Columbia River Basin Fish and Wildlife

Anadromous Fish

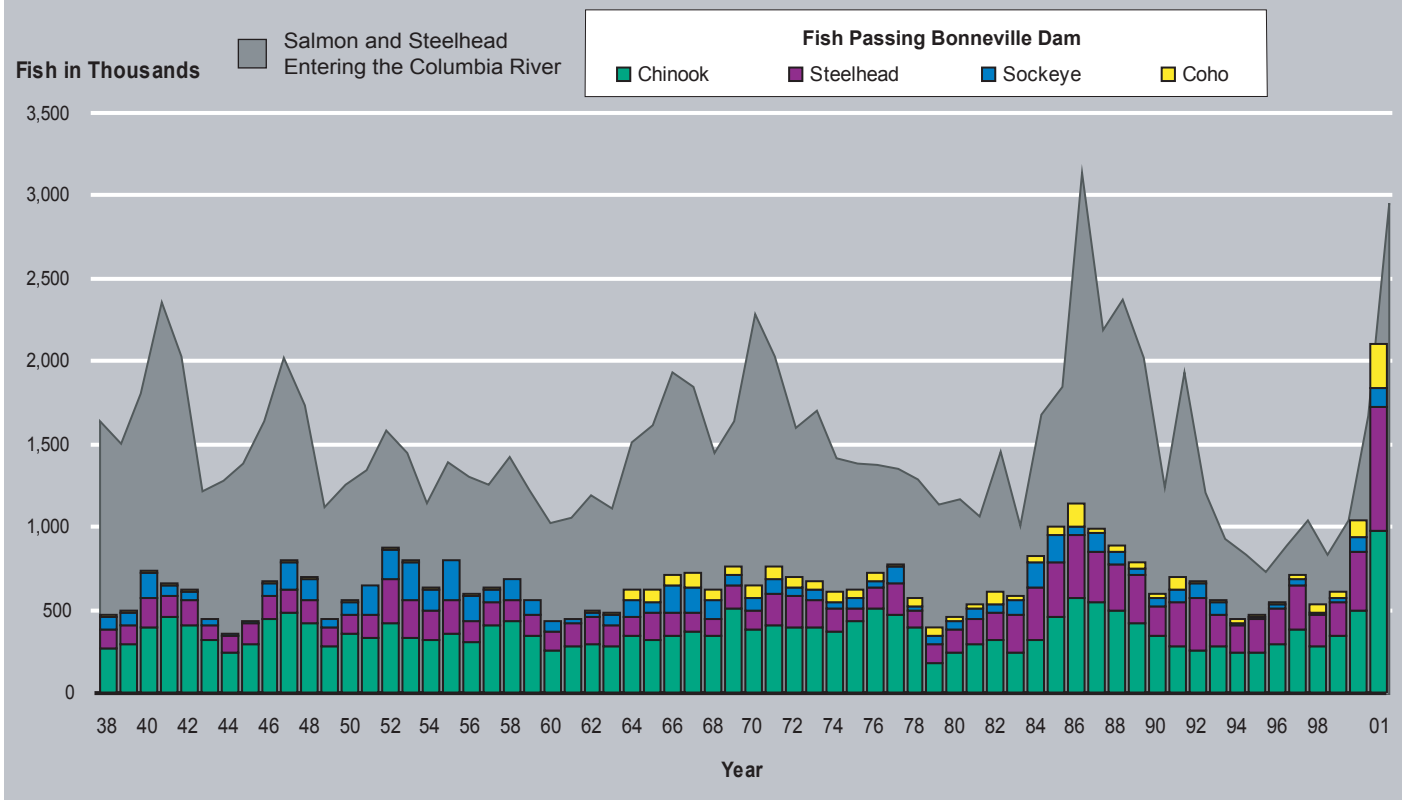
The Northwest Power Act notes the "significant importance" of anadromous fish in the Columbia River basin "to the social and economic well-being of the Pacific Northwest and the Nation" and asserts these fish "are dependent on suitable environmental conditions substantially obtainable from the management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

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

Adult fish returns set records in 2001 for many different salmon species, attributable to good out-migration conditions several years ago, improved (cooler) ocean conditions and, of course, Bonneville-funded investments in the basin. As Figure 7 shows, more than two million salmon and steelhead crossed Bonneville Dam in 2001, exceeding the previous record during that period by almost a million fish. Many of these were hatchery fish, but preliminary indications are that the number of wild fish passing Bonneville Dam were increasing as well, at least through 2000.

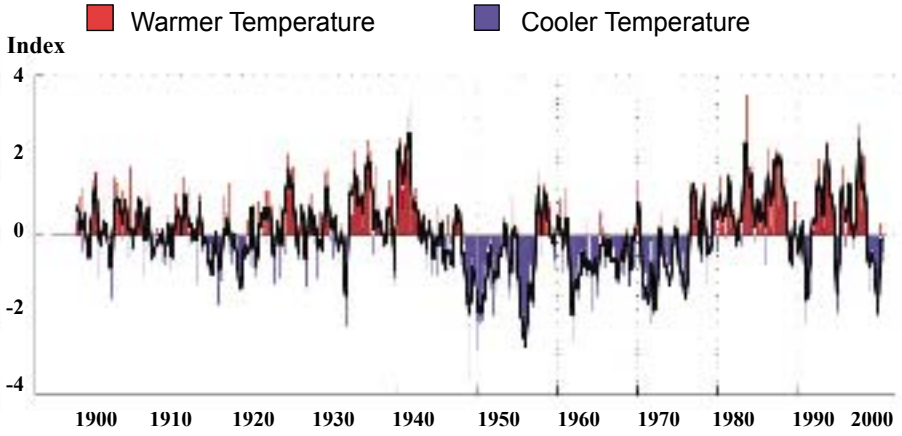
Juvenile fish had a harder time because of the drought, which adversely impacted fish habitat including migration through the hydropower system. To ensure a reliable electricity supply, Bonneville greatly reduced the amount of water spilled over Snake and Columbia River dams — spills requested by the National Marine Fisheries Service to aid the migration of Endangered Species Act-listed juvenile salmon and steelhead

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



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

FIG 9
Ocean Cycle Temperature Cycles
1900-2000



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

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

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

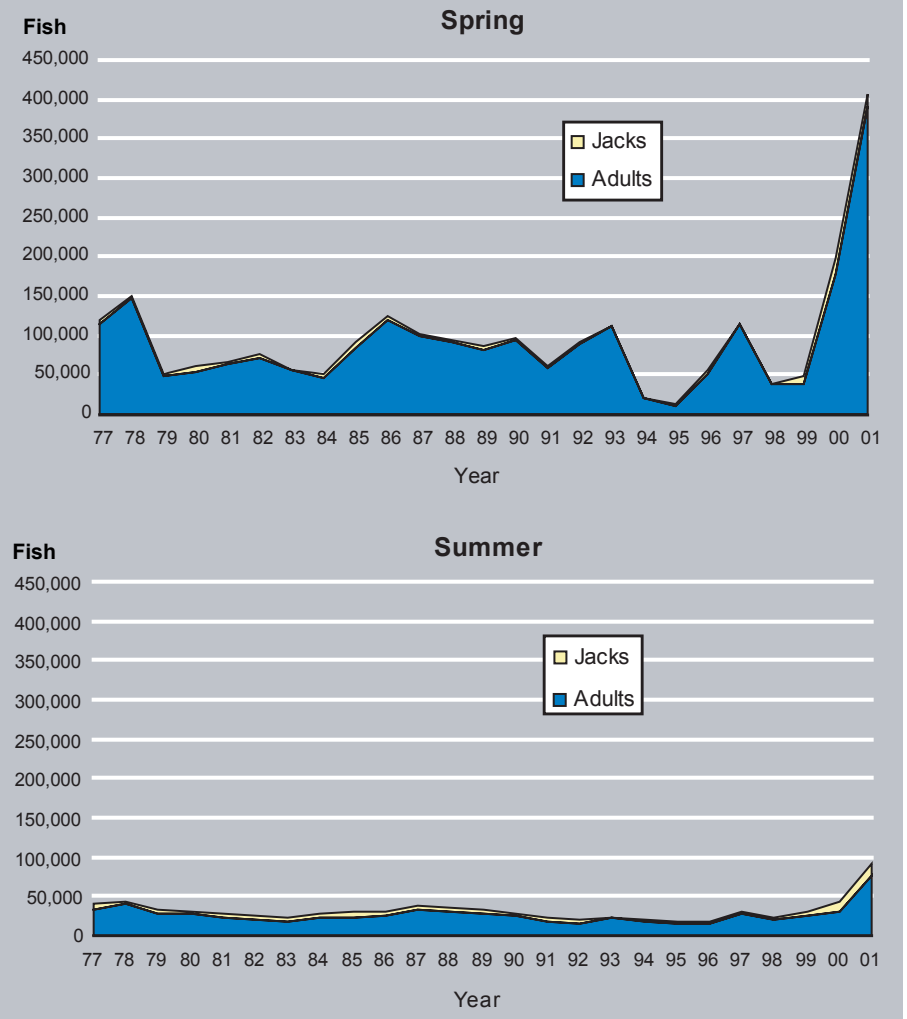
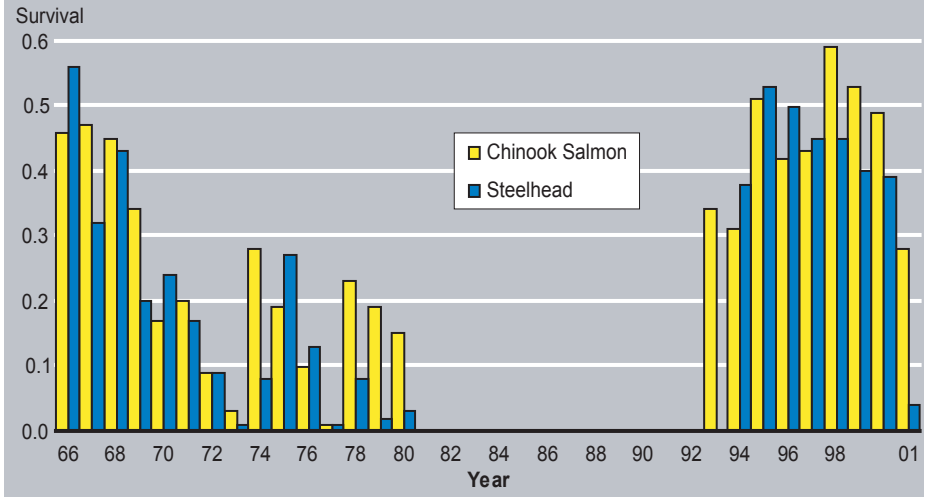


FIG 11
Estimated Inriver Juvenile Survival through the Hydrosystem, Upper Snake through Bonneville Dam
1966-1980, 1993-2001



a Extrapolation based on three dam and reservoirs as survival estimates between Ice Harbor Dam and The Dalles Dam did not change between 1966 and 1970 after completion of John Day Dam in 1968.

b Based on product of two non-rounded numbers

c No data for steelhead in this year

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

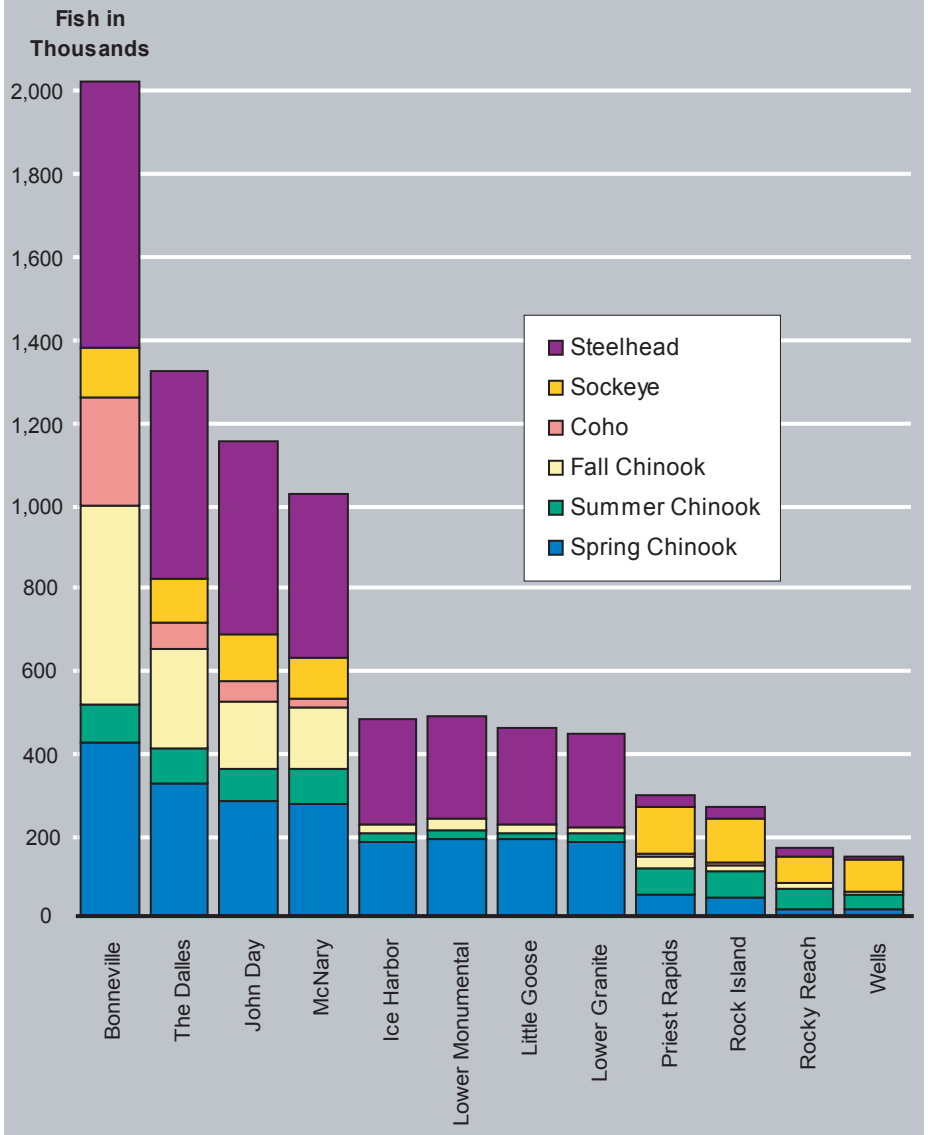


FIG 13
Wild Fish Passing Bonneville Dam
1990-2000

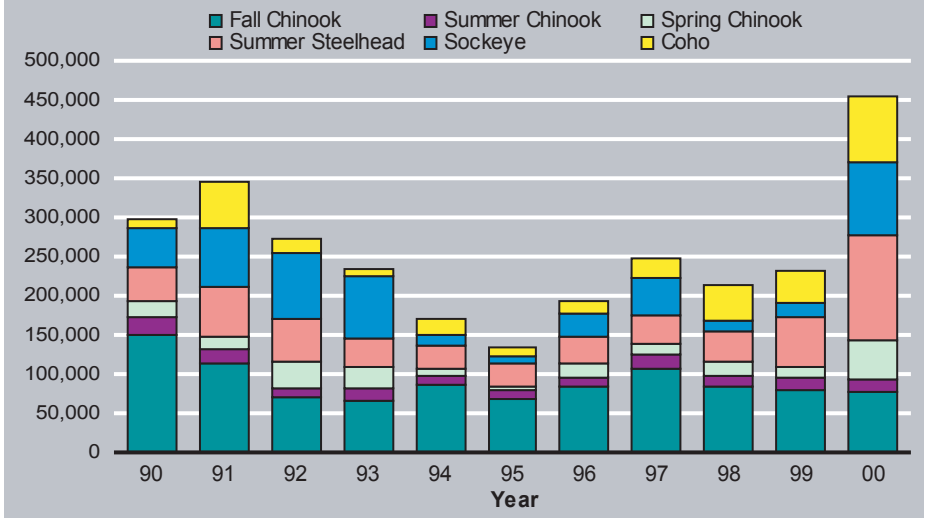
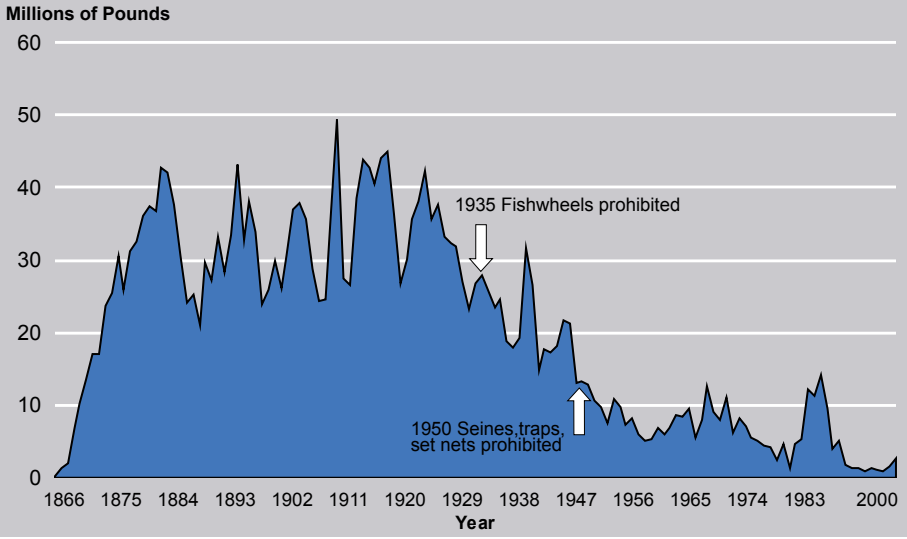


FIG 14
Commercial Landings of Salmon and Steelhead from the Columbia River
1866-2000



Resident Fish

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

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

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

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

Wildlife

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

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

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

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

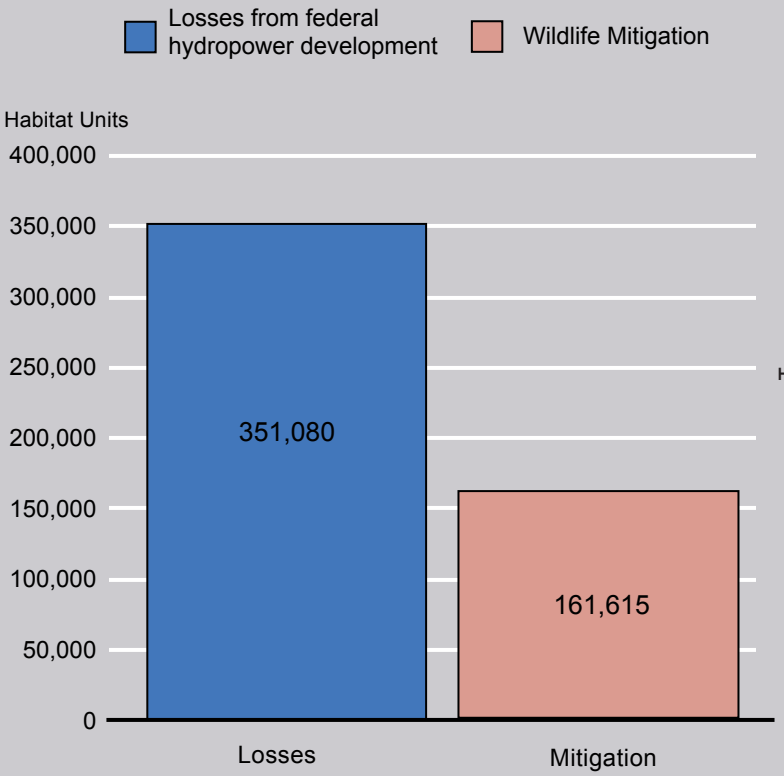
Habitat unit losses and acquisitions are presented in Figures 14 and 15. More detailed information, including specific information about species and dams, location and types of purchases and mitigation costs is reported in Tables 14A-D and Table 15 in the Appendix. To date, 139,514 habitat units have been acquired through acquisitions of habitat or habitat-protection agreements. An additional 22,101 habitat units have been estimated for the property acquired but not yet credited to losses for specific species. The Council and Bonneville are continuing to discuss the issue of how to accurately credit acquired habitat units against identified losses.

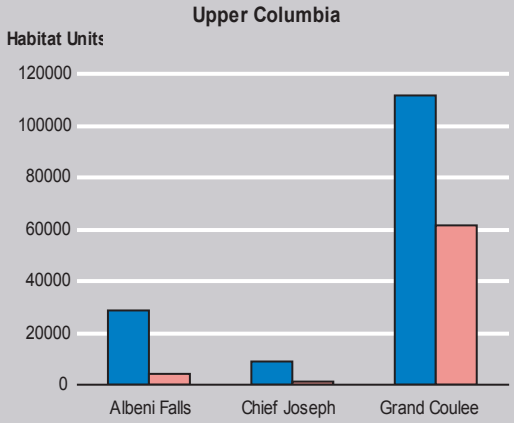
As shown in Table 3 of the Appendix, Bonneville's wildlife spending from 1978 through 2000 totals $127,896,767. For 2000 alone, the amount was $11,491,168.

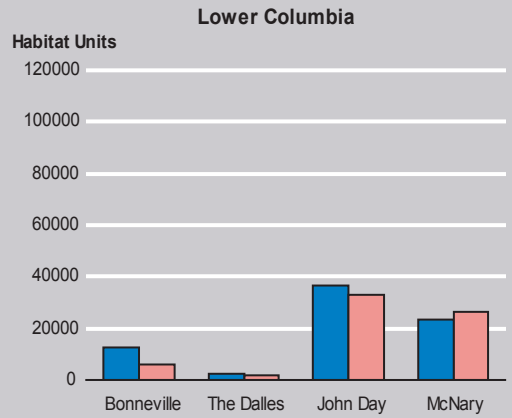
Endangered Species Act Status of Columbia River Basin Fish Populations

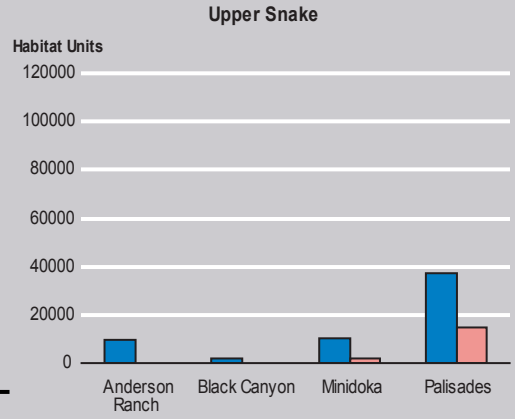
Species	Status	Date listed
Sockeye, Snake River	Endangered	1991
Chinook, Snake River Fall-run	Threatened	1992
Chinook, Snake River Spring/Summer-run	Threatened	1992
White Sturgeon, Kootenai River	Endangered	1994
Steelhead, Upper Columbia	Endangered	1997
Steelhead, Snake River Basin	Threatened	1997
Steelhead,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

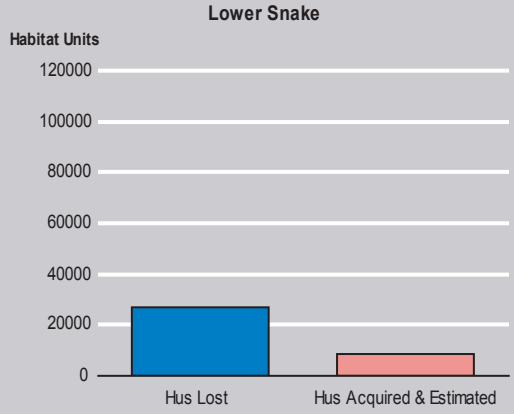
FIG 15
Wildlife Habitat Units: Lost & Acquired

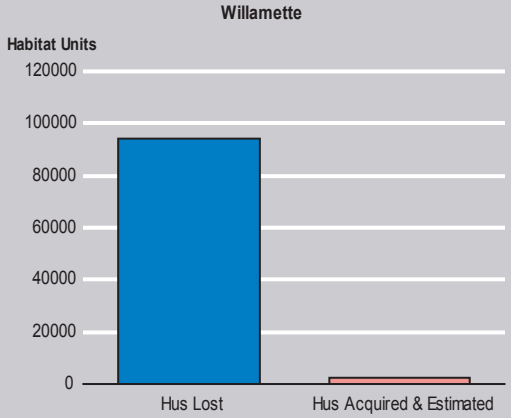












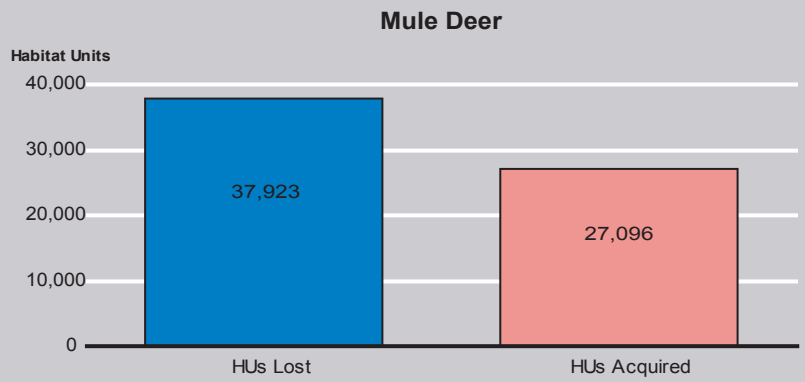
Mitigation Projects where credits have not been accounted:

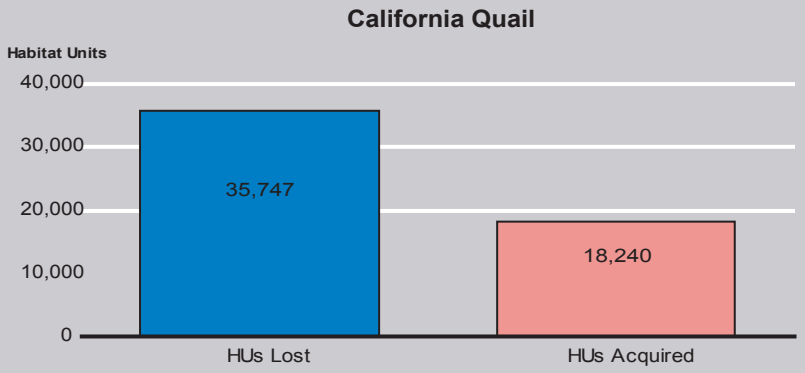
- Denny Jones BLM allotment: 34,022 acres
- Denny Jones State allotment: 4,355 acres
- NE Oregon Project acquisition: 1,175 acres
- Enhancement Potential on 24,350 acres acquired to date

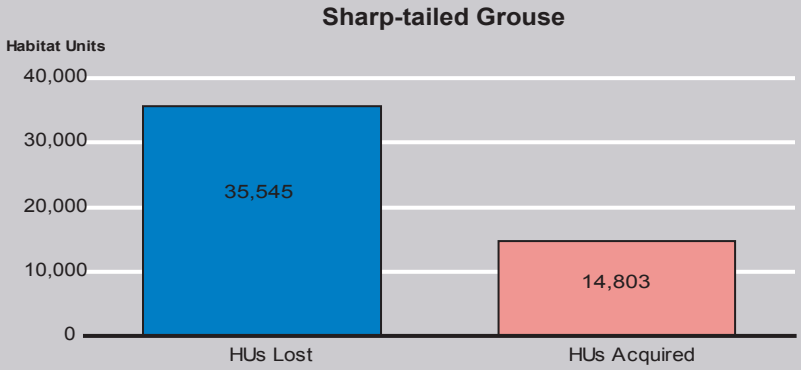
* Note: “Acres acquired within the state of Idaho for Dworshak agreement are not measured in habitat units and are not included in these totals.”

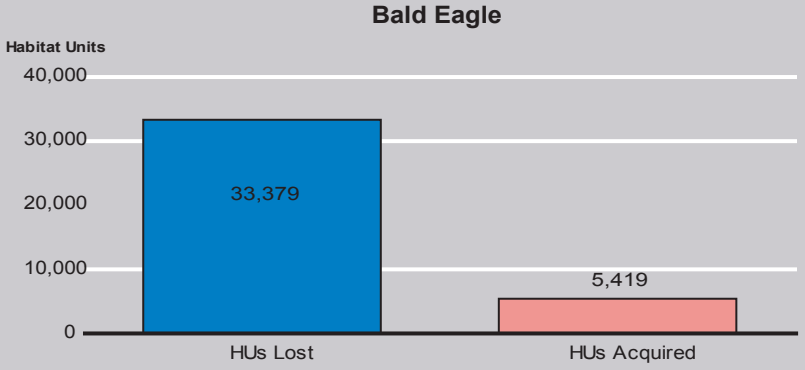
** The Habitat Units lost and mitigated, by species and by dam, are shown in figure 15c, page 34.

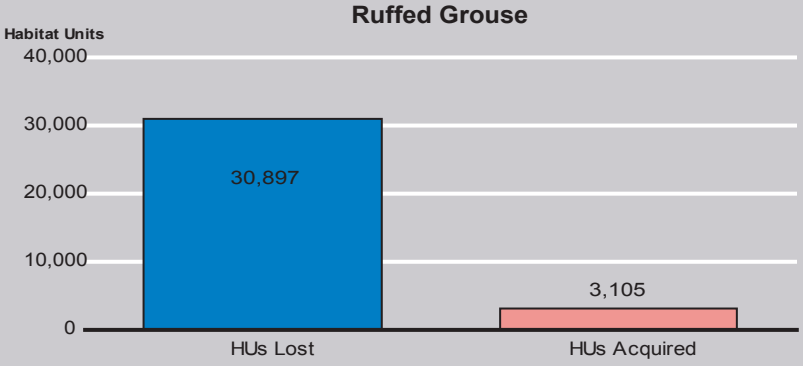
FIG 16
Wildlife Habitat Units Lost, Most-Affected Species











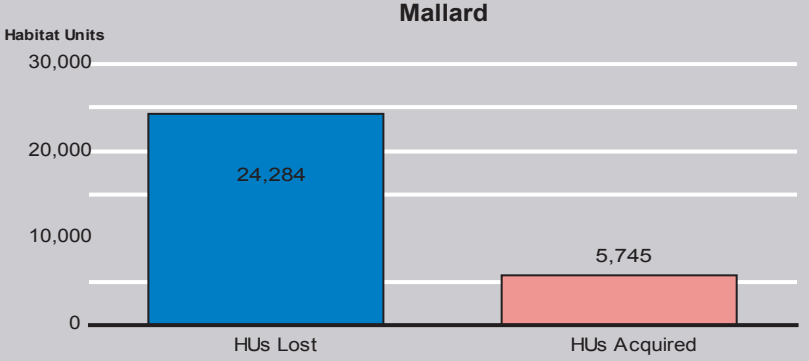


FIG 17
Properties Protected by BPA for Wildlife Purposes
1978-2001

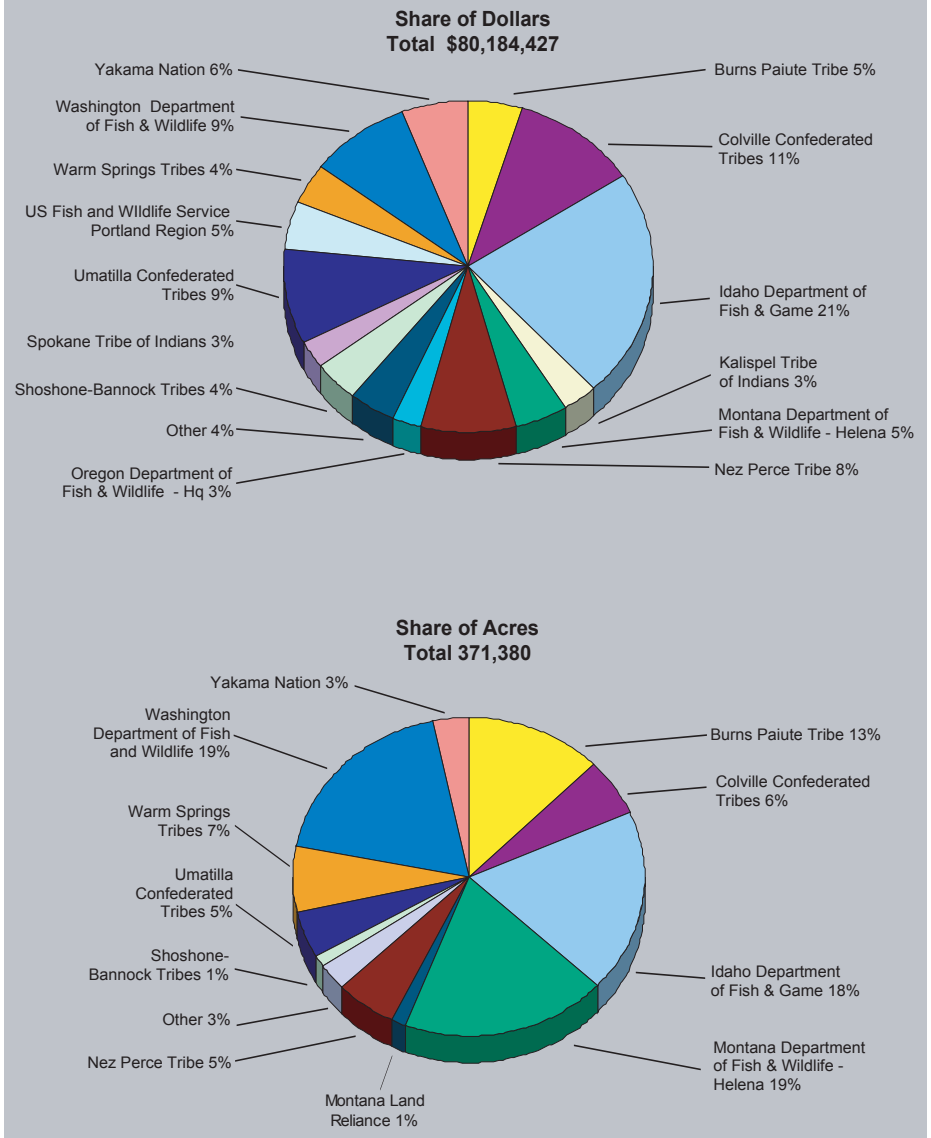
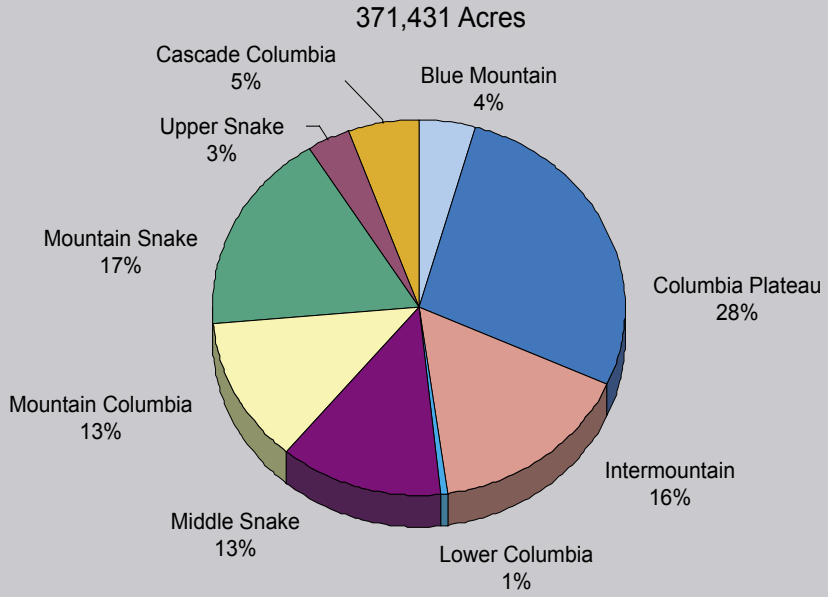


FIG 18
Properties Purchased by BPA for Wildlife Purposes by Province*
1978-2001



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

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