

LOWER SNAKE RIVER

COMPENSATION PLAN PROGRAM

ANNUAL REPORT

FISCAL YEAR 1993

Boise, Idaho

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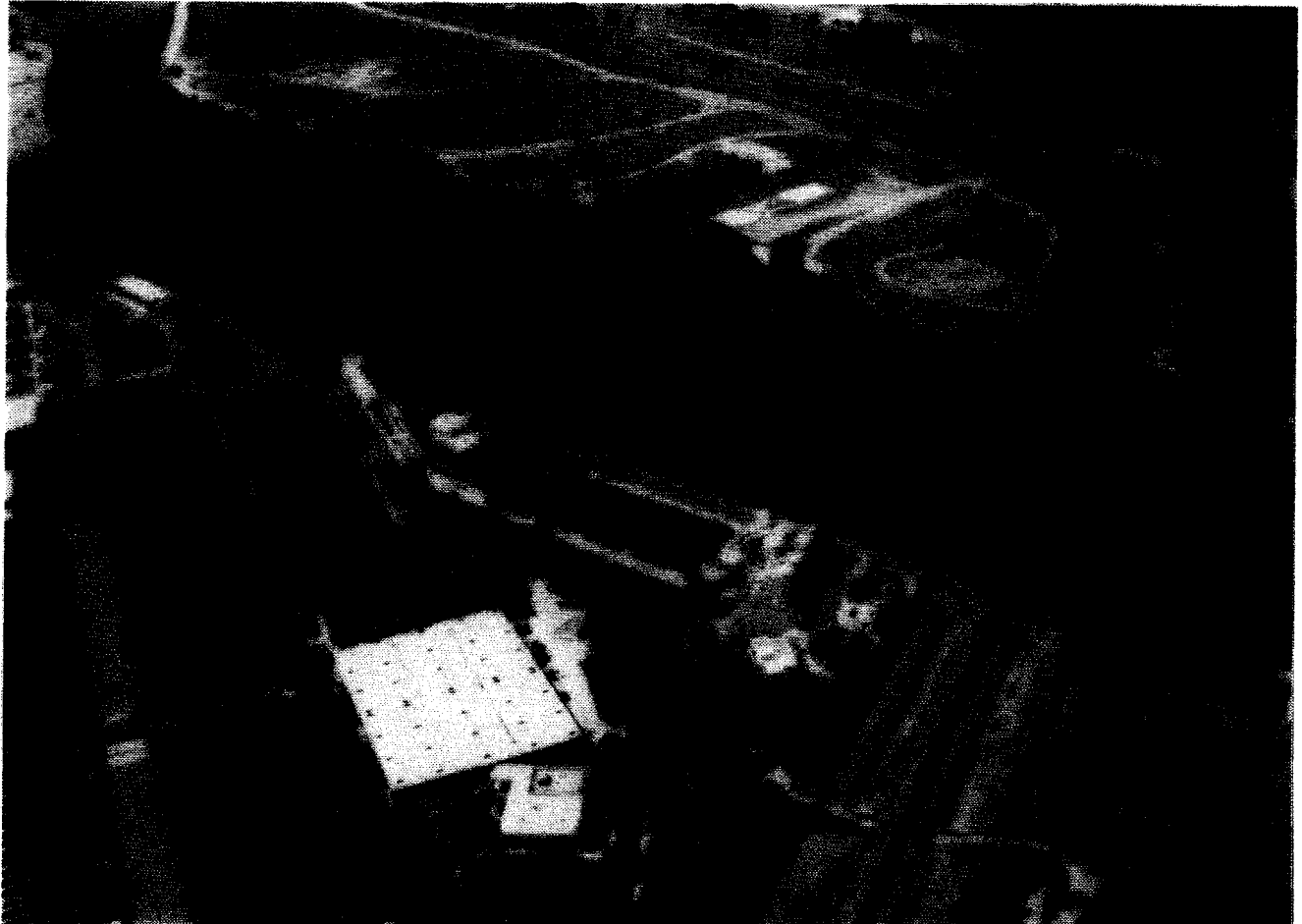


Cover Photo - Clearwater Fish Hatchery located in Ahsahka, Idaho was the last LSRCF facility to be built. Sites originally considered for construction were Powell (located on the Lochsa River), Boulder Creek, Fish Creek and expansion of Kooskia NFH. The alternative sites had one or more severe deficiencies which eliminated them from further consideration. The Clearwater FH is the largest of the LSRCF facilities and was constructed by the U.S. Army Corps of Engineers between August 1989 and December 1991 on a 17.5 acre site across the North Fork of the Clearwater River from Dworshak NFH (see photo). The hatchery has a 30,600 square foot concrete hatchery building and nearly 300,000 cubic feet of outdoor raceways for rearing nearly 4 million salmon and steelhead annually.

The Clearwater FH depends on gravity flow of water from Dworshak Reservoir. Water is drawn from the reservoir through a 36-diameter primary intake line and a 24-inch diameter secondary intake line. Collectively, the two pipes supply nearly 40,000 gallons of water per minute to the hatchery.

Construction of the hatchery's water supply system was an engineering challenge as two large holes had to be drilled through 25 feet of concrete approximately 250 feet below the top of the dam without jeopardizing the safety of the dam. The 36-inch diameter primary intake line takes 56 degree F water from near the surface of the reservoir through a floating intake system. The secondary 24 inch line, permanently located near the bottom of the reservoir, provides water at approximately 40 degrees F. Water is blended in a large tank to the desired temperature for rearing chinook and steelhead. The hatchery is located approximately 1.8 miles downstream of the dam which required extensive pipeline construction and incorporation of a pressure relief system to prevent water hammer effects.

Photo Below - The Clearwater FH, constructed on the site shown in the upper portion of the photo, was formerly dedicated in August 1992.



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I. INTRODUCTION

The Lower Snake River Compensation Plan Office was established with the closing of the Boise Area Office in September, 1982. The Office's primary responsibility is to administer U.S. Fish and Wildlife Service (FWS) operations and maintenance funds (O&M) for cooperator fisheries operations under the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP).

The LSRCP was authorized by the Water Resources Development Act of 1976 (90 Stat. 2917) to replace fish and wildlife losses caused by the construction and operation of Ice Harbor, Lower Monumental, Little Goose, and Lower Granite Lock and Dam projects on the lower 150 miles of the Snake River in Washington and Idaho. The plan described fish hatchery developments as well as improvements to the dams and powerplants to improve smolt passage. Construction responsibility for the LSRCP was assigned to the Walla District, U.S. Army Corps of Engineers (Corps), while responsibility for fish hatchery O&M funding was to be accomplished by "one of the Federal fisheries agencies." The question of O&M funding was settled in 1977 with the signing of an interagency agreement by the Corps, National Marine Fisheries Service (NMFS), and FWS; it stated that the FWS would budget for and administer O&M funds for LSRCP fish hatchery programs (responsibility for administration and O&M for fish passage and wildlife programs remains with the Corps).

Public Law 99-662, approved November 17, 1986, modified the Water Resources Development Act of 1976 in accordance with recommendations contained in a report from the Chief of Engineers, dated March 6, 1985. The Chief's 1985 report confirmed the 1977 NMFS/FWS agreement on Page 2, Section 4.d with a directive which stated: "The U.S. Fish and Wildlife Service should be designated to fund the operation and maintenance of all fish rearing facilities." Regarding ownership of property, the 1985 Report stated in Section 5.3: "Transfer of jurisdiction over all Compensation Plan fish hatcheries, appurtenant facilities and lands to the U.S. Fish and Wildlife Service for operation, maintenance, and replacement shall occur upon completion of construction by the Corps of Engineers." The Corps is currently conveying operational responsibility for constructed fish facilities to the FWS by Memoranda of Understanding for each facility (usually 5-year agreements). Consistent with the desires of the Administration and Congress, the Corps is also transferring fee title of LSRCP hatcheries and associated satellite facilities to the FWS as they are completed and fully operational. Ownership of several hatcheries and satellites has already been transferred to the FWS.

The Corps' estimated cost for construction of the authorized LSRCP off-project fisheries facilities (hatcheries and related satellite facilities) is \$177 million; the FWS costs for annual O&M now exceeds \$12 million. All anadromous fisheries compensation and most resident fisheries compensation are allocated to project power costs and are reimbursed to the U.S. Treasury with interest by the Bonneville Power Administration (BPA) from power revenues.

The LSRCP legislation authorized what was believed to be sufficient anadromous fish hatcheries and associated trapping and holding facilities to produce enough smolts to return 18,300 fall chinook adults, 58,700 spring and summer chinook adults, and 55,100 steelhead adults back to the project area, and sufficient resident fish hatcheries and stream enhancement projects to produce 93,000 pounds of trout annually to replace lost resident sport fisheries in Washington and Idaho. The program required expansion or construction of 12 hatcheries and 11 satellite facilities in Idaho, Oregon, and Washington. Idaho Department of Fish and Game (IDFG) operates four hatcheries, Oregon Department of Fish and Wildlife (ODFW) operates three hatcheries, Washington Department of Wildlife (WDW) two hatcheries, Washington Department of Fisheries (WDF) one hatchery, and FWS two hatcheries.

II. Program Highlights for FY1993

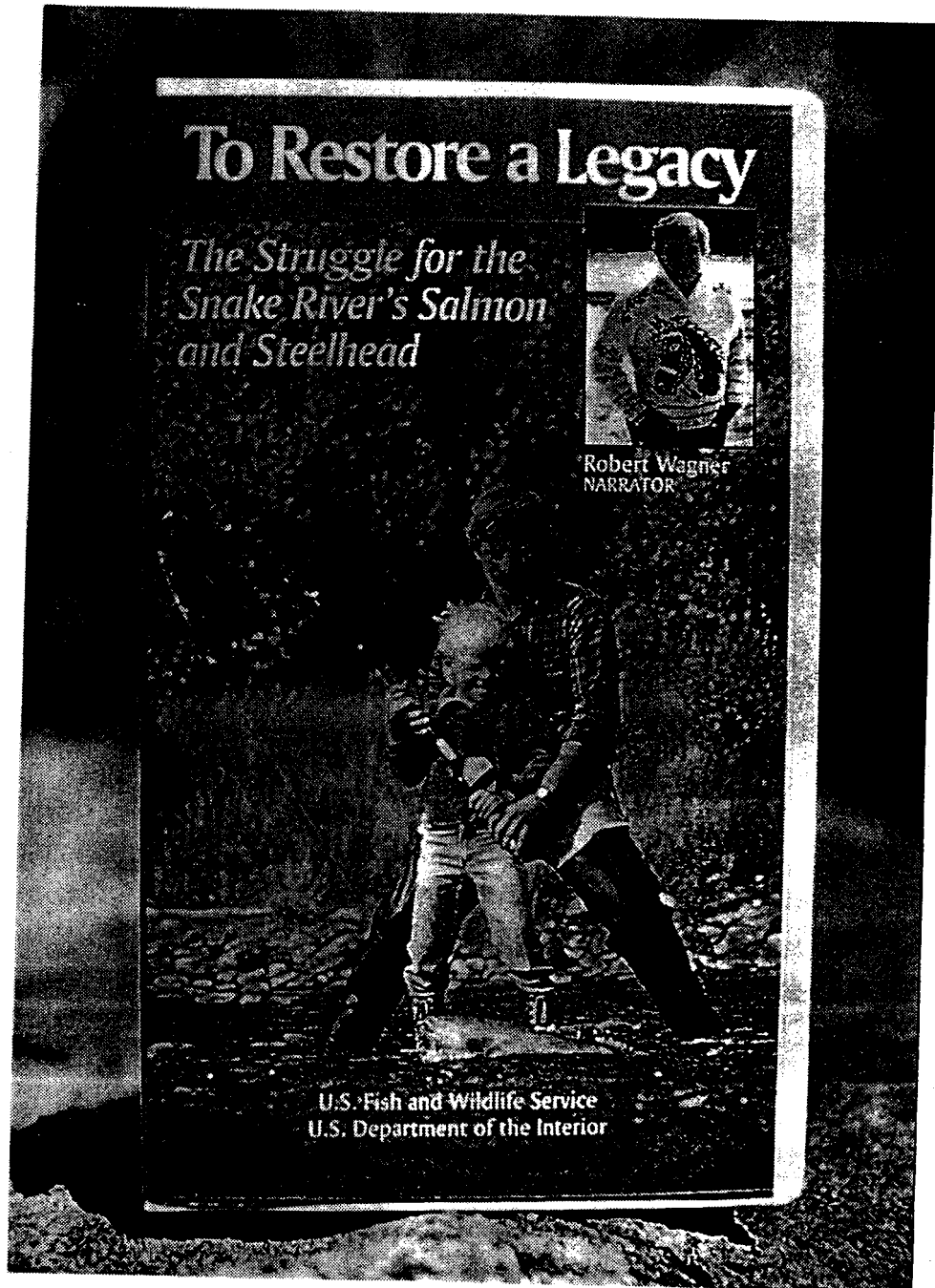
The 1992-93 steelhead run above Lower Granite Dam was once again substantially higher than the previous years total of 97,000 with over 113,000 fish counted. A large percentage of the run was the result of hatchery releases in 1989, 1990 and 1991 and the LSRCP portion of the total count over Lower Granite Dam and easily meets our adult steelhead mitigation goal of 55,100 steelhead adults back to the project area. In 1989 approximately 6.5 million steelhead were released from LSRCP hatcheries followed by releases of 6.3 million in 1990 and 6.5 million from these facilities in both 1991 and 1992. In keeping with the success of the LSRCP steelhead production program, Magic Valley Fish Hatchery (FH) alone released approximately 1,926,000 steelhead smolts this year weighing 334,500 pounds. The Magic Valley release contributed approximately 30% of the total of 6.4 million steelhead released from LSRCP facilities.

The Clearwater FH, the last facility to be constructed under the LSRCP, was completed in December 1991. This facility completed its first full year of production in FY1992 and is now in its second full year. This year Clearwater FH released approximately 500,000 salmon and steelhead through its satellite facilities at Powell, Red River and Crooked River.

LSRCP facilities continue to produce and release large numbers of salmon, steelhead and resident trout as part of their mitigation responsibility. In FY1993, 10,128,228 salmon, steelhead and rainbow trout weighing over 1.5 million pounds were released from LSRCP facilities. The numbers and pounds of fish produced were lower than FY1992 because of program adjustments to reduce impacts on listed species and reduced numbers of chinook adults returning to the release areas.

Once again the majority of the LSRCP staff time in FY1993 was spent on Endangered Species Act (ESA) Section 7 and Section 10 consultation and preparation of biological assessments on hatchery production and release effects on listed Snake River spring/summer and fall chinook. Fish hatchery production was and will continued to be adjusted where appropriate to meet ESA requirements.

The long awaited LSRCP video, three years in the making by FWS in cooperation with the National Fish and Wildlife Foundation, was completed this year. Over 250 copies were distributed to FWS Offices and to all LSRCP Cooperators. In addition the Service entered into a partnership with Albertson Food Stores in the northwest and the video is now available through their video departments throughout a three state area. The video was also shown on Idaho and Oregon Public Television stations transmitting to Idaho and parts of Oregon and



Video Photo

Washington. Large numbers of copies have been loaned to environmental groups and civic organizations throughout the country after being advertised nationally through U.S.A. Today and other national publications.

The LSRCP Office also completed the camera ready art work for brochures for Lyons Ferry and Magic Valley FH's. Contracts were also awarded for preparation of camera ready art work for the last two facilities Lookingglass and Clearwater FHs. The Corps has agreed to print 50,000 full color brochures for each facility.



Lyons Ferry FH and Magic Valley FH Brochures.

Members of the LSRCP staff have actively participated in implementing Region 1's VISION either as leaders or members of VISION Action Teams. Their efforts helped result in the production of VISION documents directed towards improving various Region 1 fisheries programs.

III. STATION AND COOPERATOR OPERATIONS

The Boise LSRCP Office negotiated cooperative agreements with and administered funds to four state agencies, two Indian Tribes and the FWS for operation and maintenance of fish hatcheries and to conduct hatchery monitoring and evaluation studies and fish health programs. A total of \$8,849,195 was obligated to WDF, WDW, ODFW, and IDFG or transferred to Dworshak NFH, Hagerman NFH, and Dworshak Fish Health Center (DFHC) for operation and maintenance and fish health monitoring of 12 hatcheries and 11 associated satellite facilities. An additional \$3,125,189 was obligated to the same four state cooperators, Nez Perce and Umatilla tribes, Idaho Fisheries Resource Office (IFRO), Columbia Basin Fish and Wildlife Authority, Seattle National Fishery Research Center (NFRC), and the Columbia River Coordinators Office for hatchery monitoring and evaluation studies, Section 7 consultation work and a comprehensive environmental analysis of hatchery operations. A total of 10,766,168 salmon, steelhead and rainbow trout weighing 1,538,546 pounds were stocked from LSRCP facilities in FY1993. Funds were also provided to IDFG, WDF, WDW and ODFW for pathology support at all LSRCP facilities in their respective states. BPA funded a disease monitoring program at all Columbia and Snake River hatcheries until FY1991. This responsibility for all LSRCP facilities was taken over by our office in 1991 and continued in FY1993. LSRCP pathologists met this year to discuss the status of their efforts and will be meeting annually. BPA also furnished Passive Integrated Transponder (PIT) tags which were used in all LSRCP evaluations programs.

Below are brief summaries of hatchery and evaluation activities in FY1993. Tables 1, 2, and 3 provide further data on funds obligated, fish stocked, production targets, construction costs, and hatchery/trap returns.

Clearwater Anadromous Fish Hatchery - Idaho

Clearwater Fish Hatchery is the last of the 12 hatcheries to be completed under the Corps' LSRCP construction program. The hatchery, operated by IDFG, was built across the North Fork of the Clearwater River from Dworshak NFH. It is designed to produce (with its three satellites) 1,369,500 spring chinook smolts weighing 91,300 pounds and 2,500,000 steelhead smolts weighing 350,000 pounds. The spring chinook adult return goal for the program is 11,915 salmon and the steelhead return goal is 14,000 adult returns to the Snake River basin.

The Clearwater FH is located on land (17.5 acres) purchased by the Corps in 1989. Construction of Clearwater FH began in August 1989 and was completed by the end of 1991. The water supply line was tested in November 1991, and steelhead eggs from Dworshak NFH and rainbow trout for resident fisheries program were supplied to Clearwater in 1992 for the first rearing cycle.

The Clearwater FH receives its entire water supply from Dworshak Reservoir via two pipes. The primary (and largest) line takes water from just below the reservoir's surface while a secondary (smaller) line receives cold water from

an intake deep below the water surface. A distribution tank near the hatchery allows mixing of the water from the two lines to select proper temperatures for various uses at Clearwater FH and also provides a water supply line to Dworshak NFH.

Three satellite facilities are associated with the hatchery: Red River, which was completed in November 1986; Powell, completed in the summer of 1989 and Crooked River, completed in the spring of 1990. Red River, Crooked River and Powell are now being operated as rearing, release, and trapping facilities using excess fish from either Sawtooth FH or, more recently, Dworshak NFH.

Red River trapped 138 adult spring chinook and one jack this year, a four-fold increase over the 34 adults collected last year. Ninety-one of these adults were released to spawn naturally. A total of 426 adults and 7 jacks were trapped at Powell; and all adults captured were spawned. Crooked River was operational for the fourth year of trapping; a total of 461 adults and 8 jacks were trapped and 152 fish were released to spawn naturally. The Crooked River return was more than twice the 215 adults, 7 jacks trapped last year. The Clearwater FH is now holding a total of approximately 1,300,000 BY1992 salmon and chinook fingerlings for production and a 1993 presmolt release from the satellite facilities. In addition approximately 3,000,000 spring chinook eggs were on hand at the end of FY1993.

A total of 22,246 chinook presmolts were released from the Red River pond in October 1993, and 144,863 spring chinook presmolts were directly released as a part of the Idaho Supplementation Study in Pete King, Squaw, Big Flat and White Sand creeks. In addition 6,000 smolts were released from Red River Satellite in October 1992 and 326,300 steelhead smolts were released in the North Fork Clearwater River April 1993.

Magic Valley Fish Hatchery - Idaho

Magic Valley FH is located on the Snake River near Filer, Idaho, and is operated by IDFG. It was completed in August 1987 and is designed to produce 2,000,000 steelhead smolts weighing 291,500 pounds annually. The return goal for Magic Valley FH is 11,660 adults back to the Snake River basin.

The hatchery was constructed on a commercial hatchery site that was purchased by the Corps in March 1981. Steelhead have been produced for the Magic Valley program since 1982. Until 1985, fish were produced onsite in a commercial facility; however, with the start of construction, fish production was transferred to unused raceways at Hagerman NFH (approximately 255,000 steelhead smolts were reared at Hagerman in 1986 for the Magic Valley program). Sawtooth FH and the East Fork Salmon River satellite serve as the juvenile release and adult trapping sites for the hatchery program. Magic Valley FH completed its sixth rearing season this year, and released approximately 1,925,700 steelhead smolts in March and April 1993, weighing 334,500 pounds. The releases were distributed between the East Fork of the Salmon, upper and lower Salmon and the Little Salmon rivers.

McCall Fish Hatchery - Idaho

Operated by IDFG, McCall FH was completed in 1981 and is located along the North Fork Payette River near McCall, Idaho. The program's adult trapping facility and the smolt release site are located on the South Fork of the Salmon River near Warm Lake (salmon do not have access to the Payette River system). McCall FH is designed to produce 1,000,000 summer chinook smolts weighing 61,300 pounds. McCall FH is the only LSRCP summer chinook facility and its adult return goal is 8,000 adults to the Snake River basin. McCall FH also has a concurrent federally-approved trout production program which is funded entirely by the IDFG.

The hatchery has achieved considerable success with its summer chinook program, trapping 2,690 adults in 1986, 2,705 in 1987, and 2,393 in 1988. Typical of the lower chinook runs throughout the basin, McCall's returns decreased in 1989 and 1990 when 939 (444 adults and 495 jacks) and 969 fish (941 adults and 28 jacks) were trapped. In 1991, 1,212 fish (391 adults and 821 jacks) and in 1992, 2,848 (2,645 adults, 203 jacks) were trapped. In 1993, 2,703 fish (2,675 adults, 28 jacks) were trapped. This year's egg take 1,069,312, will be sufficient to produce the desired smolts for release in 1995. A total of 1,581 adult males and females were released to spawn naturally in 1993. The numbers of summer chinook returns are increasing each year. In 1993 a total of nearly 8,000 summer chinook were counted over Lower Granite Dam which is nearly double the 10 year average.

The McCall FH staff released 607,298, BY1991 summer chinook salmon smolts weighing 33,659 pounds in the South Fork Salmon River in March 1993; this is below the hatchery's release target of 1,000,000 smolts due to the low number of adult returns in 1991. The fish were in good health throughout the rearing cycle and mortalities were low. McCall FH experienced excellent outmigrant survival to Lower Granite Dam (38%) attributed mainly to the two feedings of feed medicated with oxytetracycline.

Sawtooth Fish Hatchery - Idaho

Sawtooth FH, located on the upper Salmon River near Stanley, was completed in January 1985 and is operated by IDFG. In addition to its primary mission of rearing 2,235,000 spring chinook salmon smolts weighing 149,000 pounds and trapping steelhead ("A" strain) for Hagerman NFH and Magic Valley FH, the staff operates a major satellite facility on the East Fork of the Salmon River. The satellite traps adult spring chinook for Sawtooth FH and steelhead ("B" strain) for Hagerman and Magic Valley and also serves as a direct stream release site. The program's goal for returns back to the Snake River basin is 19,455 adults.

The adult steelhead returns to Sawtooth FH in 1993 was 1,598, slightly lower than the 1,705 returning last year. Returns for the years 1988, 1989, 1990, and 1991 were 994, 974, 1,056 and 261 respectively. The East Fork satellite facility trapped 176 steelhead, compared to 156 in 1992, 119 in 1991, and 454 in 1990.

Spring chinook trapping and spawning ended in September with a total of 587 chinook trapped this year compared to 387 trapped in 1992 and 566 trapped in 1991. The East Fork trapped 90 spring chinook this year compared to 65 in 1992, and 62 in 1991. Numbers of chinook trapped at both sites were larger than previous years but typical of the low numbers that returned basinwide.

Most BY1991 spring chinook were released in October 1992 due to anticipated low river flows during the winter. The release included 613,100 presmolts into the Salmon River at the hatchery. The remainder of the 195,000 BY1991 spring chinook were released as smolts in the Salmon River at the weir (109,600), above the weir (51,900) as apart of the Idaho Supplementation Study, and in the East Fork (33,500) in April, 1993.

In addition to the LSRCF program, the State cooperates with the Shoshone-Bannock Tribe, BPA, NMFS, and other agencies in a FWS-approved sockeye salmon restoration project at Sawtooth FH. The project is funded by BPA and is an effort to recover the endangered sockeye run. This year a catchable trout holding and distribution program was instituted to stock local waters; that project was funded entirely by IDFG.

Irrigon/Wallowa Hatcheries - Oregon

Irrigon FH located on the Columbia River near Umatilla, Oregon; is operated by the ODFW and was completed in October 1985. Collector wells were designed for 25,000 gallons per minute (gpm) supply water for the entire program of 1,691,991 steelhead smolts weighing 279,600 pounds. Irrigon FH's return goal is 11,200 adults back to the Snake River basin.

An expansion of ODFW's Wallowa State Hatchery was completed in May 1985; it serves as a final rearing, acclimation, and release site for about 600,000 steelhead smolts from Irrigon FH and has facilities for steelhead trapping and spawning. In 1993 a total of 1,353 steelhead returned to the Wallowa FH compared to 2,644 in 1992 and 576 in 1991.

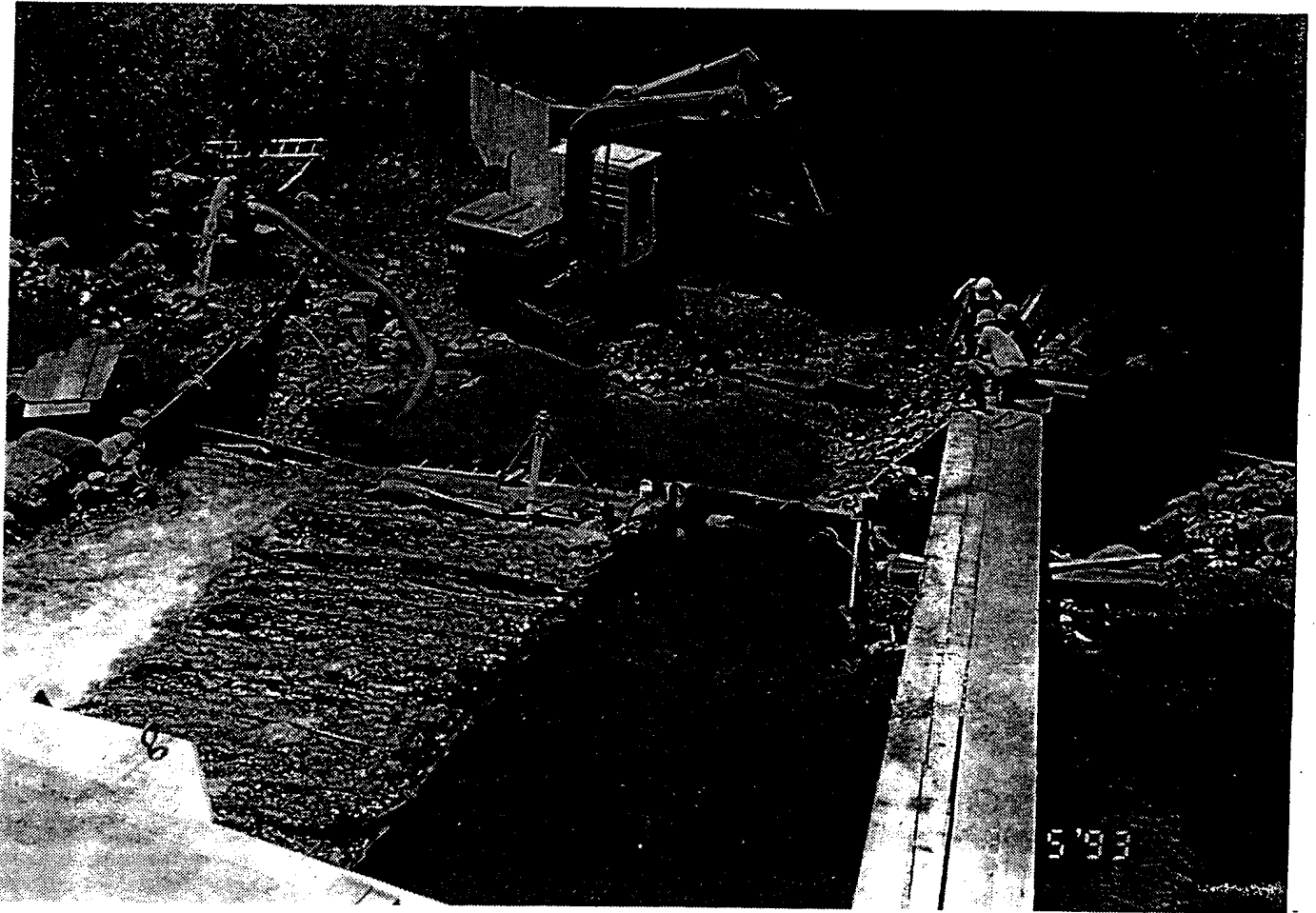
Two other advanced rearing and trapping sites, which are satellites of the Irrigon FH, were operational in 1992. Big Canyon satellite is located at the mouth of Big Canyon Creek on the Wallowa River. It was completed in April 1987 and is capable of holding and releasing 225,000 smolts. Two hundred and sixteen adult steelhead returned to Big Canyon satellite in 1989, 336 adults in 1990, 428 in 1991, and 370 adults in 1992. Big Canyon did not trap spring chinook this year.

The Little Sheep Creek satellite station in the Imnaha basin is used as an advanced rearing pond and release site for 250,000 steelhead smolts reared at Irrigon FH. The satellite was completed and became operational in August 1987. In 1987, 1988, and 1989, 730, 286, and 322 steelhead returned to the trap. In 1990, returns were high and 959 steelhead were trapped. The run declined in 1991 and 1992 with only 395 and 789 steelhead trapped. This year 1,872, more than twice the number trapped last year, returned to Little Sheep Creek.

Releases for 1993 of Irrigon-reared fish included 1,037,630 steelhead from the Wallowa FH Big Canyon rearing ponds and 237,969 steelhead from the Little Sheep Creek site. Irrigon also released a total of 416,392 smolts at various river sites in the Snake and Grande Ronde river basins.

Lookingglass Fish Hatchery - Oregon

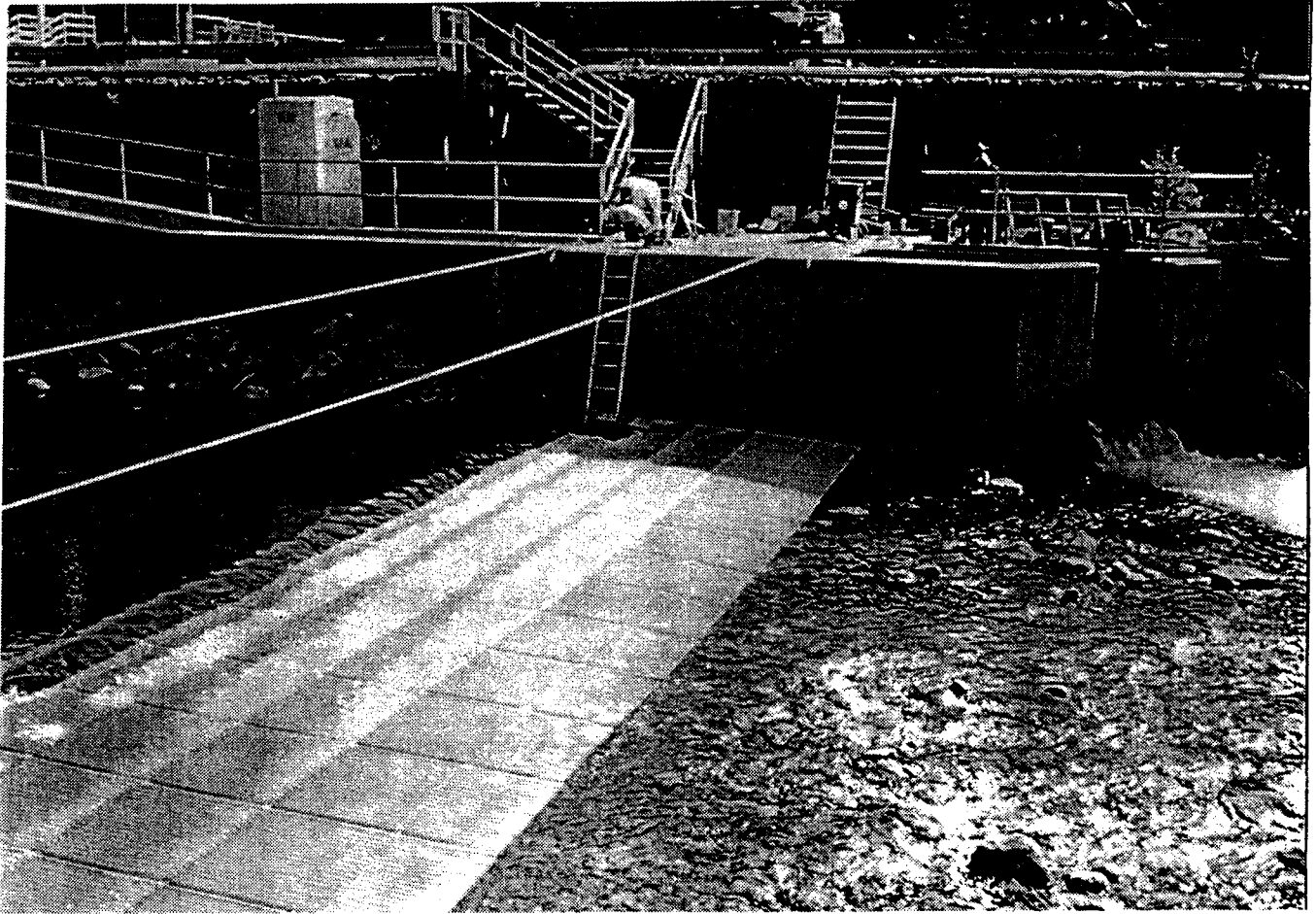
This hatchery is located on Lookingglass Creek north of Elgin, Oregon, and was completed in November 1982. The hatchery is operated by the ODFW and is designed to produce 1.4 million spring chinook smolts weighing 69,600 pounds. Two satellites, Big Canyon Creek (discussed above) and a renovation of Oregon's Imnaha trapping site, which was completed in 1989, are part of the hatchery program. The Snake River basin return goal for the Lookingglass FH program is 9,070 spring chinook adults.



A new Mitsubishi floating weir was installed at Lookingglass FH this year and required major modification of the old weir with installation of a concrete wall and sill to attach the weir to the creek bed.

Adult spring chinook trapping went well this year with a total of 1,243 fish collected at the Imnaha trap (1,217 adults and 26 jacks) and 1,020 adults and 20 jacks returning to the Lookingglass trap. No chinook were trapped at Big

Canyon Creek facility in 1993. The Lookingglass and Imnaha stock returns were substantially better than 1992 returns. In 1992 a total of 844 chinook were trapped at Imnaha and 806 at Lookingglass. BY1991 spring chinook releases from Lookingglass FH totaled 605,878. These releases included 448,219 Rapid River stock into Lookingglass Creek in April 1993 and 157,659 Imnaha stock from the Imnaha River satellite facility acclimation pond in April 1993.



Completed Mitsubishi floating weir installed at Lookingglass FH.

Some rearing problems were experienced at Lookingglass FH which required facility modifications. A larger emergency generator, to handle all critical power needs during power outages that occur frequently, and chillers were installed last year to facilitate uniform size of chinook throughout the rearing cycle. The chillers were not operating according to design and were again modified this year. The Corps, FWS LSRCP Office Coordinator, and ODFW personnel worked out the details for these modifications and some changes were necessary to insure dependable operation during 1993.

Lyons Ferry/Tucannon Fish Hatchery Complex - Washington

Located at the confluence of the Palouse and Snake rivers, the Lyons Ferry facility is two hatcheries in one. Phase I, completed in November 1983, is operated by WDW. It is designed to produce 1,169,500 steelhead trout smolts weighing 116,400 pounds and 45,000 pounds of rainbow trout. Its adult return goal to the basin is 4,656.

Phase II of Lyons Ferry facility, completed in November 1984, is operated by WDF. It is designed to produce 9,162,000 fall chinook smolts weighing 101,800 pounds, and 132,000 spring chinook smolts weighing 8,800 pounds. Lyons Ferry FH's adult salmon return goals are 18,300 fall chinook and 1,148 spring chinook to the basin.

A renovation of Tucannon State Fish Hatchery was completed in November 1984 to rear an additional 41,000 pounds of rainbow trout for WDW and to serve as an adult trapping and smolt release site for WDF's Tucannon River spring chinook program. The remaining 7,000 pounds of rainbow trout production stipulated in the compensation plan (the total requirement is 93,000 pounds) is to come from stream enhancement structures funded by the Corps. These structures were constructed by WDW in the early 1980's. The WDW personnel operate the Tucannon FH in cooperation with WDF as a satellite of Lyons Ferry Phases I and II.

The hatcheries along with the Phase I (steelhead) satellite facilities at Cottonwood Creek, Dayton Pond, and Curl Lake were completed from 1983 to 1986. Some problems that existed, were addressed this year. The two fall chinook adult holding ponds were found to be unmanageable and were rehabilitated by the Corps this year. Both ponds were divided into two units by construction of a dividing wall down the center of each pond. This now provides much more versatility for handling and sorting adults. Additional office space at the Lyons Ferry Steelhead facility was constructed in 1992 by adding 400 square feet onto the administration building. This work was done by the WDW personnel. The road to the Marmes pump site, which was originally constructed with large cobbles was smoothed and graded by hatchery personnel.

Gull use of the large steelhead rearing ponds had increased greatly in recent years. The severity of the depredation problem was determined to be high and the only feasible solution was installation of a bird deterrent system. A wire system was installed last year and has nearly eliminated the bird predation problem.

In 1991, Corps installed a new floating type weir on the Tucannon River at the hatchery site which was an improvement over previous weirs. The new Mitsubishi designed and manufactured weir is a tremendous improvement over past designs and works much better.

Spring chinook returns to the Tucannon trap and weir totaled 429 adults and 19 jacks in 1993, down from the previous year of 509 adults and 38 jacks. The returns included 244 adults and 13 jacks of hatchery origin and 185 adults and 6 jacks of natural origin. A total of 50 females, 37 males and 2 jacks were

spawned and 335 adults and 16 jacks were released upstream of the weir to spawn naturally.

There are currently about 86,000 BY1992 Tucannon River fish on hand for release in 1994. A total of 57,316 Tucannon River spring chinook were released into the upper Tucannon River on 10/21-25/93.

This year adult fall chinook were trapped at the Lyons Ferry FH and at Lower Granite and Ice Harbor dams and transported to Lyons Ferry FH for holding and spawning. A total of 823 adult and 150 jacks voluntarily entered the hatchery compared to a total of 898 last year. Because of the large number voluntarily entering the hatchery trap it was not necessary to use all of the fish trapped at the dams. An additional 488 adults and 78 jacks were captured at the two dams and transported to the hatchery. A total of 2.3 million eggs were collected from 1,204 adults spawned. A considerable effort was necessary during spawning to ensure that only Snake River fall chinook adults were used for broodstock. All coded wire tags were read before spawning to ensure that the Snake River genetic stock is maintained. Strays from programs outside the basin were inadvertently used in past years. The new concerted effort to spawn only Snake River stocks with each other is of particular importance because the fall chinook are listed as threatened under the ESA.

Because of the potential for large numbers of stray steelhead that return to the Lyons Ferry ladder in the fall (when it remains open for fall chinook returns) all trapped steelhead are checked for Lyons Ferry brands. In FY1993, 3,940 steelhead returned to the hatchery. There are currently over 600,000 FY1993 Lyons Ferry stock and over 400,000 Wallowa stock steelhead on hand for release in 1994.

Releases from Lyons Ferry FH were below the goals for fall/spring chinook and steelhead. The fall chinook release totaled 760,018 smolts (414,997 at the hatchery and 345,021 barged and released below Ice Harbor Dam). In addition 206,775 fingerlings (BY1993) were released at the hatchery in June. A total of 74,058 spring chinook were released into the Tucannon River as smolts.

A total of 1,045,016 steelhead smolts weighing 205,315 lbs were released from Lyons Ferry FH, hauled to the three satellite ponds, or trucked directly to streams. Tucannon FH released 4,602 natural origin BY1992 (Tucannon River stock) steelhead smolts into the Tucannon River. Lyons Ferry and Tucannon FH's combined, reared and released 531,216 catchable (8 to 9 inch) and sublegal rainbow trout for Washington lakes and streams and the Idaho Program weighing 117,737 pounds.

Dworshak National Fish Hatchery Expansion - Idaho

Dworshak NFH is located at the confluence of the North Fork and Clearwater rivers. An expansion of the existing Dworshak NFH steelhead facility for LSRCP spring chinook production was completed by the Corps in November 1982. The FWS facility is designed to produce 1,400,000 spring chinook smolts weighing 70,000 pounds. The adult return goal for Dworshak is 9,135 spring chinook to the Snake River basin. Beginning in 1986 twelve raceways formerly

used to rear resident trout were converted to rearing spring chinook. This increased Dworshak's chinook rearing potential by about 20,000 pounds, for a total of 90,000 pounds. This additional rearing effort will now be shifted to the Clearwater FH in FY1992.

Spring chinook returns in the Clearwater River in 1993 totaled 2,003 jacks) returning to the Dworshak/Kooskia Complex compared to 675 adults in 1992, 632 fish in 1991, but still down substantially from the 3,183 trapped in 1990. The Dworshak Program currently has over 1.8 million BY1992 spring chinook on hand for the Program. This includes BY1992 Rapid River Stock.

In April 1993, Dworshak NFH personnel released approximately 467,222 BY1991 chinook smolts into the North Fork and main stem Clearwater River directly from the hatchery.

Hagerman National Fish Hatchery - Idaho

Hagerman NFH, located on a 59°F spring water supply from the Snake River aquifer east of Hagerman, Idaho, was expanded by the Corps to rear 1,400,000 steelhead smolts weighing 340,000 pounds. Hagerman NFH also retained the capacity to produce 100,000 pounds of fish for FWS production commitments for programs other than LSRCP. The expansion was completed in April 1984 and the hatchery, is operated by the FWS. Hagerman NFH has a goal of returning 13,600 adult steelhead to the Snake River basin.

Hagerman NFH received a total of 2.02 million BY1993 steelhead "A" eggs from Sawtooth and Pahsimeroi FH's this year. No Dworshak or East Fork "B" eggs were received this year.

In April 1993 Hagerman NFH released nearly 1.5 million BY1992 steelhead smolts weighing 308,520 pounds into various streams in the Salmon River basin. Fish health for the entire history of steelhead production for BY1992 was excellent.

IV. LSRCP OFFICE OPERATIONS

A total of \$12,564,380 was obligated for LSRCP programs in FY1993 (\$2,022,380 from carry-over monies). This total included \$3,125,189 for cooperator monitoring and evaluation studies, \$317,550 for Boise LSRCP Office management and coordination, \$100,000 for Youth Conservation Corps (YCC) (salaries and benefits), \$421,000 for the Regional Office, \$116,700 for the marking of all hatchery releases for endangered species issues and \$8,483,941 for hatchery operations and maintenance. Eleven cooperative agreements were signed for FY1993 to distribute \$10,535,800 in evaluation and operation and maintenance funding to non-federal entities.

In FY1993 the LSRCP program continued to sponsor a YCC program at a cost of \$100,000. The program was conducted on 18 state and federal LSRCP hatcheries and evaluation study projects and included 49 YCC student enrollees and team leaders. Once again the program was well received by the cooperating agencies, it not only accomplished necessary station work but also provided an environmental awareness experience and job training for local youths.

The LSRCP program information video, a cooperative venture with the National Fish and Wildlife Foundation (NF&WF) which was placed on hold in FY1991 pending announcement of Endangered Species status for several Snake River salmon species, was completed this year. The video produced by award winning cinematograph Stefan Dobert and narrated by movie and TV personality Robert Wagner has received excellent reviews. The video was advertised nationwide through the news media and a large number of copies were loaned to civic and environmental groups. The video was also shown on Idaho Public Television and more than 250 copies have been distributed to all cooperators and to Albertsons Food Stores in the Northwest and are available to the public through their video departments.

The LSRCP Office also completed the camera ready artwork for two additional public information brochures this year, one for Lyons Ferry FH and one for Magic Valley FH. These two brochures will be completed in the spring of 1993. The Corps has agreed to print 50,000 copies of each six page brochure in full color when completed. Two additional contracts for Clearwater and Lookingglass FHS were also awarded this year. These brochures will be made available at each fish hatchery for distribution to the public.

V. EVALUATION STUDIES

*I*n 1993 all five operating agencies and two Indian tribes had fully operational evaluation studies underway. By the end of the fiscal year, a total of \$2,149,589 had been obligated for twelve studies being carried out by the IDFG, ODFW, WDW, WDF, FWS (IFRO), and the Nez Perce and Umatilla tribes. Below is an overview of the FY1993 evaluation program followed by a synopsis of state and tribal evaluation programs. The IFRO evaluation program is discussed in the next section, **FWS Cooperative Programs**. Results of 1993 and earlier studies are available in our cooperator's annual reports; a listing of reports is found in Section XIII of this document.

Evaluation Study Committee (ESC) meetings were initiated in 1985 and have continued annually through 1993. Although the ESC consists of a single representative from each operating agency and cooperating Indian Tribe, ESC meetings often include additional staff members from each agency and occasionally visitors. One fully-attended ESC meeting was conducted in FY1993, while several partial committee meetings were held to discuss specific topics and study proposals. The annual meeting was primarily an update of ongoing studies. Endangered Species requirements and issues dominated many of the partial committee meetings.

Once again the cooperating LSRCP evaluation biologists dedicated a large amount of effort to assist the LSRCP office in meeting our responsibilities under the ESA. They worked with our office in writing our 1993 LSRCP Programmatic Biological Assessment, which met our Section 7 responsibilities, and developed applications for scientific and enhancement permits under Section 10 of the ESA. ESA activities will continue in FY1994 when we will assess our program for the next 5 years.

IDFG's Evaluation Study Program

In 1993, IDFG began the year with a single study, LSRCP Fish Hatchery Evaluations-Idaho, which combines three projects--Hatchery Evaluations, Hatchery-Wild Composition of the Idaho Steelhead Harvest, and Coded-Wire Tag Analyses. A fourth project was added shortly after the beginning of the fiscal year to address ESA products and issues. Idaho's LSRCP studies were initiated in 1982 and are being conducted to 1) ensure that accurate and adequate monitoring of hatchery practices occurs so the most cost effective mode of operation for each hatchery is implemented, and 2) assess the LSRCP contribution to fisheries and escapement. The Hatchery Evaluations studies include monitoring and evaluation of hatchery rearing; size, time, and location of releases; and adult returns. These types of studies are long-term because constant monitoring is required to identify problems before they result in catastrophic fish losses and to determine which hatchery rearing and release practices will result in the best adult returns.

Several evaluation studies initiated in previous years to address specific hatchery problems and needs were continued in 1993. PIT-tagged groups of salmon were released from all LSRCP rearing programs in 1993 to determine migration timing and interrogation rates at Snake and Columbia river dams. IDFG continued to collect scales from known chinook hatchery adults (i.e. those tagged as juveniles) and wild fish and provide them to ODFW biologists who are developing scale pattern models which may eventually be used to identify hatchery fish for broodstock and other management purposes. Steelhead size at release experiments, designed to identify the optimum size with the greatest survival and lowest residualism, continued as adults returned from 1991 and 1992 releases into the Salmon River (reared at Hagerman NFH). Survival determinations of high, medium, and low density chinook rearing conditions continued as adults returned from 1991 and 1992 releases. (The emergency fall release of BY1991 juveniles in September and October 1992 included the density study fish planned for release in spring 1993.) To assess effects of handling and CWTing, BY's 1988 through 1990 summer chinook in one pond at McCall FH were marked with TM-100 for comparison to ad-clipped/CWTed fish in the adjacent pond. The study continued this year as adults returned and bone samples were taken and analyzed for TM-100 marks.

IDFG initiated a time of release study of South Fork Salmon River summer chinook salmon (reared at McCall FH) in 1993 to help identify the optimum time of release into the South Fork. Also, a study to determine if survival is improved by more natural rearing conditions was initiated at Sawtooth and Clearwater FH's.

In late 1984 Idaho began an angler survey to assess the LSRCP contribution to Idaho's steelhead fishery, estimate the total escapement of LSRCP fish, recover information on marked fish, and obtain data for managing the fishery while protecting wild stocks. This survey is the major means of recovering adult steelhead tagged as fingerlings under other evaluation studies. These efforts were funded through 1993 and will be continued annually until compensation goals have been met, and periodically thereafter.

The process of reading tags and analyzing marks was funded in 1992 as part of the evaluation study, whereas actual marking costs remained a part of each hatchery's budget. In 1993 several thousand tags (many recovered under the Harvest Study described above) were removed from fish and decoded at IDFG's Lewiston Lab.

ODFW's Evaluation Study Program

ODFW conducts nearly all of their evaluations under one study, *An Evaluation of the LSRCP Program in Oregon*. ODFW began a few evaluations under this study in 1983 but full-scale studies did not begin until FY1984. Their evaluation program currently encompasses monitoring and evaluating hatchery practices; implementing size, time, and location of release studies; marking activities (CWTing, branding); assisting with disease monitoring efforts; determining the LSRCP contribution to Oregon's steelhead fishery (while recovering tagged fish); and determining the success of maintaining the genetic integrity of native wild stocks potentially effected by the LSRCP program. In addition to being the evaluation studies coordinator, the principal LSRCP investigator in Oregon also coordinates the broodstock selection, egg-taking programs, and outplanting program for all of Oregon's LSRCP program, currently the only anadromous hatchery program in NE Oregon.

ODFW conducted a third year of acclimated versus direct stream releases of steelhead at Little Sheep and Big Canyon creeks. Similar studies at Wallowa FH were completed with the release of smolts in 1991. Adult returns from releases at all three locations are being compiled and assessed as the studies continue. Size at release studies of steelhead released from Wallowa FH are in the final stages of data collection. The last adults were released for those experiments in 1991.

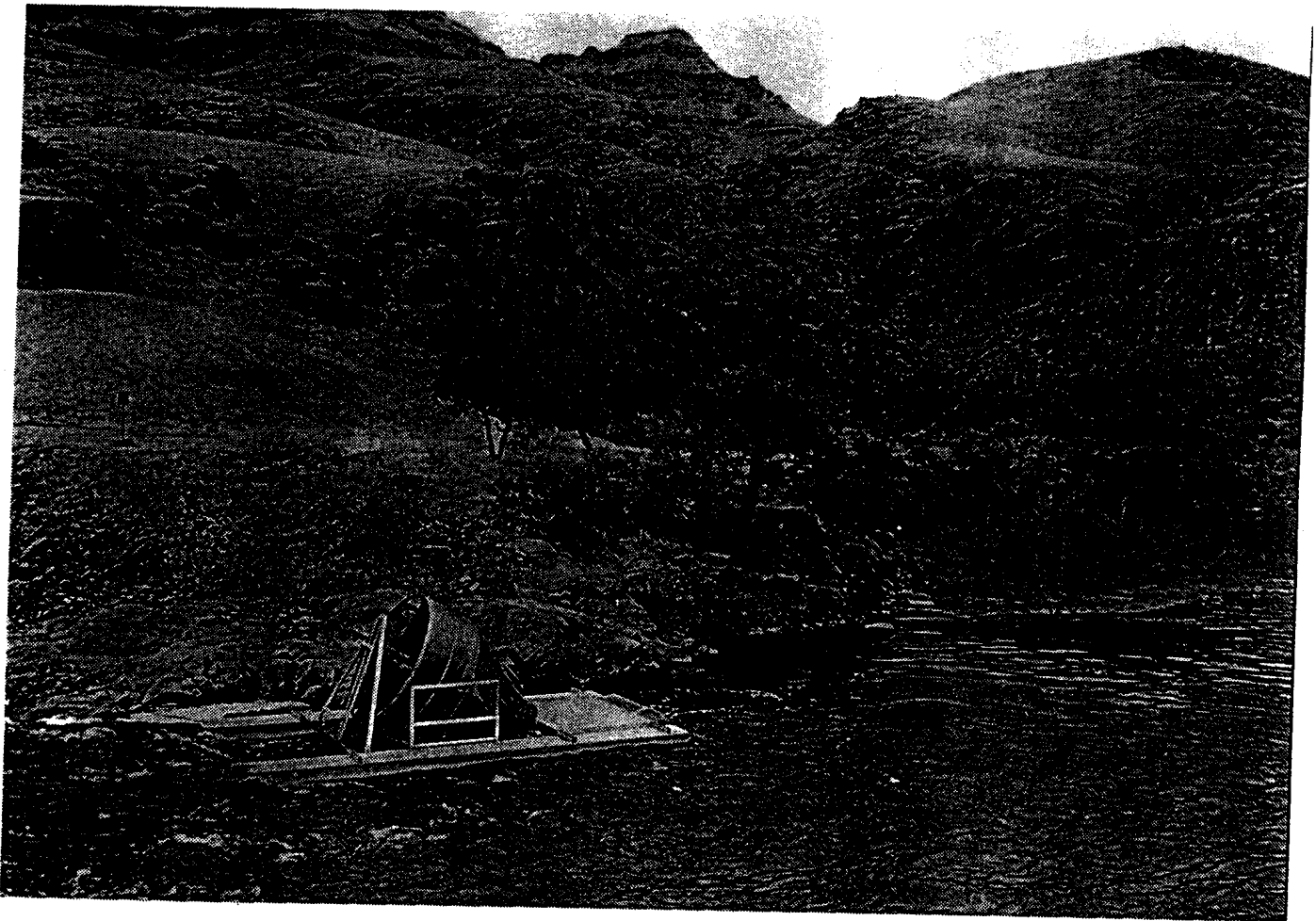
Chinook acclimation versus direct stream release studies were initiated at the Imnaha facility with BY1990 progeny releases. Because too few broodstock returned in 1991, acclimated vs direct released smolt studies could not continue with the 1993 releases.

Spring chinook size at release experiments (24 vs 12 fpp) continued in 1993 with smolt releases into the Imnaha River. The last size experiment releases from Lookingglass FH (Rapid River stock) occurred in 1992. Outmigration timing and survival and adult return rates of past releases are currently being compiled and evaluated for both Imnaha and Rapid River stocks.

Because of the low BY1991 returns, most Rapid River stock fish were reared at 50 percent of normal densities at Lookingglass FH. A test group was reared at

normal density to compare the two. The fish were released in April 1993 as smolts; a similar study is planned for BY1992.

In 1990 a study was initiated to develop a discriminate function model based on scale growth patterns to allow identification of hatchery and wild-origin adult salmon at Lower Granite Dam and points above (e.g. hatchery racks, spawning grounds). This effort was continued in FY1993 and incorporated Idaho's scale collection effort (as noted above).



The Nez Perce Tribe, in cooperation with Oregon Dept. of Fish and Wildlife, is operating a trap in the Lower Imnaha River to capture migrating natural and hatchery-reared juvenile chinook and steelhead. In addition to obtaining migration time and size data, tribal biologists are marking and PIT tagging some migrants and calculating recovery rates at other traps and several Snake and Columbia river dams.

Two new evaluation projects were initiated by ODFW in 1992 and continued in 1993. The first was to develop a Snake River chinook life-cycle model to evaluate combinations of downstream migration, upstream migration, harvest, and production management measures with respect to rebuilding depressed runs. The study will take about three years to complete and will provide a means to analyze various recovery proposals for listed Snake River stocks.

ODFW's other second year study is to identify the characteristics and interactions of residual steelhead with natural chinook in N.E. Oregon. ODFW's 1993 objectives were to 1) define spatial and temporal distribution and abundance of juvenile chinook and residual steelhead, 2) evaluate predation by hatchery-reared steelhead on juvenile spring chinook, and 3) describe characteristics of steelhead which residualize.

WDF's Evaluation Study Program

The WDF field evaluation program was initiated in 1985 when a principal investigator was hired and stationed in Dayton, Washington. Their 1993 studies combine fall and spring chinook under one multiple-objective study including 1) monitoring and evaluation of hatchery practices, juvenile outputs, adult returns, and contribution to fisheries; 2) time, size, and location of release studies; and 3) evaluation of impacts of hatchery releases on wild chinook stocks. Because the hatchery stocks are comprised entirely of endemic fall and spring chinook stocks, special attention is being paid to quantifying and monitoring genetic variables in each population.

As has been true for the last several years, major efforts were taken in 1993 by evaluation and hatchery staffs to identify the origin of fall chinook broodstock captured at Ice Harbor and Lower Granite Dams and returning to the Lyons Ferry ladder. WDF is trying to ensure that future broodstocks contain no non-endemic fish as has happened in some past years. All Lyons Ferry FH fall chinook releases are being marked so Lyons Ferry origin adults can be identified in future returns.

Spring chinook BY's 1990 through 1993 have been used to conduct a controlled mating study. WDF is attempting to determine if there are measurable genetic or survival differences between progeny of hatchery x hatchery and natural x natural single pair matings. As in previous years, these crosses will be compared through the hatchery rearing period and uniquely marked to determine adult return rates.

A major activity initiated in 1989 and continued in 1993 involved radio tagging and tracking wild and hatchery adult spring chinook above the Tucannon FH weir to determine movement; spawning time; and location, survival, and spawning success. With the completion of a new weir in 1990, and further modifications in 1991, biologists have been able to enumerate all returns, both wild and hatchery, and select a predetermined proportion of both wild and hatchery-origin fish for the hatchery use and for upstream release.

A study was initiated in 1993 to evaluate the effectiveness of outplanting spring chinook adults and presmolts to increase spawner density in the upper Tucannon River. Adults were radio-tagged, transported and monitored until spawning. Juvenile "scatter plant" releases are planned for October 1993.

Other studies initiated in previous years and continued in 1993 included determining smolt outmigration timing and relative survival from Tucannon and Lyons Ferry FH's, comparing fall chinook on-station vs barged (below Ice Harbor Dam) yearling releases, comparing fall chinook yearling vs subyearling

releases, determining the extent and cause of prespawning mortalities of adult spring chinook, estimating production and migration timing of naturally-produced Tucannon River spring chinook, collecting spring and fall chinook stock profile data (meristic, morphometric, electrophoretic monitoring), and cryopreserving spring and fall chinook milt.

WDW's Evaluation Study Program

WDW's evaluation program is conducted under one study, Lyons Ferry FH Evaluation Study - Steelhead. This long term program includes objectives for evaluating both the steelhead and resident trout hatchery programs, with the steelhead objectives having the highest priority and requiring the most funding (over 90 percent of the total). An additional objective initiated in 1991 and continued in 1993 is similar to IDFG's 1992 residualism studies and ODFW's ongoing efforts to investigate interactions of hatchery-reared steelhead and resident trout and natural chinook.

The hatchery evaluations and related field studies at Lyons Ferry FH's and Tucannon FH have been underway since 1983, when the steelhead and trout production programs were initiated. Major concerns which have surfaced as a result of evaluations have been the large numbers of residuals below some satellite release facilities, lower than expected returns to the Tucannon River (from Curl Lake releases), and poor fall/early winter returns to the Cottonwood Pond area (Grande Ronde River). In addition, surveys since 1986 showed large portions of the Lyons Ferry FH and Curl Lake-released fish are returning above Lower Granite Dam, well above their release sites. A WDW/ODFW radio tagging study conducted several years ago confirmed that many Lyons Ferry and Tucannon River adult returns are wintering above Lower Granite; and, although some drop back to the dam, most fail to return to their release area.

Studies initiated in 1992 at Curl Lake, to compare volitional releases with direct stream releases into the Tucannon River, were continued in 1993. The hypothesis is that poor outmigration survival and homing and perhaps high residualism rates may be related to method of release. The direct stream releases will be compared to acclimated releases when data becomes available on outmigration success, adult returns, and stray rates. A second direct vs acclimated study was conducted in 1993 at Dayton Pond on the Touchet River.

In an effort to directly reduce residualism in 1993, WDW tested a method which could actually reduce the number of fish planted that are likely to residualize. This was done by preventing juveniles from leaving the Curl Lake when 80% of the fish remaining in the pond during the volitional release were males and a high percent were precocious. In past years all fish were forced into the river when volitional movement had ceased. A preliminary assessment of results indicated this method had reduced the number of residuals in the river.

Development of endemic wild broodstocks may also result in improved homing behavior of hatchery-reared fish. WDW captured wild broodstock on the Tucannon River in 1992 and again in 1993 for rearing, release, and comparison to existing hatchery broods during migration (with PIT tags) and at adult

return. Although a similar program was delayed for Touchet River in 1992, the logistics of trapping and handling fish were tested there in 1993.

Tribal Evaluation Study Programs

In 1986 the LSRCP office initiated funding for tribal involvement in the LSRCP program. Because the Tribes do not operate any LSRCP propagation facilities and because their primary concerns are for the compensation of tribal fisheries and natural production, their projects are oriented toward evaluating the implementation and success of the program rather than solving fish culture problems.

Nez Perce Tribe

The Nez Perce Tribe (NPT) initiated their **Nez Perce Tribe LSRCP Evaluation Study** in 1986 and continued it in 1993 to develop tribal stocking and outplanting priorities, monitor tribal harvest, evaluate effects of hatchery plants on native production, and assist IDFG, ODFW, and FWS in their evaluation studies. The NPT's major initiative in 1991 was to develop a long-term plan for monitoring natural production in the Imnaha River. The plan was closely coordinated with ODFW and the CTUIR, completed in late FY1991, and funded for field studies in 1992 and 1993.

While tribal planning, coordination, natural production, and harvest monitoring efforts continued in 1993, their major field activities this past year again involved the long term Imnaha River study. NPT continued the use of rotary screw traps in the Imnaha River to monitor juvenile chinook migration timing and survival in the Imnaha River and use of PIT tags to estimate migration timing and interrogation rates of outmigrants to the Snake and Columbia river dams. The Imnaha River study objectives in 1993 were to: 1) determine the timing of migration and travel time of natural vs hatchery-rearing chinook and steelhead and 2) compare survival rates during migration of several life history stages of natural and hatchery-produced juveniles. The latter objective is proving difficult to achieve with available funding and equipment and will be revised in FY1994.

Confederated Tribes of the Umatilla Indian Reservation

The Confederated Tribes of the Umatilla Indian Reservations (CTUIR) became cooperators in the LSRCP Program for the first time in FY1987 (they were subcontractors of the Nez Perce in 1986). The CTUIR biologist, assigned to the LSRCP program, works for the LSRCP ODFW research coordinator because of the close coordination required for their joint studies in Oregon. The CTUIR initiated studies in late FY1989 and continued with 1993 funds to assess smoltification stresses of steelhead released at Wallowa FH and spring chinook at Lookingglass FH. The CTUIR's new initiative for 1991, which continued in 1993, was a program to evaluate the success of reestablishing a naturally reproducing population of spring chinook in Lookingglass Creek. A study plan was drafted in FY1992 and continued to undergo review and revision in 1993. The program was initiated with the release of Lookingglass FH/Rapid River

stock above the weir and the monitoring of their movements and spawning effort. As soon as necessary permits are obtained, CTUIR will install a rotary screw trap in Lookingglass Creek to obtain information on juvenile migration timing and survival and to trap migrants for marking and PIT tagging.

VI. FWS COOPERATIVE PROGRAMS

The LSRCP program funded a variety of studies with other FWS stations. Most can be categorized as evaluation studies and were funded to investigate and solve specific hatchery production problems or assist with ESA-related activities.

The IFRO was funded by the LSRCP program in FY1993 to conduct hatchery monitoring and evaluation studies at Dworshak and Hagerman NFH's. IFRO's program was similar to those conducted by the state agencies; and they, in fact, closely coordinate all work with IDFG. Their study, *Evaluation and Technical Coordination for FWS LSRCP Hatchery Programs*, is a long-term effort designed to: 1) define and solve cultural and management problems affecting LSRCP success (adult returns), 2) provide intra- and interagency coordination, 3) determine fishery contribution and escapements of Dworshak and Hagerman NFH's LSRCP programs, and 4) aid the NFH's with the development and maintenance of a database system for hatchery management.

The IFRO initiated a study in 1990 to determine optimum rearing densities for spring chinook at Dworshak NFH and continued with release of BY1990 smolts in 1992. This study parallels IDFG's Sawtooth FH density study (discussed above under IDFG). Due to insufficient returns in BY1991, no experimental density releases occurred in 1993. A pilot study was initiated in 1992 to determine the optimum time of release of Dworshak/Kooskia chinook production. The study continued in 1993 when smolts were CWTed and PIT-tagged and released from early April to early May (at one-week intervals) from Dworshak NFH. Emigration was monitored and adult returns will be assessed through 1997.

LSRCP funds were provided to the Dworshak Fish Health Center for diagnostic activities at Dworshak and Hagerman NFH's and for health monitoring coordination between State and Federally-operated LSRCP hatcheries. The Seattle National Fisheries Research Center, Willard Field Station, was funded for their assistance to LSRCP cooperators in analyzing blood and tissues as smoltification/stress indicators. FY1993 monies were also obligated to FWS's Office of the Columbia River Coordinator for their assistance to the LSRCP office on regional issues.

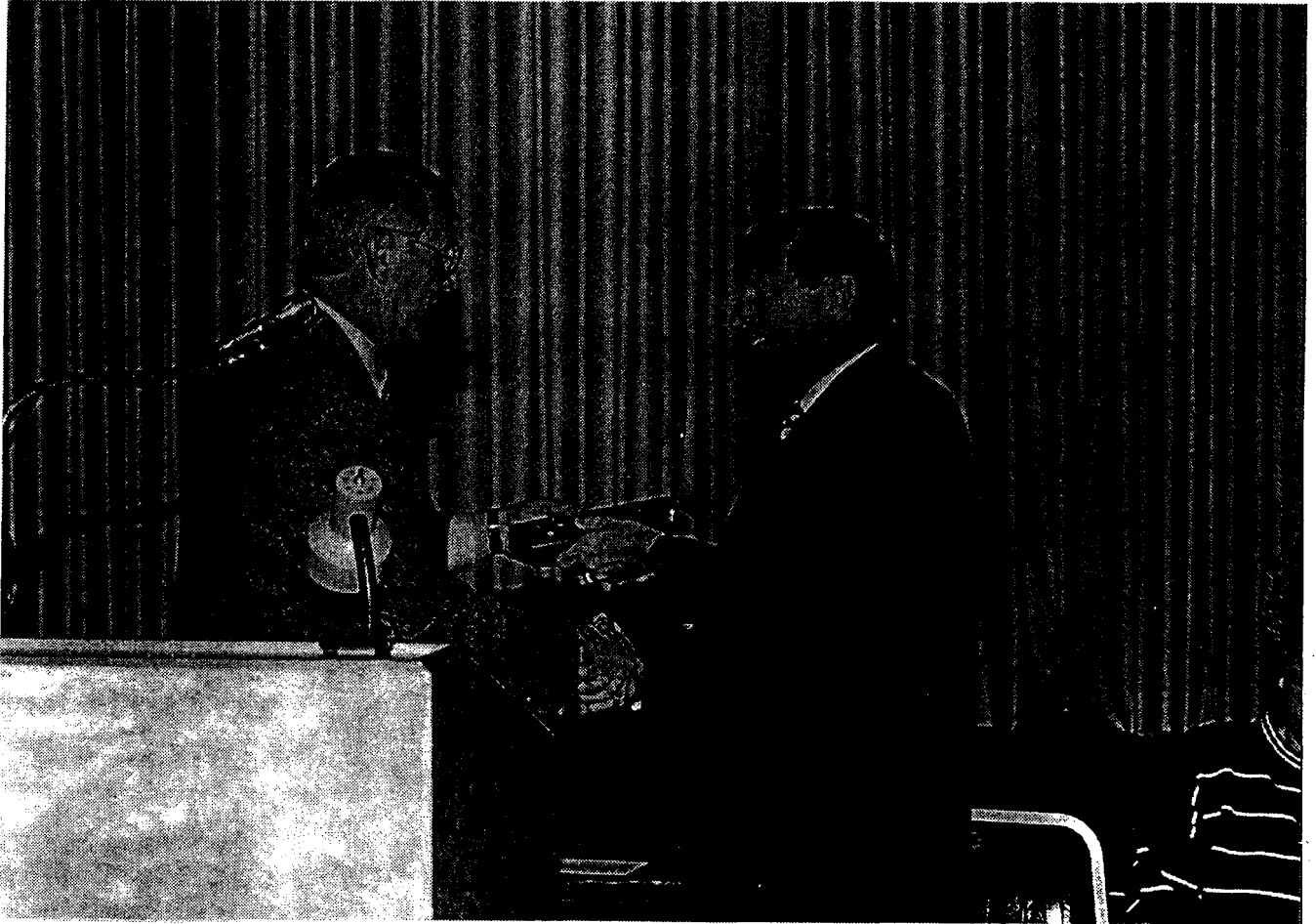
VII. OTHER COOPERATIVE PROGRAMS

IDFG, the Shoshone-Bannock Tribe, BPA, NMFS, and others are attempting to restore sockeye salmon runs to Redfish Lake. To assist in the restoration effort, facilities at Sawtooth FH are being made available for the sockeye

salmon propagation program which is funded by BPA. IDFG and the LSRCP Office also entered into an informal agreement which allowed the Sawtooth FH to act as a distribution point for catchable trout stocking in surrounding waters.

ODFW utilized several raceways at Irrigon FH to hold fall chinook salmon smolts scheduled for release in eastern Oregon and to serve as a catchable trout distribution point under the state's catchable trout program.

Cooperative agreements are in place with all State agencies for the temporary loan of equipment and vehicles between programs.



Joe McMichael a long time friend and principal moving force behind the construction of all LSRCP facilities retired from the U.S. Army Corps of Engineers, Walla Walla, Washington this year. The LSRCP Office presented him with a gift and a commemorative plaque for his outstanding contributions and service to the LSRCP program.

VIII. CORPS CONSTRUCTION ACTIVITIES

The Corps of Engineers has statutory responsibility to design and construct all LSRCP facilities. The LSRCP Office does not get deeply involved in this

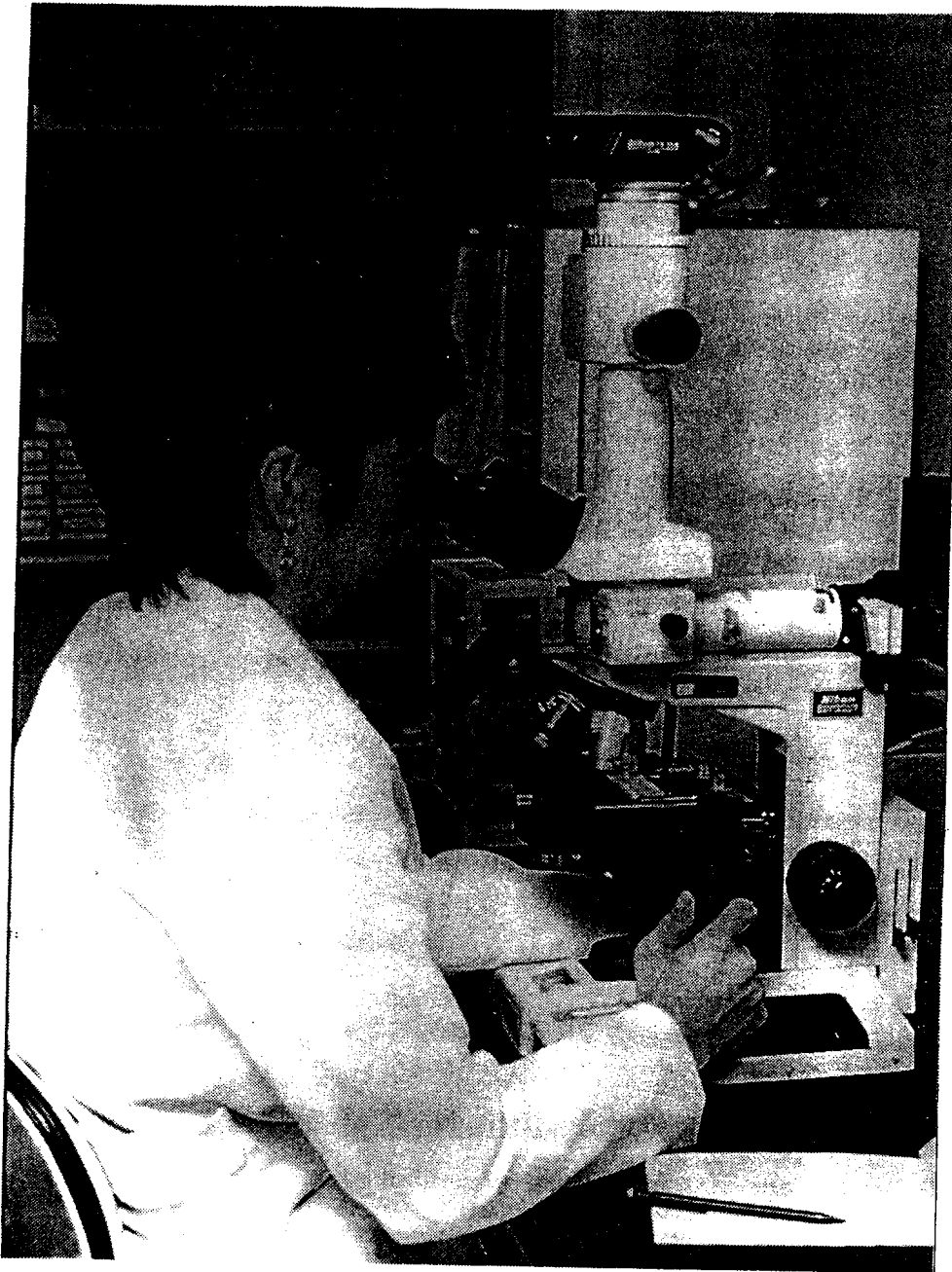
process although we do review designs and the Corps always seeks our advice, particularly on items which would affect operation and maintenance of a new facility.

Construction of the Clearwater FH, the last hatchery under the LSRCP, was completed last year. The Clearwater FH began operation by late winter and early spring of 1992. The manager moved on station October, 1991 and the staff moved on station shortly after October. The first water to the hatchery was turned on December 30, 1991 to test the system. Several problems were noted and corrected before fish or eggs were brought to the facility. On January 23, a test lot of rainbow trout eggs were brought into the hatchery. Several more problems, which were later corrected were noted. The first production lots of chinook and steelhead eggs were received in early spring and summer.

We have been negotiating with the Corps throughout the year to develop final clean-up contracts for all facilities that have been in operation 3 or more years. Completion contracts were advertised in FY1991 and 1992 for Irrigon, Lookingglass, Imnaha, Wallowa, Little Sheep Creek, Big Canyon Creek, Lyons Ferry, Tucannon, and Magic Valley. A clean-up contract will be developed for Clearwater FH after it has been operating for several years. Emergency clean up items were completed at Clearwater FH this year. The Corps also either began or completed the following clean up contract items:

- Lyons Ferry FH
 - Constructed dividing wall in each of two adult holding pounds.
- Wallowa FH
 - Repaired raceways, installed handrails, storage tank, completed miscellaneous electrical repair.
- Big Canyon Satellite facility
 - Remodeled existing building to create new storage area and shop, installed handrails and completed concrete repair.
- Irrigon FH
 - Developed third well, added emergency power to building and well #1 and 2.
- Lookingglass FH
 - Installed chiller
- Imnaha Satellite facility
 - Installed hand rails, concrete curb, stop waste valve, roof cover over electrical panel, jib crane at river intake, holding pond screens, constructed road to river intake structures.
- Magic Valley FH
 - Completed grading and landscaping, modified feed bins, miscellaneous electrical repairs.
- Powell Satellite facility
 - Miscellaneous raceway modifications, new storage building, modified existing office, house and shop building.
- Crooked River Satellite facility
 - Add new storage cabin near raceways, install drainfield, modify river intake, miscellaneous landscaping and electrical repairs.
- Clearwater FH
 - Repair main water supply pipeline valve.

Construction of the Eagle Disease Diagnostic Laboratory, Eagle, Idaho was completed in 1991 and it began full operation in mid 1991. The official dedication ceremony was held on October 25, 1991. The lab provides diagnostic services to all IDFG-operated LSRCP facilities in Idaho.



The LSRCP continues to fund disease diagnostic programs at Dworshak FHC and Eagle Lab in Idaho as well as Oregon Lab in LaGrande. Disease diagnostic, treatment and research are essential in operation of fish hatcheries.

Pertinent data relating to hatchery design and construction schedules and costs are included in Table 2. Approximate facility locations are identified on the LSRCP facility map (Figure 1).

IX. STAFFING

A total of 5.0 permanent full time (FTE) staff years are now being utilized for operation of the LSRCP Office.

LSRCP Boise Office employees as of September 30, 1993

Edouard J. Crateau, LSRCP Coordinator, GM-13
Daniel M. Herrig, Evaluation Study Coordinator, GS-12
Joseph J. Krakker, Fishery Biologist, GS-11
Lori R. Arden, Cooperative Agreement Assistant, GS-7
Tammy A. Froscher, Secretary, GS-6



LSRCP staff: bottom row Tammy Froscher, Ed Crateau, Lori Arden, top Joe Krakker and Dan Herrig.

X. FUTURE OUTLOOK

Although still in its infancy, the Lower Snake River Compensation Plan Program is well underway with the last hatchery, Clearwater, just completed. The Corps' contractor Morgan and Oswood, began construction of Clearwater FH in the spring of 1990 with completion in late 1991. All satellite facilities serving to support full hatchery production, by providing broodstock trapping and holding capabilities and smolt acclimation and release ponds, have been completed.

The Corps has in most cases done an excellent job in constructing and equipping LSRCP hatcheries and satellites facilities and, where problems have been experienced, the Corps has been willing to make the necessary repairs and changes in an attempt to help them reach their full capability. With the exception of the new facilities, the Corps advertised clean-up contracts on 11 facilities in FY1991, 1992, and 1993 and major changes and repairs were completed this year.

The adult steelhead return goals to the Snake River basin set in the original LSRCP were met in 1993 when approximately 113,000 steelhead returned to the mitigation area above Lower Granite Dam. Some difficulty is being experienced however in poor returns in some steelhead programs. Also, getting steelhead to return back at the right time and to the right place has been a problem.

As evidenced by the listing of naturally-produced fall and spring/summer chinook last year, we are experiencing difficulties in achieving programmed rates of return for hatchery chinook salmon. Changes are being made in rearing and release strategies which we hope will improve this situation, and research, to solve outmigration and disease problems that we hope will further improve our performance, is underway. In fact, most LSRCP chinook facilities are now operating under Section 10 enhancement and/or research permits under the ESA. These efforts to save listed stocks will also help to increase hatchery adult return rates.

Hatchery monitoring and evaluation programs are being improved, redesigned, and refined each year to assist hatcheries in providing the best rate of return of released hatchery smolts. We substantially increased funding for this phase of the LSRCP program in FY1993 and continued funding will be needed for an adequate hatchery evaluation program which ensures protection and enhancement of naturally reproducing populations.

The LSRCP is a relatively new program with the average age of hatcheries at only 8 to 9 years and satellite facilities about 7 years. This translates to less than two full chinook life cycles and two for steelhead.

We are optimistic about the future of the LSRCP Program and the general trends indicate increases in the return rates of steelhead which may exceed model predictions. The chinook salmon return rates and adult returns to the basin are currently below the level used to design the LSRCP facilities. Improved adult chinook return rates are expected with changes in production release

strategies, increased disease treatment and prevention, and improvements in smolt emigration.

XI. MEETINGS ATTENDED IN FY1993

10/05/92 NMFS Meeting, Portland, OR. Ed, Dan, Joe

10/05-09/92 Assisted Regional Office, Portland, OR. Tammy

10/07/92 Columbia River Coordination Meeting, Portland, OR. Ed, Dan

10/15-16/92 BA Meeting with LSRCP Cooperators, Boise, ID. Ed, Dan, Joe

10/19/92 Clearwater Completion Meeting with Corps, Orofino, ID. Ed

10/21/92 Property Procedures Review & Procurement Procedures Review with R.O. Staff (A. Molinar, J. Pitts, T. Swerdlik) in Boise, ID and gave tour of Magic Valley FH/Hagerman NFH. Tammy

10/22/92 Meeting on LSRCP Video with S. Dobert, R-1 personnel, and Cooperators, Portland, OR. Ed

10/26-29/92 Fisheries Information Workshop, Reno, NV. Ed

10/27-29/92 Evaluation Coordination Meeting, Status of Studies for OR, WA, ID, Troy, OR. Dan, Joe

11/04/92 Columbia R. Basin Project Leaders Meeting, RO staff Meeting on Section 7 process, Richland, WA. Ed, Dan, Joe

11/10/92 Meeting with D. Alfs on Magic Valley/Lyons Ferry FH brochures, Boise, ID. Ed

11/12/92 Meeting with Wally Steucke, CBFWA, discuss comprehensive hatchery evaluation, Boise, ID. Ed, Dan, Joe

11/17-18/92 Pathologist Meeting, Orofino, ID. Ed

11/19/92 Dworshak NFH Coordination Meeting, Ahsahka, ID. Ed, Dan

11/23-24/92 LSRCP Pathologist Meeting, Boise, ID. Ed

11/30-12/2/92 Property inventories at Clearwater FH and satellite facilities, Ahsahka, ID. Tammy

12/7-8/92 Meeting with NMFS regarding hatchery effects under ESA, Portland, OR. Dan, Joe

12/10/92 Meeting with D. Pitman, S. Kiefer, S. Yundt on ESA about Sawtooth and McCall FH's. Boise, ID. Ed

12/15/92 Meeting on Irrigon/Umatilla FH's Water Problems with Corps, ODFW & BPA, Portland, OR. Ed

12/16/92 Weir Workshop on examination of the use of barriers in fishery management with BPA & NMFS, Portland, OR. Joe

01/4/93 Meeting on AFS Hatchery role position paper discussion at USFS Research Station with USFS, IDFG & BSU, Boise, ID. Dan

01/5-6/93 Fisheries Information Workgroup, FIS Subgroup FWMA Computer Module, Denver, CO. Ed

01/11-12/93 Vision Management Team Meeting, Portland, OR. Dan

01/11/93 Meeting on ESA about Sawtooth FH water rights with S. Huffaker, B. Hutchinson & T. Rogers at IDFG, Boise, ID. Ed

01/14-15/93 Meeting with Corps on transfer of facilities and budget with J. Murray, S. Gail, G. Fisher in Walla Walla, WA. Ed

01/25/93 Meeting with AFS Ad Hoc Hatchery Roles Committee on AFS Roles of Hatcheries Position Paper, Boise, ID. Dan

01/26/93 Meeting with Boise ES Office on status of Comprehensive Biological Analysis of LSRCP Program, Boise, ID. Ed, Dan, Joe

01/28/93 Meeting with Salmon Recovery Team and LSRCP cooperators on role of FH's in recovery of listed chinook, Portland, OR. Dan

01/29/93 Briefing with S. Kiefer, IDFG on Salmon Recovery Team Meeting in Portland, OR. Ed, Dan, Joe

02/2/93 Meeting with Boise ES regarding Clearwater FH water supply hydro project, Boise, ID. Ed

02/3-5/93 Meeting with S. Dobert and Robert Wagner to record narrative for LSRCP Video, Pittsburgh, PA. Ed

02/8/93 Meeting with AFS Ad Hoc Committee on development of AFS position paper on roles of FH's, USFS Office, Boise, ID. Dan

02/9/93 Meeting with B. Hutchinson, IDFG on LSRCP Program and ESA recovery, Boise, ID. Ed, Dan, Joe

02/10/93 Hagerman NFH Coordination Meeting, Hagerman, ID. Ed

02/11/93 Meeting with R.O. personnel, Idaho Fishery Resources Office and Columbia River Coordinators Office on hatchery roles under ESA salmon listings, Boise, ID. Ed, Dan, Joe

02/18/93 Meeting with BPA, D. New, J. Marcotte, T. Clune, M. Nelson on LSRCP funding, Irrigon/Umatilla water supply, CBFWA biological analysis of hatcheries, Boise, ID. Ed

02/22/93 NMFS and LSRCP Cooperators on LSRCP BA consultation. Portland, OR. Ed, Dan, Joe

02/23/93 Meeting with COE and IDFG on cleanup contracts and FERC small hydro project on water supply, Ahsahka, ID. Ed

02/25-27/93 AFS Meeting, McCall, ID. Ed, Dan, Joe

03/1-2/93 Meeting with NMFS on Section 7 consultation and Columbia River Coordination Meeting, Portland, OR. Ed, Dan

03/3/93 Meeting with Boise ES on ESA Coordination, Boise, ID. Ed, Dan

03/16/93 Meeting with D. Alfs and B. Hutchinson on Magic Valley FH brochures, Boise, ID. Ed

Meeting with NPT and ODFW biologists on Imnaha River Studies, Lapwai, ID. Dan

03/17/93 Meeting with IFRO, R. Jones on LSRCP Evaluation studies at Dworshak NFH, Ahsahka, ID. Dan

03/18/93 Dworshak Coordination Meeting, Dworshak NFH, Ahsahka, ID. Dan

Meeting with D. Cannamela on IDFG evaluations, Eagle, ID. Joe

03/25-26/93 Vision Training Team Meeting, Portland, OR. Lori

03/31/93 Meeting with Boise ES, Columbia River Coordinators, IFRO, Lower Col. River FRO on Coordination of Columbia and Snake River issues, LSRCP Office, Boise, ID. Ed, Dan, Joe

04/5/93 Capitol High School Career Day, Boise, ID. Dan

04/6/93 Meeting with Wally Stueke, LSRCP Office, Boise, ID. Ed

04/12/93 Meeting with IDFG Research and Management on 1993 LSRCP/IDFG evaluation studies, Boise, ID. Dan, Joe

04/13/93 Columbia River Coordination Meeting, Portland, OR. Ed

04/13-15/93 Meeting with R. Jones on evaluation studies review, Orofino, ID. Joe

04/14/93 Meeting with IDWR, IDFG, COE, Montgomery Watson Engineers, BPA, NPT on small hydro operation on hatchery water supply, Orofino, ID. Ed

04/16/93 Meeting with D. Alfs on progress of brochures, LSRCP Office, Boise, ID. Ed

04/20-21/93 Meeting of Vision Management Team, Portland, OR. Dan

04/28-29/93 Teach a class at the Fisheries Academy, Leetown, W. VA. Dan

05/3-6/93 Fisheries Information System and Development of FWMA Module with Regional representatives from other regions and Washington Office, Bangor, Maine. Ed

05/10/93 Visa Card Training at Deer Flat Refuge, Nampa, ID. Ed, Tammy, Lori

05/17-20/93 Meeting with regional representatives from other regions and D.C. Offices, Ellsworth, Maine. Ed

05/27/93 Vision Management Team Meeting, Portland, OR. Dan

06/1-3/93 Meeting with FWS Fisheries, hatcheries, ES and FWMA D.C., NMFS on ESA on direct/indirect take, ESU definition in Washington, D.C. Ed, Joe

06/3/93 Meeting with S. Kiefer, B. Hutchinson, V. Moore on Section 10 permits for Sawtooth, McCall; ESA related management changes, evaluation programs at IDFG Office, Boise, ID. Dan

06/4/93 Meeting with L. Mellmer, J. Dinan, BPA on new method of applying differences on overpayments, Boise, ID. Lori

06/7/93 Meeting with Corps, B. Hutchinson to discuss clean-up contracts and transfer of property, Walla Walla, WA. Ed

06/8-9/93 Meeting with FWS/ES fisheries, D.C. and all regions to develop guidelines for the FWS in maintaining and propagating threatened and endangered species, Albuquerque, N.M. Joe

06/9/93 Meeting with ODFW personnel on screening and fish ladder problems that affect listed chinook at Wallowa FH, Enterprise, OR. Ed

06/17/93 Meeting with K. Holtz and S. Stone of NMFS on ESA issues in LaGrande, OR. Ed, Joe

06/18/93 Meeting with ODFW and NMFS on Lookingglass program, LaGrande, OR. Ed, Joe

06/19/93 Assist Dworshak NFH personnel with National Fishing Day Activities at Dworshak NFH, Ahsahka, ID. Ed, Joe

07/12/93 Meeting with S. Huffaker, A. Brunell Governor's Office, V. Moore, B. Goodnight, IDFG on LSRCP video and media event in Boise, ID. Ed

07/19/93 Meeting with D. Alfs on Lyons Ferry FH brochure text, LSRCP Office, Boise, ID. Ed

07/20/93 Meeting with B. Goodnight (IDFG) and D. Klinger (FWS) on LSRCP video premier arrangements, Boise, ID. Ed

07/22/93 Meeting with CBFWA and var. Federal, State and Environmental community representatives on FH comprehensive environmental analysis, Portland, OR. Ed

07/26-28/93 Property Inventories at Irrigon, Lookingglass and Wallowa Fish Hatcheries. Tammy

07/28/93 Meeting with ODFW, IDFG, NMFS and Corps on Lookingglass adult trapping and LGD and Lookingglass program, at Lower Granite Dam, WA. Ed

08/3/93 Meeting with T. Whitesel (ODFW) and P. Kucera (NPT) on NPT Imnaha River Studies, at Wallowa FH, Enterprise, OR. Dan

08/9-11/93 Property Inventories at Lyons Ferry Trout Hatchery, Lyons Ferry Salmon Hatchery and Tucannon FH, WDF Evaluation Personnel. Lori

08/17/93 Meeting with IDFG Research and Management personnel on FY1994 Evaluation Studies at IDFG Office, Boise, ID. Dan

08/18/93 Meeting with ODFW, NPT, CTUIR on Lookingglass FH production program at ODFW Regional Office, LaGrande, OR. Ed, Dan, Joe

08/20/93 Meeting with ES, B. Maxon (RO) on West Coast Anadromous Fish Restoration Initiative, Boise, ID. Ed, Dan, Joe

Meeting with IFRO, IDFG, NPT, ODFW, WDF representatives on fall chinook studies and status report, proposed studies, LSRCP Office, Boise, ID. Ed, Dan, Joe

08/27/93 Property Inventory at McCall FH and South Fork Satellite Facility. Lori

09/1/93 Meeting with D. Diggs, D. Kimball (R-5), J. Smith, Red Bluff, CA and S. Bream (WA), on review and change, interim artificial propagation policy, Portland, OR. Ed

09/2/93 Meeting with NMFS on review and comment on interim artificial propagation policy, Portland, OR. Ed

09/9-11/93 Meeting with other Federal and State Representatives on conservation biology of Endangered Pacific Salmonids, Bodega Bay, CA. Ed, Joe

09/10/93 Meeting with IDFG research personnel on IDFG's FY1994 evaluation project at IDFG Office, Boise, ID. Dan

09/13-17/93 Dan Acting for Chuck Dunn in Regional Office, Portland, OR

09/13/93 Assisted ODFW with spawning ground surveys on the Minam River, Imnaha River, and Catherine Creek in Oregon. Joe

09/14/93 Meeting with FWS on Tunnison Lab and its future related to our plans, Hagerman NFH, Hagerman, ID. Ed

09/16-17/93 Meeting with NMFS and LSRCP cooperators on 1994 BA and Section 10 permit applications, Portland, OR. Ed, Dan, Joe

09/20-24/93 Clearwater FH and Satellite facilities inventory. Lori

09/21/93 Meeting with all Columbia River Basin, Associate managers, FRO's OCRC, on issues in Columbia River Basin, Portland, OR. Dan

09/28/93 Meeting with R. Carmichael (ODFW) on FY1994 Evaluation Studies in LaGrande, OR. Dan

09/29/93 Meeting with B. Bugert, G. Mendel (WDF) on FY1994 evaluation studies, Dayton, WA. Dan

Meeting with FWS, IDFG and Idaho Aquaculture association, and Hagerman NFH Coordination Meeting, Hagerman, ID. Ed

09/30/93 Meeting with M. Schuck and A. Viola (WDW) on FY1994 evaluation studies, Dayton, WA. Dan

XII. TRAINING

Edouard Crateau
10/20-22/92 EEO Training, Deer Flat Refuge, Nampa, ID.

Dan Herrig
10/20-22/92 EEO Training, Deer Flat Refuge, Nampa, ID
03/24-26/93 Mid Career Retirement Planning, Portland, OR

Tammy Froscher
09/15-16/93 Decision Making and Problem Solving for Clerical Staff, San
Francisco, CA

XIII. AVAILABLE REPORTS

U.S. Fish and Wildlife Service Operation & Maintenance

- Bjornn, T.C. and R. Ringe. 1985. Fall Chinook Trapping at Ice Harbor Dam in 1980 (80165). Idaho Cooperative Fishery Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T.C. and R. Ringe. 1985. Fall Chinook Trapping at Ice Harbor Dam in 1981 (81127). Idaho Cooperative Fishery Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T.C. and R. Ringe. 1985. Fall Chinook Trapping at Ice Harbor Dam in 1982 (82265). Idaho Cooperative Fishery Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T.C. and R. Ringe. 1985. Fall Chinook Trapping at Ice Harbor Dam in 1983 (83160). Idaho Cooperative Fishery Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T.C. and R. Ringe. 1985. Fall Chinook Trapping at Ice Harbor Dam in 1984 (84122). Idaho Cooperative Fishery Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T. C. and R. R. Ringe. 1985. Fall Chinook Trapping at Ice Harbor Dam in 1985. Idaho Cooperative Fishery Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T.C. and R. Ringe. 1987. Fall chinook trapping at Ice Harbor Dam in 1986. Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T.C. and R. Ringe. 1987. Fall chinook trapping at Ice Harbor Dam in 1987. Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bjornn, T.C. and R. Ringe. 1989. Fall chinook trapping at Ice Harbor Dam in 1988. Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Idaho. 6 pp.
- Bruhn, D. 1983. Annual Report, FY 1983, Hagerman National Fish Hatchery. U. S. Fish and Wildlife Service, Hagerman, Idaho. 8 pp.
- Bruhn, D. 1985. Annual Report, FY 1984, Hagerman National Fish Hatchery, U.S. Fish and Wildlife Service, Hagerman, Idaho. 2 pp.

- Bruhn, D. 1986. Annual Report, FY 1985, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 6 pp.
- Bruhn, D. 1987. Annual Report, FY 1986, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho.
- Bruhn, D. 1988. Annual Report, FY 1987, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 13 pp.
- Bruhn, D. 1988. Annual Report, FY 1988, Hagerman National Fish Hatchery. U.S. Fish Wildlife Service, Hagerman, Idaho. 18 pp.
- Bruhn, D. 1989. Annual Report, FY 1989, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 19 pp.
- Bruhn, D. 1990. Annual Report, FY 1990, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 18 pp.
- Bruhn, D. 1991. Annual Report, FY 1991, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 20 pp.
- Bruhn, D. 1992. Annual Report, FY 1992, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 20 pp.
- Hesson, C.P., J. C. Lientz, G. Pratschner, and R. B. Roseburg. 1986. ELISA/FAT Comparisons for Bacterial Kidney Disease (BKD). U.S. Fish and Wildlife Service, Dworshak National Fish Hatchery, Ahsahka, Idaho. 12 pp.
- Kenworthy, B. 1993. Annual Report, FY 1993, Hagerman NFH. U.S. Fish and Wildlife Service, Hagerman National Fish Hatchery, Hagerman, Idaho. 18 pp.
- Lientz, J. 1988. Annual Report FY 1987, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 30 pp.
- Lientz, J., C. Hesson, and E. Steiner. 1988. Annual Report FY 1988, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 10 pp.
- Lientz, J. 1989. Annual Report FY 1989, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 53 pp.
- Lientz, J. 1990. Annual Report, FY 1990, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 65 pp.
- Lientz, J. 1991. Annual Report, FY 1991, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 41 pp.
- Lientz, J. 1992. Annual Report, FY 1992, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 54 pp.

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- Olson, W. 1982. Annual Report, FY 1981, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 47 pp.
- Olson, W. 1983. Annual Report, FY 1982, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 47 pp.
- Olson, W. 1984. Annual Report, FY 1983, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 50 pp.
- Olson, W. 1985. Annual Report, FY 1984, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 50 pp.
- Olson, W. 1986. Annual Report, FY 1985, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 51 pp.
- Olson, W. 1987. Annual Report, FY 1986, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 45 pp.
- Olson, W. 1988. Annual Report, FY 1987, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 63 pp.
- Olson, W. 1988. Annual Report, FY 1988, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 65 pp.
- Olson, W. 1990. Annual Report FY 1989, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 66 pp.
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- Olson, W. 1992. Annual Report FY 1992, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 84 pp.
- Olson, W. 1993. Annual Report FY 1993, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 94 pp.

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Evaluation Studies

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- Jones, R.N. 1994. An Evaluation of Rearing Density in Relation to Rearing Performance, Post-Release Performance and Adult Returns of Spring Chinook Salmon at Dworshak NFH, Idaho, 1993 Progress Report. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 30 pp.
- Jones, R.N. and D. Burum. 1994. Dworshak-Kooskia NFH Complex Spring Chinook Salmon Evaluation Program, FY 1993 Annual Report - June 1992 to May 1993. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 23 pp.
- Ketola, G. 1985. Study of the Etiology of Early Mortality in Spring Chinook Salmon (0009-1500). Tunnison Lab. Fish Nutrition. U.S. Fish and Wildlife Service, Cortland, New York. 50 pp.
- Miller, W. 1989. Annual Report, FY 1988, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 30 pp.
- Miller, W. 1989. Annual Report, FY 1989, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 37 pp.
- Miller, W. 1990. Annual Report, FY 1990, Idaho Fishery Resource Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 35 pp.
- Miller, W. 1992. Annual Report, FY 1991, Idaho Fishery Resources Office, U.S. Fish and Wildlife Service, Ahsahka, Idaho. 21 pp.
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- Miller, W. 1994. Annual Report, FY 1993, Idaho Fishery Resources Office, U.S. Fish and Wildlife Service, Ahsahka, Idaho. 42 pp.
- Miller, W.H. and D. Diggs. 1985. Annual Report, FY 1984, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 4 pp.
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- Miller, W.H. and S.M. Noble. 1985. IHN-Water Supply Study, Dworshak National Fish Hatchery, 1985. U.S. Fish and Wildlife Service, Fisheries Assistance Office, Ahsahka, Idaho. 20 pp.
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- Frew, T. 1986. Annual Report, McCall Summer Chinook Salmon Hatchery, 1984 Brood Year. Idaho Dept. of Fish and Game, McCall, Idaho. 26 pp.
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- Hutchinson, W. G. 1984. Annual Report, McCall Summer Chinook Salmon Hatchery, 1 Oct. 1983 - 30 Sept. 1984, (80002). Idaho Dept. Fish and Game, McCall, Idaho. 6 pp.
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- McGehee, J. 1991. Clearwater Fish Hatchery, Annual Report, 1991. Idaho Dept. of Fish and Game, Kamiah, Idaho. 4 pp.
- McGehee, J. 1992. Clearwater Fish Hatchery, Annual Report, 1992. Idaho Dept. of Fish and Game, Ahsahka, Idaho. 5 pp.
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- Rogers, T. L. 1984. Annual Report Sawtooth Hatchery, 1 Oct. 1982 - 30 Sept. 1983 (83103). Idaho Dept. Fish and Game, Boise, Idaho. 10 pp.
- Rogers, T. L. 1985. Annual Report Sawtooth Hatchery, 1 Oct. 1983 - 30 Sept. 1984 (83103). Idaho Dept. Fish and Game, Boise, Idaho. 20 pp.
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- Rogers, T. 1988. Sawtooth Fish Hatchery and East Fork Satellite, 1985 Spring Chinook Salmon and 1986 Steelhead Brood Year Reports. Idaho Dept. of Fish and Game, Stanley, Idaho. 26 pp.
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Table 1. LOWER SNAKE RIVER COMPENSATION PLAN ACTIVITIES FOR FY 1993.

INSTALLATION/PROGRAM	FUNDING LEVELS	SPECIES	TYPE	FISH RELEASED	
				NUMBERS	POUNDS
STATE OF IDAHO					
McCall FH	\$419,767	SuCS			
South Fork Satellite			Smolts	607,298	33,659
Sawtooth FH	\$732,700	SpCS	Smolts	161,500	6,403
			Fingerlings	613,100	24,524
East Fork Satellite		SpCS	Smolts	33,500	1,477
Magic Valley FH	\$849,104	STT	Smolts	1,925,700	334,500
Clearwater FH	\$1,036,266	SpCS	Smolts	6,000	380
Satellite Facilities		SpCS	Fingerlings	167,109	5,143
		STT	Smolts	326,300	35,030
Eagle Lab	\$275,130				
STATE OF OREGON					
Lookingglass FH	\$974,302	SpCS	Smolts	448,219	22,372
Imnaha Satellite			Smolts	157,659	9,015
Irrigon FH	\$1,167,101	STT	Smolts	416,392	78,325
Wallowa FH & Big Canyon Satellite		STT	Smolts	1,037,630	208,275
Little Sheep Creek		STT	Smolts	237,696	43,267
STATE OF WASHINGTON					
Lyons Ferry FH (WDF)	\$725,624	SpCS	Smolts	74,058	4,937
		SpCS	Fingerlings	57,316	1,592
		FCS	Smolts	760,018	66,914
		FCS	Fingerlings	206,775	3,390
Lyons Ferry FH (WDW)	\$1,155,573	STT	Smolts	1,045,016	205,315
		RBT	Catchables	115,448	59,640
		RBT	Fingerlings	219,882	6,689
Tucannon FH Satellite	\$248,554	RBT	Catchables	173,402	51,116
		RBT	Fingerlings	22,484	292
		STT	Smolt	4,602	767
FISH AND WILDLIFE SERVICE					
Hagerman NFH	\$553,700	STT	Smolts	1,487,842	308,520
Dworshak NFH	\$288,300	SpCS	Smolts	467,222	27,384
Dworshak FHC	\$57,820				
Columbia River Coord.	\$38,500				
CBFWA-CEA	\$929,500				
SNFRC-CRFS (Willard)					
Smoltification Analysis	\$7,600				
Dworshak SpCS Tagging (ESA)	\$116,700				
YCC Program	\$100,000				
Regional Office	\$421,000				
LSRCP Management/Coord.	\$317,550				
COOPERATOR EVAL ST.	\$2,149,589				
TOTAL OBLIGATED	\$12,564,380				

SPECIES SUMMARY:			
FCS	Smolts	760,018	66,914
FCS	Fingerlings	206,775	3,390
SuCS	Smolts	607,298	33,659
SpCS	Smolts	1,348,158	71,968
SpCS	Fingerlings	837,525	31,259
STT	Smolts	6,481,178	1,213,999
RBT	Catchables	288,850	110,756
RBT	Fingerlings	242,366	6,981
TOTALS		10,772,168	1,538,926

RBT-rainbow trout/FCS-fall chinook salmon/SpCS-spring chinook salmon/SuCS-summer chinook salmon
STT-steelhead trout.

Table 2. Pertinent Data for Lower Snake River Fish and Wildlife Compensation Plan Fish Hatchery Facilities.

Hatchery (Operator) ^a	Fish Type	Pound	Total Cost (\$1,000)	Satellite Facilities	Date of Completion	
Lookingglass (ODFW)	Spring Chinook	69,600	\$ 8,993	Big Canyon Ck. Imnaha	Nov. 82	
			\$ 2,763		Apr. 87	
			\$ 1,525		Jul. 89	
Irrigon/Wallowa (ODFW)	Steelhead	279,600	\$15,646	(Wallowa) ^b Little Sheep Ck (Big Canyon Ck)	Oct. 85	
			\$ 3,230		May 85	
			\$ 2,545		Aug. 87	
Lyons Ferry:			\$31,831 ^c			
Phase I (WDW)	Steelhead	116,400			Nov. 83	
	Trout	45,000				
Phase II (WDF)	Trout	41,000	\$ 801	Cottonwood	Feb. 85	
			\$ 1,182	Dayton Pond	Oct. 86	
	Fall Chinook	101,800	\$ 4,235	Tucannon FH	Nov. 84	
			\$ 230	Curl Lake	Feb. 85	
Spring Chinook	8,800			Nov. 84		
Sawtooth (IDFG)	Spring Chinook	149,000	\$13,543	E.Fk. Salmon R.	Jan. 85	
			\$ 2,067		Nov. 83	
Dworshak (FWS)	Spring Chinook	70,000	\$ 2,234		Nov. 82	
Clearwater (IDFG)	Steelhead	350,000	\$37,128	Red River Crooked River Powell	Dec. 91	
			\$ 1,651		Nov. 86	
			\$ 2,054		May 90	
Magic Valley (IDFG)	Steelhead	291,500	\$19,520	(Sawtooth) (East Fork)	Aug. 87	
Hagerman (FWS)	Steelhead	340,000	\$ 9,801	(Sawtooth) (East Fork)	Apr. 84	
McCall (IDFG)	Summer Chinook	61,300	\$ 5,741	S.Fk. Salmon R.	Sep. 81	
			\$ 1,149		Jul. 80	
Eagle Lab (IDFG)	Disease Diagnostic		\$ 1,300		Apr. 89	

^a ODFW - Oregon Department of Fish and Wildlife
 WDW - Washington Department of Wildlife
 WDF - Washington Department of Fisheries
 IDFG - Idaho Department of Fish and Game
 FWS - U.S. Fish and Wildlife Service

^b Parentheses used when dual-use hatchery/satellite is listed a second or third time.

^c Total cost of Lyons Ferry Phases I and II

Table 3. Hatchery or trap rack returns to LSRCP hatcheries operating in 1993.

<u>Species/Hatchery</u>	<u>Hatchery/Trap Adults</u>	<u>Returns Jacks</u>
Summer Chinook		
McCall FH/South Fork	2,675	28
Spring Chinook		
Clearwater FH ¹	1,025	16
Sawtooth FH	558	29
East Fork Trap	85	5
Lookingglass FH	1,004	16
Imnaha Trap	1,214	24
Big Canyon Trap	0	0
Dworshak NFH ²	815	
Lyons Ferry/Tucannon FH	429	19
Fall Chinook		
Lyons Ferry FH ³	1,332	273
Steelhead Trout		
Irrigon FH:		
Wallowa FH	1,353	
Little Sheep Trap	1,794	
Big Canyon Trap	370	
Lyons Ferry FH ⁴	3,940	
Hagerman NFH/Magic Valley FH ⁵	1,774	

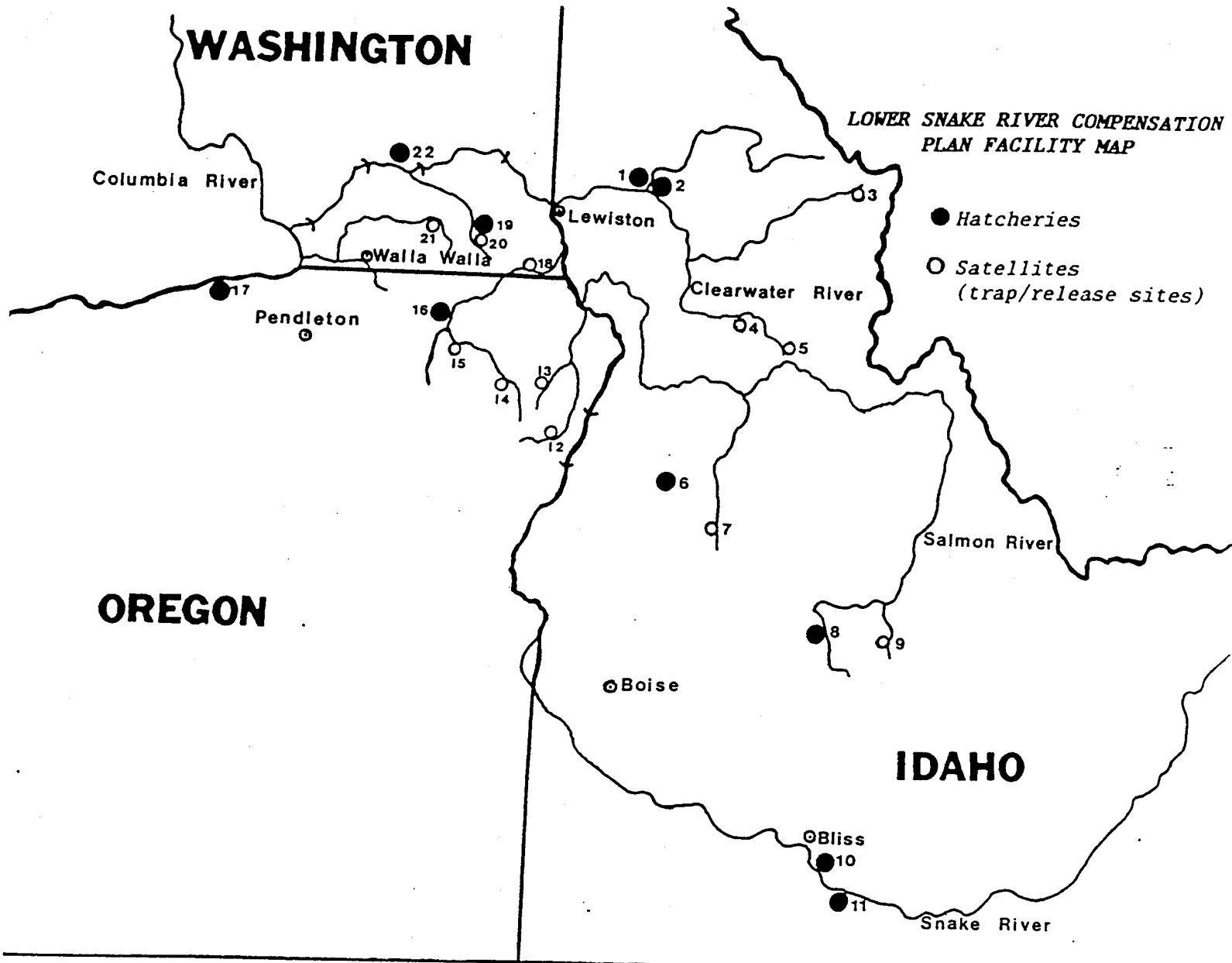
¹ Returns to Powell, Red River and Crooked River traps only.

² Dworshak and Kooskia returns.

³ Includes ladder returns plus Ice Harbor and Lower Granite trapping.

⁴ Ladder is only open for short period, many captures are strays.

⁵ Includes returns to East Fork, Sawtooth FH racks.



Operating Agencies

Idaho Department of Fish & Game

- 1. Clearwater FH
- 3. Powell
- 4. Crooked River
- 5. Red River
- 6. McCall FH
- 7. South Fork Salmon River
- 8. Sawtooth FH
- 9. East Fork Salmon River
- 11. Magic Valley FH

U.S. Fish and Wildlife Service

- 2. Dworshak NFH Expansion
- 10. Hagerman NFH

Oregon Department of Fish & Wildlife

- 12. Imnaha
- 13. Sheep Creek
- 14. Wallowa FH
- 15. Big Canyon
- 16. Lookingglass FH
- 17. Irrigon FH

Washington Department of Fisheries

- 22. Lyons Ferry FH - Salmon

Washington Department of Wildlife

- 18. Cottonwood Creek
- 19. Tucannon FH
- 20. Curl Lake
- 21. Dayton Pond
- 22. Lyons Ferry FH - Steelhead