997 through fiscal 2001, $67,000 (in 2001 constant dollars) specifically for salmon- and steelhead-recovery efforts, as shown in table 13. Of the $67,000, $47,000 was expended on the salaries of those participating in ESA consultation actions and the remainder on other meeting and coordination actions. EPA estimated that it had no expenditures for projects, research, or monitoring.

Table 13: Environmental Protection Agency's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands						
Salmon- and steelhead specific-expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$0	$0	$0	$0	$0	**$0**
Research expenditures	0	0	0	0	0	**0**
Monitoring expenditures	0	0	0	0	0	**0**
ESA consultation expenditures	10	10	9	9	9	**47**
Other consultation expenditures[b]	0	5	5	5	5	**20**
Litigation[c]	0	0	0	0	0	**0**
Administration[d]	0	0	0	0	0	**0**
Total salmon- and steelhead-specific expenditures	10	15	14	14	14	**67**
Funds provided to nonfederal entities	0	0	0	0	0	**0**
Nonspecific salmon and steelhead expenditures	0	0	0	0	0	**0**
Total expenditures	**$10**	**$15**	**$14**	**$14**	**$14**	**$67**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

EPA identified no funds that it provided nonfederal entities with nor did it identify any funds expended on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead.

Fish and Wildlife Service

The U.S. Fish and Wildlife Service estimated that it expended over $182 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. FWS estimated that it expended, for fiscal year 1997 through fiscal 2001, almost $97 million (in 2001 constant dollars) specifically for

salmon- and steelhead- recovery efforts, as shown in table 14. Of the $97 million, more than $78 million was expended on such projects as the Abernathy Fish Technology Center, the Kooskia National Fish Hatchery, the Little White Salmon/Willard National Fish Hatchery, the Lower Snake River Compensation Plan, the Lower Columbia River Fish Health Center, and the Mid-Columbia River Fishery Resources Office.

Table 14: Fish and Wildlife Service's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands

Salmon- and steelhead-specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$15,747	$14,652	$14,775	$15,103	$17,960	**$78,237**
Research expenditures	479	515	549	528	784	**2,855**
Monitoring expenditures	1,121	1,580	1,779	1,841	2,337	**8,658**
ESA consultation expenditures	0	0	0	0	0	**0**
Other consultation expenditures[b]	489	517	534	468	462	**2,470**
Litigation[c]	0	0	0	0	0	**0**
Administration[d]	689	794	844	1,134	1,050	**4,511**
Total salmon- and steelhead-specific expenditures	18,525	18,058	18,481	19,074	22,593	**96,731**
Funds provided to nonfederal entities	375	1,244	22,944	9,679	13,167	**47,409**
Nonspecific salmon and steelhead expenditures	485	958	753	1,010	1,239	**4,445**
Total expenditures	**$19,385**	**$20,260**	**$42,178**	**$29,763**	**$36,999**	**$148,585**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

FWS also estimated it provided state and tribal entities with over $47 million (adjusted to 2001 dollars) from fiscal year 1997 through fiscal 2001. The states and tribal entities used these funds for hatchery

improvement studies, estuary research initiatives, and salmon reproductive biological research. Finally, FWS expended another $4.4 million (adjusted to 2001 dollars) on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead.

Forest Service

The U.S. Forest Service estimated that it expended about $118 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. The Forest Service estimated that it expended, for fiscal year 1997 through fiscal 2001, almost $106 million (in 2001 constant dollars) specifically for salmon- and steelhead-recovery efforts, as shown in table 15. Of the $106 million, more than $87 million was expended on such projects as watershed improvements, flood area restoration, burned-area emergency restoration, and land acquisition.

Table 15: Forest Service's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands

Salmon- and steelhead-specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$21,320	$16,511	$14,819	$16,020	$18,400	**$87,070**
Research expenditures	257	233	340	457	300	**1,587**
Monitoring expenditures	1,178	847	730	816	900	**4,471**
ESA consultation expenditures	2,464	2,434	2,609	2,551	2,500	**12,558**
Other consultation expenditures[b]	0	0	0	0	0	**0**
Litigation[c]	0	0	0	0	0	**0**
Administration[d]	0	0	0	0	0	**0**
Total salmon- and steelhead-specific expenditures	25,219	20,025	18,498	19,844	22,100	**105,686**
Funds provided to nonfederal entities	0	0	0	0	0	**0**
Nonspecific salmon and steelhead expenditures	27,855	24,132	19,829	26,020	33,500	**131,336**
Total expenditures	**$53,074**	**$44,157**	**$38,327**	**$45,864**	**$55,600**	**$237,022**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

The Forest Service also expended more than $131 million (adjusted to 2001 dollars) on changes to mission—related projects that benefited, but were not specifically directed at, salmon or steelhead. The Forest Service did not report providing nonfederal entities with any funds.

National Marine Fisheries Service

The National Marine Fisheries Service estimated that it expended about $21 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. NMFS estimated that it expended, for fiscal year 1997 through fiscal 2001, approximately $49 million (in 2001 constant dollars) specifically for salmon- and steelhead-recovery efforts, as shown in table 16. Of this amount, almost $34 million was expended on consultation actions under the Endangered Species Act and for such research projects as the effects of hatchery operations on small wild salmon populations.

Table 16: National Marine Fisheries Service's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands

Salmon- and steelhead-specific expenditures[a]	1997	1998	1999	2000	2001	Total
Project expenditures	$600	$766	$1,002	$1,261	$1,434	**$5,063**
Research expenditures	1,091	2,748	2,054	3,213	4,292	**13,398**
Monitoring expenditures	0	0	0	41	94	**135**
ESA consultation expenditures	3,180	3,515	4,485	4,641	4,772	**20,593**
Other consultation expenditures[b]	0	159	96	104	147	**506**
Litigation[c]	126	196	219	241	239	**1,021**
Administration[d]	806	1,314	1,380	2,155	2,172	**7,827**
Total salmon- and steelhead-specific expenditures	5,803	8,698	9,236	11,656	13,150	**48,543**

(Continued From Previous Page)

Dollars in thousands

Salmon- and steelhead-specific expenditures[a]	1997	1998	1999	2000	2001	Total
Funds provided to nonfederal entities	14,715	19,390	17,068	14,208	15,929	**81,310**
Nonspecific salmon and steelhead expenditures	894	995	2,279	1,089	1,142	**6,399**
Total expenditures	**$21,412**	**$29,083**	**$28,583**	**$26,953**	**$30,221**	**$136,252**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

NMFS estimated it also provided state and tribal groups with over $81 million (adjusted to 2001 dollars) from fiscal year 1997 through fiscal 2001. The states and tribal groups used these funds for many actions, including hatchery operations to mitigate the negative impacts on fish caused by the dams. Finally, NMFS expended another $6 million (adjusted to 2001 dollars) on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) estimated that it expended more than $3.6 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996, on actions in the Columbia River Basin to benefit salmon and steelhead. NRCS estimated that it expended, for fiscal year 1997 through fiscal 2001, approximately $8 million (in 2001 constant dollars) specifically for salmon and steelhead recovery efforts, as shown in table 17. Of the $8 million, almost $7 million was expended on such projects as salmon-recovery initiatives in the states of Idaho, Oregon, and Washington Conservation Technical Assistance to various soil conservation districts for salmon and steelhead recovery. NRCS estimated that it had no expenditures for research and monitoring.

Table 17: Natural Resources Conservation Service's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands						
Salmon- and steelhead-specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$1,714	$945	$1,117	$1,410	$1,384	**$6,570**
Research expenditures	0	0	0	0	0	**0**
Monitoring expenditures	0	0	0	0	0	**0**
ESA consultation expenditures	48	58	72	62	93	**333**
Other consultation expenditures[b]	150	116	170	181	220	**837**
Litigation[c]	0	0	0	0	0	**0**
Administration[d]	0	0	0	0	0	**0**
Total salmon- and steelhead-specific expenditures	1,912	1,119	1,359	1,653	1,697	**7,740**
Funds provided to nonfederal entities	0	0	0	0	0	**0**
Nonspecific salmon and steelhead expenditures	24,916	28,006	21,975	26,503	22,197	**123,597**
Total expenditures	**$26,828**	**$29,125**	**$23,334**	**$28,156**	**$23,894**	**$131,337**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead-specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

NRCS also expended more than $123 million (adjusted to 2001 dollars) on changes to mission-related projects that benefited fish but were not specifically directed at salmon or steelhead. NRCS officials stated that these expenditures assisted farmers, ranchers, and other private landowners to manage their natural resources in a sustainable manner without degradation while complying with federal, state, and local natural resources laws. Most of these expenditures provided cost-share funds to private landowners for installing and managing conservation practices through the Environmental Quality Incentives Program, Wetland Reserve Program, Wildlife Habitat Incentive Program, and Small Watershed

Program. A portion of these funds was used by the agency to provide landowners with technical assistance to plan and implement these conservation programs.

U.S. Geological Survey

The U.S. Geological Survey (USGS) estimated that it expended more than $12 million (in unadjusted dollars) from fiscal year 1982 through fiscal 1996 on actions in the Columbia River Basin to benefit salmon and steelhead. USGS estimated that it expended, for fiscal year 1997 through fiscal 2001, over $19.5 million (in 2001 constant dollars) specifically for salmon- and steelhead-recovery efforts, as shown in table 18. Of the $19.5 million, more than $16 million was expended on such research projects as the genetic effects of hatchery fish introduction on the productivity of naturally spawning salmon, the significance of other salmon and steelhead predators, and the development of prey protection measures for juvenile salmon and steelhead in Columbia and Snake rivers reservoirs, and the behavior and survival of hatchery fall Chinook salmon after being released into the Snake River. Because USGS's Western Fisheries Research Center is primarily a research facility, it did not report any project or monitoring expenditures.

Table 18: U.S. Geological Survey's Estimated Salmon and Steelhead Expenditures in the Columbia River Basin, Fiscal Years 1997 through 2001

Dollars in thousands

Salmon- and steelhead-specific expenditures[a]	**1997**	**1998**	**1999**	**2000**	**2001**	**Total**
Project expenditures	$0	$0	$0	$0	$0	**$0**
Research expenditures	4,006	3,684	2,930	2,719	3,003	**16,342**
Monitoring expenditures	0	0	0	0	0	**0**
ESA consultation expenditures	0	0	0	0	15	**15**
Other consultation expenditures[b]	0	29	30	31	41	**131**
Litigation[c]	0	0	0	0	0	**0**
Administration[d]	571	585	598	609	654	**3,017**
Total salmon- and steelhead-specific expenditures	4,577	4,298	3,558	3,359	3,713	**19,505**
Funds provided to nonfederal entities	0	0	0	0	0	**0**
Nonspecific salmon and steelhead expenditures	432	604	608	724	904	**3,272**
Total expenditures	**$5,009**	**$4,902**	**$4,166**	**$4,083**	**$4,617**	**$22,777**

Note: Dollars adjusted to 2001 dollars.

[a]Salmon- and steelhead-specific expenditures include those funds used specifically for the recovery, mitigation and restoration of salmon and steelhead in the Columbia River Basin.

[b]Other consultation expenditures include funds spent to attend meetings and to perform coordination actions associated with salmon and steelhead recovery, mitigation, and restoration in the Columbia River Basin.

[c]Litigation expenditures include funds used to support active or pending lawsuits but do not include funds expended by the agency's Office of General Counsel.

[d]Administration expenditures include funds spent to support all the salmon- and steelhead- specific efforts including funds spent for contract administration and project management. Some agencies have incorporated these funds into their project costs because they could not be separated.

Source: GAO's analysis of agency-supplied data.

USGS also expended more than $3.3 million (adjusted to 2001 dollars) on changes to mission-related projects that benefited, but were not specifically directed at, salmon or steelhead. USGS did not report providing nonfederal entities with any funds.

Agency Actions Benefiting Salmon and Steelhead Populations

Each of the 11 federal agencies with significant responsibilities for salmon and steelhead recovery in the Columbia River Basin has taken many actions in the past 5 years to fulfill those responsibilities. Some actions were undertaken specifically to benefit fish while others were undertaken in pursuit of other agency mandates or programs. In both instances, a direct correlation between actions taken and the number of fish returning is not always clear and often takes years to materialize. Below, in alphabetical order, are examples of actions taken by each agency.

Army Corps of Engineers

The U.S. Army Corps of Engineers operates numerous hydroelectric dams in the Columbia River Basin. Each dam is authorized for specific purposes, such as flood control, navigation, power production, water supply, fish and wildlife, and recreation. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin.

- Consulted with NMFS and FWS on the operation of FCRPS and other projects in the Columbia River Basin; developed in conjunction with the Federal Caucus, the All-H Strategy for restoring threatened and endangered salmon and steelhead; in conjunction with Bonneville and BOR, prepared 1-year and 5-year plans to implement the biological opinion on the Federal Columbia River Power System.

- Constructed juvenile bypass systems at seven of the eight mainstem dams to improve juvenile fish guidance and survival rates. For example, the juvenile bypass system at Bonneville Dam's second powerhouse was expected to increase juvenile survival by 6 to 13 percent, depending on the species.

- Redesigned and/or rehabilitated fish ladders to improve passage efficiency.

- Constructed spillway deflectors at the John Day and Ice Harbor dams to allow higher spill flows and increase juvenile passage.

- Constructed new facilities and modified operations to enhance juvenile fish transportation. For example, the Corps improved or replaced the collecting and holding facilities at the four dams that collect juvenile fish, purchased two additional barges to transport juvenile fish, modified existing barges to provide better fish release systems, and extended the transport season on the Snake River.

- Rehabilitated turbines at Bonneville Dam's first powerhouse, resulting in a 2 percent increase in juvenile fish survival.
- Constructed a monitoring facility at John Day Dam to obtain data on juvenile passage and other research needs.
- Installed a prototype surface bypass system at Lower Granite Dam and evaluated the effects of various configurations of behavioral guidance structures.
- Conducted a study to identify the characteristics of dissolved gases resulting from spills at Columbia River projects and to identify and evaluate alternatives for spillway modifications to reduce dissolved gas production to benefit fish passage while meeting water quality standards.
- Conducted juvenile and adult passage evaluation studies at eight dams on the Columbia and Snake rivers to help determine improvements in facilities and operations that may be necessary to increase spawning success.

Bonneville Power Administration

The Pacific Northwest Electric Power Planning and Conservation Act directs the Bonneville Power Administration to use its funding authorities to protect, mitigate, and enhance fish and wildlife affected by the construction and operation of the Federal Columbia River Power System. Primarily, Bonneville provides other agencies with funding to undertake actions to meet this goal. In doing so, Bonneville is to act consistently with the Northwest Power Planning Council's fish and wildlife program while ensuring an adequate, economical, and reliable power supply. Examples of the actions that Bonneville has taken to benefit salmon and steelhead in the Columbia River Basin include the following:

- Provided federal, state, tribal and other entities with funding to protect and enhance fish and wildlife affected by hydropower development in the Columbia River Basin. Worked with other federal agencies to protect and rebuild species listed under the Endangered Species Act.
- In conjunction with the Federal Caucus, developed the All-H strategy for restoring threatened and endangered salmon and steelhead in the Columbia River Basin.

- Consulted with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service on the operation of the Federal Columbia River Power System in the Columbia River Basin.

- In conjunction with the Corps of Engineers and Bureau of Reclamation, prepared a 1- and 5-year plan to implement the biological opinion on the Federal Columbia River Power System.

- Made fish protection the priority of FCRPS operations (except under flood control and power emergencies).

- Provided, on average, 7.2 million acre feet (50-water-year average) of flow augmentation annually (this equates to approximately 1.5 times the storage capacity of Grand Coulee Dam).

- Worked with the Corps and BOR to increase fish passage survival at dams, on average, by 5 percent or more at each dam.

- Funded predator control throughout FCRPS and the estuary to save approximately 7 million to 12 million juvenile salmon and steelhead per year. This equates to an approximate 5 to 10 percent increase in juvenile fish survival.

- Achieved, together with the Corps and BOR, on average, an in-river survival of juveniles through FCRPS that is now higher than ever measured.

Bureau of Indian Affairs

The Bureau of Indian Affairs is a trustee of fishing rights reserved by certain tribes in their treaties with the United States. As a party to the *U.S. v. Oregon* case, BIA plays a role in protecting, rebuilding, and enhancing upper Columbia River fish runs while providing harvests for both treaty Indian and non-Indian fisheries. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin:

- Monitored actions of the Federal Caucus and others that affect tribal trust resources. Communicated its concerns regarding the All-H Strategy and other plans, including italics harvest negotiations and Mid-Columbia Habitat Conservation Plans.

- Provided the Columbia River Inter-Tribal Fish Commission with funding to, among other things, implement its recovery plan, conduct fishery enforcement, develop an Energy Vision report, implement certain aspects of the Pacific Salmon Treaty, and provide input on federal actions affecting salmon recovery, including the Bonneville Power Administration's rate case.

- Provided individual tribes, including the Umatilla Tribe, the Yakama Indian Nation, the Warm Springs Tribe, the Nez Perce Tribe, the Colville Tribe, and the Shoshone-Bannock Tribes, with funding and actions performed by the tribes with these funds include the construction of hatchery and acclimation facilities and stream restoration.

Bureau of Land Management

The Bureau of Land Management manages lands for multiple uses, including livestock grazing, recreation, mineral production, timber, and fish and wildlife. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin:

- Acquired land for conservation purposes, including land at Fisherman's Bend and on the Sandy River corridor.

- Performed road and trail maintenance, decommissioned roads, conducted culvert inventories, and replaced culverts to reduce erosion that can run off into streams.

- Performed habitat restoration and protection actions. Specific actions include planting 50 acres of riparian habitat on the lower Grande Ronde River, constructing 1 mile of cattle fencing and completing 3 acres of planting in the Grande Ronde Basin, improving in-stream habitat through the placement of boulders and large woody debris, rehabilitating areas burned by fire to reduce sedimentation, and reducing fuel loads to reduce the risk of future fires.

- Conducted several studies, including water quality, temperature, and flow monitoring on numerous streams in the basin; juvenile salmon and steelhead abundance and run timing in the Clackamas River; the effects of boulder placement on fish in streams in southwest Oregon; the effects of watershed disturbances on fish habitat; and an inventory of stream habitat.

- Prepared biological assessments to meet ESA consultation requirements.
- Coordinated with the Federal Energy Regulatory Commission during the relicensing of the Hells Canyon and Pelton/Round Butte projects.
- Increased staff of fishery biologists to address fish issues of land management actions.
- Provided the federal liaison and board member for the Willamette River Restoration Initiative, a pilot project under the Oregon State Salmon and Watershed Recovery Plan.
- Participates in the Interagency Implementation Team to implement the biological opinions for a federal land management conservation strategy for salmon and steelhead, commonly referred to as PACFISH.
- Participates in the Federal Caucus.
- Participates with private landowners, watershed councils, Native American tribes, and other partners in the development and implementation of restoration plans and projects.

Bureau of Reclamation

The Bureau of Reclamation operates numerous hydroelectric dams in the Columbia River Basin. Each dam may be authorized for specific purposes, including irrigation, power production, and recreation. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin:

- Consulted with NMFS on the operation and maintenance of the Federal Columbia River Power System and 19 other BOR projects in the Columbia River Basin. In conjunction with requirements under the biological opinion, prepared and submitted annual and 5-year plans to NMFS and the U.S. Fish and Wildlife Service.
- Initiated the implementation on 61 of the 199 reasonable and prudent alternatives included in the biological opinion for the Federal Columbia River Power System that apply to BOR, including dam operations; water conservation; water quality; hatchery operations; tributary habitat improvements; and research, monitoring, and evaluation.

- Developed, in conjunction with the Federal Caucus, the All-H Strategy for restoring threatened and endangered salmon and steelhead.
- Worked with the Idaho legislature and local water masters in Idaho and Oregon to meet flow augmentation standards required by the 1995 biological opinion.
- Completed nine consultations for biological opinions and other purposes.
- Prepared Tributary Enhancement Water Conservation Demonstration Project reports for the Lemhi River Basin in Idaho and the Wallowa and John Day River basins in Oregon.
- Conducted studies on dissolved gas abatement and management at Grand Coulee Dam.
- Designed and built fish screens and fish passage facilities for irrigation diversions on authorized BOR projects.
- Provided federal and state agencies, tribes, irrigation districts, and watershed councils with technical assistance to replace or improve fish screens and fish ladders at diversions in the Lemhi River Basin in Idaho; in the Deschutes, John Day, Umatilla, Wallowa, and Willamette River basins in Oregon; and in the mid-Columbia, Okanogan, and Yakima basins in Washington.
- Initiated the Water Conservation Field Services Program to encourage the efficient use and conservation of water at federal reclamation projects. This program provides water districts and water users with technical and financial assistance and supports watershed partnerships to improve fish and wildlife habitat.
- Funded and worked with numerous Indian tribes, including the Nez Perce, Shoshone Bannock, Umatilla, Yakama, Warm Springs, Colville, Nisqually, Elwha, and Colville, to improve migration, water quality, and spawning and rearing habitat in support of treaty obligations.

Environmental Protection Agency

Under the Clean Water Act, the Environmental Protection Agency is authorized to establish water quality standards and to issue permits for the discharge of pollutants from a point source to navigable waters. The act

also authorizes EPA to approve the total maximum daily load standards established by states. These standards determine the maximum amount of a pollutant that a water body can receive and still meet water quality standards for specified uses, including for fish and wildlife. The agency participated in the following actions to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin:

- Participated in developing the All-H Strategy to ensure that Endangered Species Act actions would be coordinated with ongoing and future water quality efforts in the Columbia River Basin.
- Negotiated an agreement with other federal agencies and the Council on Environmental Quality for the 2000 Federal Columbia River Power System's biological opinion to efficiently integrate ESA and Clean Water Act implementation efforts.
- Worked closely with the Federal Caucus and the Federal Regional Executive Forums to provide a unified federal voice for Columbia River decisions.
- Developed a one-dimensional temperature model for the mainstem Columbia and Snake rivers that will provide a critical foundation for future implementation decisions.
- Using this model, EPA provided regional Columbia River managers with scientific and technical analysis to assist in critical decisions during the 2001 power emergency.

Fish and Wildlife Service

The U.S. Fish and Wildlife Service operates and/or funds fish hatcheries. Funds for hatchery operations provided under the Mitchell Act are intended to mitigate for fish affected by the construction and operation of the Federal Columbia River Power System. FWS also conducts applied research and has responsibilities for other species under the ESA that require coordination with the National Marine Fisheries Service. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin:

- Operated 12 National Fish Hatcheries and funded an additional 8 state hatcheries in the Columbia River Basin that produced over 32 million salmon and steelhead in fiscal year 2001. This represented about 50

percent of all salmon and steelhead released from hatcheries above Bonneville Dam.

- Helped to fund the compilation of research data on the status of Caspian Terns at known sites throughout the Pacific Northwest. This study will form a biological basis for future actions concerning Caspian Terns and their predation of juvenile salmon and steelhead.

- Developed a new technique to detect the presence of multiple fish pathogens from a single tissue sample, which will save considerable time and money in testing for fish diseases.

- As a part of the National Wild Fish Health Survey, surveyed wild salmon and steelhead in the basin to ascertain pathogen levels for disease.

- In conjunction with the Confederated Tribes of the Umatilla Indian Reservation and the Oregon Department of Fish and Wildlife, transferred about 350,000 spring Chinook salmon from a hatchery to the Umatilla River to increase local returns.

- Conducted spawning ground surveys and tracked the adult movement and habitat use of fall Chinook and Chum salmon below Bonneville Dam. This information was critical for determining dam operations during the 2001 drought.

- Initiated several fish-marking projects to support tribal efforts targeted at reintroducing hatchery stocks in areas where native stocks have been eliminated.

- Prepared and released a draft environmental impact statement on a proposal to provide upstream and downstream passage to salmon and steelhead in Icicle Creek.

- As part of the Washington State Ecosystem Conservation Program, restored and protected 7 miles and 28 acres of riparian habitat, restored 2 miles of in-stream habitat, removed eight barriers to fish migration, and replaced eight culverts with bridges.

- Provided technical assistance on numerous Federal Energy Regulatory Commission relicensing projects.

- As part of the Metro Greenspaces Program, completed eight conservation and restoration projects including the following: developing a strategic plan for a local land conservancy, enhancing 20 acres of riparian area, removing invasive species, and revegetating over 14 acres of land above streams.

Forest Service

The U.S. Forest Service manages lands for multiple purposes, including outdoor recreation, range, timber, watershed, and wildlife and fish purposes. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin:

- Developed a comprehensive Aquatic Conservation Strategy, a foundation for salmon and watershed restoration in 17 Columbia River Basin national forests. The strategy addressed land allocations, management direction, standards, guidelines, and monitoring designed to protect and restore fish and other aquatic resources. Implementing the strategy required close coordination with other federal agencies; tribal governments; state and local agencies; and a variety of local watershed councils, user groups, and conservation organizations.

- Improved more than 2,000 miles of stream banks and 9,000 acres of riparian area by using various methods, such as planting and placing logs in the streams to provide deeper pools.

- Decommissioned over 2,000 miles and stabilized 7,000 miles of road to reduce sedimentation runoff into nearby streams.

- Improved passage at barrier culverts.

- Under the Pacific Northwest Streams Initiative, acquired more than 50 miles (38,000 acres) of critical stream and riparian habitat for listed or at-risk fish stocks.

- Provided training sessions that are consistent with other federal, state and local agencies on fish habitat and watershed inventory, assessment, restoration, and monitoring methodologies and that are open to other agencies and the public.

- Assisted in the formation of, and provided technical and operational support for, watershed councils and groups in the states of Oregon and Washington.

- Created, in cooperation with other community partners, a variety of programs that study, inform, and monitor aquatic habitat, including school programs, self-guided interpretive exhibits, festivals, family fishing clinics, and technical assistance that reach over 100,000 people annually.

National Marine Fisheries Service

Under the Endangered Species Act, the National Marine Fisheries Service is responsible for preparing a recovery plan and for consulting with other agencies on whether their planned actions will jeopardize listed salmon and steelhead populations. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin.

- Listed nine populations of salmon and steelhead under the ESA and, pursuant to these and other listings, designated critical habitat for 19 populations and established a structure to conduct the recovery-planning process.

- Issued a final biological opinion on the operation of the Federal Columbia River Power System, the Corps' juvenile fish transportation program, and 19 BOR projects.

- Issued or is developing biological opinions for (1) 15 categories of permits issued by the Corps, (2) relicensing the Hells Canyon Complex of nonfederal dams on the Snake River, (3) deepening the Columbia River shipping channel, (4) numerous programmatic actions on several National Forests and Bureau of Land Management districts, (5) hatchery operations, and (6) tribal and sport harvest of Columbia River steelhead.

- In conjunction with the Federal Caucus, developed the All-H Strategy for restoring listed salmon and steelhead.

- Engaged in extensive public outreach actions including conducting 17 workshops on ESA attended by 1,039 individuals, participating in 15 public meetings in five states to obtain comments on salmon recovery, and holding 18 hearings in four states to obtain comments on the draft ESA rules.

- Helped develop Habitat Conservation Plans, including a plan for 1.7 million acres of private timberlands in Idaho, Montana, and Washington and a plan for public utility districts' operation of several dams on the Columbia River.
- Developed and tested an Internet-based system so applicants of the Corps' permits can track their applications.
- Conducted studies and discussed management strategies with other agencies on factors affecting salmon mortality, such as predation by terns, seals, and sea lions; screening of water diversions; and the effects of drought and energy shortages on recovery strategies.

Natural Resources Conservation Service

The Natural Resources Conservation Service provides individual landowners with technical and financial assistance, conducts surveys, and supports conservation-planning efforts. NRCS's assistance to private landowners has resulted in the following actions being taken to benefit salmon and steelhead in the Columbia River Basin in the past 5 years:

- Worked with 23,481 private individuals to develop resource management plans for 4,806,614 acres.
- Assisted with implementing these plans on 2,278,856 acres.
- Worked with private individuals to
  - create or restore 10,566 acres of wetlands,
  - treat 3,874,276 acres for erosion control,
  - protect 327,902 feet of stream bank,
  - create or improve 27,114 acres of riparian forest buffers,
  - establish 45,732 acres of trees and shrubs,
  - manage more effectively 1,237,384 acres for grazing,
  - manage more effectively 1,075,351 acres for wildlife habitat, and
  - manage more effectively 186,868 acres of irrigated land.

U.S. Geological Survey

The U.S. Geological Survey provides scientific information to assist other agencies in fulfilling their requirements under several acts, including the Pacific Northwest Electric Power Planning and Conservation Act, Economy Act, Clean Water Act, Northwest Forest Practices Act, and the National Environmental Policy Act. The following examples illustrate actions the agency has taken to meet its obligations and/or to benefit salmon and steelhead in the Columbia River Basin:

- Sponsored and organized the 11th Annual Smolt Workshop to share information.
- Prepared an annual report quantifying smolt predation by Northern Pikeminnows.
- Prepared an annual report comparing the experimental success of the progenies of hatchery and wild salmon in natural and hatchery environments.
- Prepared journal articles and reports on topics such as increased mortality to juvenile salmon, dietary and consumption patterns for juvenile salmon and steelhead, temperature-related movements of fall Chinook for 1998-99, identification of rearing habitats, and heavy metals present in foods of juvenile Chinook salmon and their potential effects.
- Estimated systemwide effects of mortality from predation.
- Evaluated the large-scale predator removal project.
- Developed data sets describing hatchery-rearing conditions, environmental factors, and migration performance for various hatcheries.
- Developed methods to detect bacterial and viral diseases in juvenile hatchery salmon.
- Issued a progress report on the use of estuarine habitats by juvenile salmon.
- Developed nonintrusive genetic markers for recognizing gender and stock in spring and fall-run Chinook.

- Conducted a week-long lecture and laboratory course for Department of the Interior resource managers in fish virology.

- Prepared a handbook for fish hatchery managers on chemical contaminants in hatchery food, and pathological symptoms.

Returning Adult Salmon and Steelhead Counted at Bonneville and Lower Granite Dams, 1977 through 2001

This appendix shows adult salmon and steelhead returns to the Columbia River Basin for the past 25 years as counted at two dams. Bonneville Dam is the first dam the adults must pass on the Columbia River, and Lower Granite Dam is the last dam they must pass on the Snake River before they can migrate into Idaho.

Table 19: Returning Adult Salmon and Steelhead Counted at Bonneville and Lower Granite Dams, 1977 through 2001

Returning adult salmon and steelhead counted at Bonneville Dam				Returning adult salmon, steelhead, and Sockeye salmon counted at Lower Granite Dam				
Year	**Salmon**	**Steelhead**	**Total**	**Year**	**Salmon**	**Steelhead**	**Total**	**Sockeye[a]**
2001	1,243,132	634,088	1,877,220	2001	195,612	262,558	458,170	36
2000	580,903	275,273	856,176	2000	42,647	113,021	155,668	299
1999	365,611	206,488	572,099	1999	10,195	74,440	84,635	14
1998	308,368	185,094	493,462	1998	16,130	72,017	88,147	2
1997	431,759	258,385	690,144	1997	46,111	85,917	132,028	11
1996	319,058	205,213	524,271	1996	8,125	86,072	94,197	3
1995	208,651	202,448	411,099	1995	2,867	80,853	83,720	3
1994	241,188	161,978	403,166	1994	4,711	47,550	52,261	5
1993	350,181	188,386	538,567	1993	30,106	66,700	96,806	12
1992	319,106	314,974	634,080	1992	25,275	121,456	146,731	15
1991	363,332	274,535	637,867	1991	11,073	100,367	111,440	8
1990	357,611	183,011	540,622	1990	22,791	56,939	79,730	0
1989	442,508	287,802	730,310	1989	16,833	132,575	149,408	2
1988	518,656	279,277	797,933	1988	36,292	87,047	123,339	23
1987	603,451	300,351	903,802	1987	35,699	69,334	105,033	29
1986	537,761	376,752	914,513	1986	38,528	134,321	172,849	15
1985	498,240	330,170	828,410	1985	30,848	114,477	145,325	34
1984	385,613	315,795	701,408	1984	12,624	98,930	111,554	47
1983	295,158	218,419	513,577	1983	14,095	86,753	100,848	122
1982	353,946	157,640	511,586	1982	17,543	72,840	90,383	211
1981	310,271	159,270	469,541	1981	16,997	40,234	57,231	218
1980	279,626	129,254	408,880	1980	8,728	40,454	49,182	96
1979	318,290	114,010	432,300	1979	10,147	25,046	35,193	25
1978	403,349	104,431	507,780	1978	53,278	29,960	83,238	123
1977	400,896	193,437	594,333	1977	45,247	51,076	96,323	458
Total	**10,436,665**	**6,056,481**	**16,493,146**	**Total**	**752,502**	**2,150,937**	**2,903,439**	**1,811**

[a]Sockeye salmon totals are included in the salmon column totals.

Source: Fish Passage Center.

Comments from the Department of Agriculture

United States Department of Agriculture
Forest Service
Washington Office
14th & Independence SW
P.O. Box 96090
Washington, DC 20090-6090

File Code: 1420
Date: JUN 13 2002

Barry T. Hill
Director, Natural Resources and Environment
General Accounting Office, Room 1842
441 G. Street NW
Washington, DC 20548

Dear Mr. Hill:

Thank you for the opportunity to review and comment on the draft report, "COLUMBIA RIVER BASIN SALMON AND STEELHEAD: Federal Agencies' Recovery Responsibilities Expenditures and Actions," (GAO-02-612, Assignment code: 360111). The report provides a concise and thorough description of federal agency roles and responsibilities in recovering Columbia River salmon and steelhead. The Forest Service and the Natural Resource Conservation Service's expenditures and accomplishments have been accurately reported and displayed.

Enclosed are the comments to the draft report. These comments include those of a general nature pertinent to the draft report as a whole and those that may assist in better describing the agencies' roles.

If you have additional questions, please contact the Agency's External Audit Liaison, Linda Washington at (202) 205-1560.

Sincerely,

for DALE N. BOSWORTH
Chief

Enclosure

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Comments from the Bonneville Power Administration

Note: GAO's comments supplementing those in the report's text appear at the end of this appendix.

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

June 10, 2002

In reply refer to: KN-DC

Mr. Barry T. Hill, Director
Natural Resources and Environment
General Accounting Office
441 G Street, NW
Washington, DC 20548

Dear Sir:

Thank you for providing us with a copy of a Draft Report titled Columbia River Salmon and Steelhead: Federal Agencies' Recovery Responsibilities, Expenditures and Actions (GAO-02-612), dated May 2002. The Bonneville Power Administration (Bonneville) appreciates the opportunity the General Accounting Office (GAO) has provided us to review and comment on the Draft Report, which you sent us on May 21, 2002. We do have some significant concerns with the accuracy and scope of the first draft of the report. Consequently, we are providing this letter and the attachment with exhibits to help GAO improve the quality of the final report and provide additional information.

Our greatest concerns with the Draft Report are understatements regarding the nature and extent of Bonneville anadromous fish recovery costs and the source of those costs. We recognize the GAO purposefully chose to limit the scope of the response to Senator Crapo. We do, however, firmly believe that without a full description of all the costs the federal agencies incur in recovering salmon and steelhead, the final report will create an incomplete picture of the recovery costs and efforts to date. In the event GAO retains its limited scope of reporting recovery costs, Bonneville believes such costs should be reported more closely following the Council on Environmental Quality's crosscut budget as presented to the governors of the four Columbia Basin states in a letter dated October 11, 2001, which is attached as Exhibit A.

See comment 1.

Bonneville encourages GAO to include in its final report a complete discussion of the kinds of Federal Columbia River Power System (FCRPS) costs our ratepayers incur—direct costs, capital costs, reimbursed costs, replacement power, and lost revenues. Many of these costs are described more fully in the Bonneville Administrator's letter dated December 3, 2001, to the Chairman of the Northwest Power Planning Council (NPPC), which is also included as Exhibit B to our comments. These are all legally mandated or recognized costs borne by Bonneville and its ratepayers.

The Draft Report, for instance, does not mention Bonneville's responsibility for reimbursing the U.S. Treasury for capital appropriations to the U.S. Army Corps of Engineers (Corps of Engineers), Bureau of Reclamation, or the U.S. Fish and Wildlife Service for certain salmon and

steelhead recovery costs. While those costs are reflected in the totals for those agencies, there is no indication that those costs actually get repaid to the Treasury, with market-based interest, by Bonneville. We are not suggesting GAO double count these dollars. We are concerned, though; that without a description of Bonneville's repayment role, readers of the report may erroneously believe because these costs start out as appropriated dollars they are fully borne by the U.S. taxpayers. Such is not the case. Similarly, there is an omission of the operation and maintenance funding that Bonneville provides directly to these agencies. We believe it is critical that the final report explain that while other federal agencies may expend them, the share of those funds allocated to power derive from Bonneville's power marketing rate base. Therefore, they are not a cost to the U.S. taxpayer, as it would appear when they are categorized as expenditures by other federal agencies; they are a FCRPS ratepayer cost.

See comment 3.

The acquisition of replacement power is often necessary to enable fish spill and flow measures called for by fish managers. These replacement power costs are recognized expressly in the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act). 16 U.S.C. §§ 839b(h)(6)(E)(i)-(ii), (10)(A), and 16 U.S.C. §§ 838i(b)(6)(iv), (b)(12). Similarly, the Northwest Power Act also acknowledges the validity of counting the opportunity costs reflected by the lost revenues. 16 U.S.C. § 839b(h)(8)(D). The attached Exhibit D, Bonneville Fish & Wildlife MOA Funding, shows the hundreds of millions of dollars in revenues Bonneville foregoes that must be made up in other places or other ways. Excluding them from a report on recovery costs significantly understates the overall costs to the region.

See comment 3.

Where appropriations have not been forthcoming to other agencies and Bonneville shares a legal duty with them to implement a recovery action, then Bonneville has used its unique ability under section 4(h)(10)(C) of the Northwest Power Act to fund the entire project and then take a credit against debts to the Treasury for the share of the cost not allocated or attributable to the ratepayers. 16 U.S.C. § 839b(h)(10)(C). For fiscal year 2001, for example, Bonneville had to recoup over $592.6 million in costs incurred by ratepayers on behalf of the taxpayers as shown in Exhibit C. Those recouped expenditures do not appear to be addressed in the Draft Report.

See comment 1.

We urge GAO to reconsider its decision to exclude everything but Bonneville's expenditures on the direct program of the NPPC and the off-site mitigation called for in the National Marine Fisheries Service's 2000 Biological Opinion on the FCRPS. The attachment and exhibits included with this letter show how Bonneville's costs from fiscal year 1997 through 2001 were over $3 billion dollars, not simply the $378 million shown in the Draft Report.

See comment 2.

Of equal importance is the nature of Bonneville's funding. We appreciate the efforts made in the Draft Report to mention that Bonneville payments come from power receipts. We would, however, like to refine that description because GAO's final report will be read by a national audience, and it is imperative that the full breadth of Bonneville funding be transparent. It is true that most of Bonneville's expenditures come from revenues generated from power marketing activities. Such revenues are deposited into the Bonneville Fund, a special self-financed revolving fund in the U.S. Treasury. We use the Bonneville Fund to implement the NPPC's Program, for the off-site mitigation in the 2000 NMFS FCRPS Biological Opinion, to reimburse the power share of appropriations to the Corps of Engineers, Bureau of Reclamation, and Fish

and Wildlife Service, to direct fund the operation and maintenance of the FCRPS, and to purchase replacement power needed when power generation decreases as a result of dam operations done for recovery and mitigation purposes. We also borrow from and repay to the U.S. Treasury funds to cover capital construction and improvements at FCRPS projects, including hatcheries. Thus, whether Bonneville uses receipts deposited in the Treasury from power marketing revenues, or funds borrowed from the Treasury and repaid with market-based interest, our recovery costs are covered completely by regional ratepayers, not the nation's taxpayers.

GAO's audit team has made tremendous effort to process and present the complex and arcane information necessary to show the costs of salmon and steelhead recovery in the Columbia River Basin. We have made these comments hoping their inclusion will improve the comprehensiveness and accuracy of the GAO final report and more precisely depict Bonneville's role and responsibilities in the recovery effort. Thank you for allowing us the opportunity to comment on the Draft Report.

Sincerely,

Jeffrey K. Stier
Vice-President for National Relations

Enclosures

The following are GAO's comments on the Bonneville Power Administration's letter dated June 10, 2002.

GAO's Comments

1. Bonneville commented that the report does not fully reflect its role in funding salmon- and steelhead-recovery efforts. For example, Bonneville stated that the report does not explain that it reimburses the U.S. Treasury for most of the expenditures for capital improvements at the Corps' and BOR's hydroelectric projects as well as operation and maintenance costs at these projects and at FWS's Lower Snake River Compensation Plan hatcheries. We agree that Bonneville is a major supplier of salmon- and steelhead-recovery moneys, and clarifications were made in the report to reflect its role. However, we were not asked to provide information on the source of funds for salmon- and steelhead-recovery efforts but rather how much the agencies expended on such efforts. Therefore, the report reflects the funds Bonneville is referring to as expenditures by other federal agencies, such as the Corps, BOR, and FWS.

2. Bonneville also commented that the report does not fully describe that the funds it provides other agencies with are from ratepayer receipts and, as a result, much of the salmon- and steelhead-recovery expenditures shown in the report are paid for by those that buy the electric power the dams generate. While the report notes that ratepayer receipts fund these expenditures, we have added additional details on the source of the funds Bonneville uses to cover agencies expenditures and how Bonneville reimburses the U.S. Treasury for agencies expenditures for capital and operation and maintenance costs.

3. Bonneville expressed concern that we did not include the cost of replacement power and lost power revenues in our expenditure totals. We did not include these costs because they do not reflect expenditures for actual recovery actions and determining these costs is difficult to derive, since replacement power and lost revenues could result from other management decisions that are not related to salmon and steelhead recovery.

Comments from the National Oceanic and Atmospheric Agency

Note: GAO's comments supplementing those in the report's text appear at the end of this appendix.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
CHIEF FINANCIAL OFFICER/CHIEF ADMINISTRATIVE OFFICER

JUL 2 2002

Mr. Barry T. Hill
Managing Director
Natural Resources and Environment
U.S. General Accounting Office
441 G Street, NW, Room 2T23A
Washington, D.C. 20548

Dear Mr. Hill:

Enclosed is the National Oceanic Atmospheric Administration's response to the Draft Report on *COLUMBIA RIVER BASIN SALMON AND STEELHEAD: Federal Agencies' Recovery Responsibilities, Expenditures and Actions (GAO-02-612).* We appreciate the opportunity to provide comments.

Sincerely,

Sonya G. Stewart

Enclosure

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NOAA COMMENTS ON THE DRAFT GAO REPORT ENTITLED COLUMBIA BASIN SALMON AND STEELHEAD: Federal Agencies' Recovery Responsibilities,Expenditures and Actions (GAO-02-612)

GENERAL COMMENTS:

On page 4 the report states that "federal agencies have undertaken many types of recovery actions and, although these actions are generally viewed as resulting in higher numbers of returning adult salmon and steelhead, there is little conclusive evidence to quantify the extent of their effects on the fish populations." This statement is repeated again on pages 16, 19, and 22 of the report. However, this is an oversimplification of the state of knowledge regarding salmon recovery efforts.

In fact, there is extensive agency and published, peer-reviewed science that documents at least the proximate effects of salmon recovery efforts. For example:

See comment 1.

- **As the report mentions under Corps of Engineers' actions, there is a great deal of detailed quantitative information documenting the reductions in juvenile and adult salmon mortality resulting from fish passage engineering efforts, including spillway, fish bypass, fish ladder, and barging program modifications. The National Marine Fisheries Service's (NMFS) survival estimates during the 1970s with 7-8 dams in place typically were 10-13 percent for Snake River spring/summer chinook salmon. In 1993-99, after structural and operational improvements in the hydropower system, survival estimates ranged from 31-59 percent. These estimates are similar to estimates made with only four dams in place between 1966 and 1967 when survival was 32-56 percent. The source of this information is Williams, Smith and Muir (2001) North American Journal of Fisheries Management, pages 10-317.**

- **There are numerous published studies in fisheries literature documenting the effects of streamflow and riparian habitat enhancement on instream habitat conditions (temperature, stream cover, pool depth, sediment loading, etc.) as well as resultant improvements to salmonid spawning and rearing success. Examples of references include:**

Olson and Foster. 1957. Temperature tolerance of eggs and young of Columbia River chinook salmon. Transactions of the American Fisheries Society 85: 203-207.

Reeves, Everest, and Sedell. 1993. Diversity of juvenile anadromous salmonid assemblages in coastal Oregon basins with different Levels of timber harvest. Transactions of the American Fisheries Society 122: 309-317.

Miller and Simenstad. 1997. A comparative assessment of a natural and created estuarine slough as rearing habitat for juvenile chinook and coho salmon. Estuaries 20: 792-806.

Bjornn and Reiser. 1991. Habitat requirements of salmonids in streams. In *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats*. American Fisheries Society Special Publication 19: 83-138.

Bugert and Bjornn. 1991. Habitat use by steelhead and coho salmon and their responses to predators and cover in laboratory streams. Transactions of the American Fisheries Society 120: 486-493.

- Studies are documenting reductions in the rate of return predation on juvenile outmigrants as a result of agency efforts to move the nesting colonies further downstream. (See Avian Predation on Juvenile Salmonids in the Lower Columbia River; Report to Bonneville Power Administration and U.S. Army Corps of Engineers. September revision.)

See comment 2.

These and many other examples provide the foundation for the analyses contained in the NMFS' 1999 Biological Opinion for the Federal Columbia River Power System [for more references, go to www.nwr.noaa.gov/1hydrop/hydroweb/docs/Final/2000Biop.html]. While natural fluctuations in salmonid populations and other complicating factors make population-level analyses complex, nonetheless NMFS and others are developing and implementing monitoring and modeling methodologies to document the effects of recovery efforts.

The following are GAO's comments on the letter dated July 2, 2002, from the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). The National Marine Fisheries Service, the lead federal agency responsible for salmon and steelhead recovery in the Columbia River Basin, is an agency of NOAA.

GAO's Comments

1. We agree that there are many studies and documents that discuss various recovery actions and their effect on the survival rates of salmon and steelhead. However, these studies and documents generally do not quantify the affect. At best they estimate or approximate the effect of recovery efforts. For example, the Williams, Smith and Muir article, cited in NOAA's comments, estimates the effect of engineering efforts on the survival rate of juvenile salmon and steelhead moving past the dams but does not quantify how many of these juveniles return as adults. The number of returning adults is important because other studies have shown that using bypass facilities increases salmon and steelhead mortality downstream. Hence, our point that there is little evidence to quantify the effects of recovery efforts on the number of returning salmon and steelhead is valid. We did, however, revise the report to include information on the estimated increased survival rates of salmon and steelhead passage at the dams.

2. The report recognizes that NMFS and others are developing and documenting recovery efforts. However, until these efforts are completed and results quantified, the full extent of recovery efforts will not be known.

Comments from the Department of the Interior

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

JUN 12 2002

Mr. Barry T. Hill
Director, Natural Resources and Environment
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Hill:

Thank you for providing the Department of the Interior the opportunity to review and comment on the draft U.S. General Accounting Office report entitled, "COLUMBIA RIVER BASIN SALMON AND STEELHEAD: Federal Agencies' Recovery Responsibilities, Expenditures and Actions" (GAO-02-612) dated May 20, 2002. In general, we agree with the findings in the report.

The enclosure provides specific comments and suggestions from the U. S. Fish and Wildlife Service, Bureau of Land Management, U. S. Geological Survey, Bureau of Reclamation, and Bureau of Indian Affairs. We hope our comments will assist you in preparing the final report.

Sincerely,

P. Lynn Scarlett
Assistant Secretary -
Policy, Management and Budget

Enclosure

Contact and Staff Acknowledgments

GAO Contact

Keith W. Oleson (415) 904-2218

Acknowledgments

In addition, Jerry Aiken, Jill Berman, Jonathan Dent, Jaelith Hall-Rivera, Jonathan McMurray, and John Kalmar, Jr., made key contributions to this report.

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