

***LOWER SNAKE RIVER***  
***COMPENSATION PLAN PROGRAM***  
***ANNUAL REPORT***  
***FISCAL YEAR 1989***

Boise, Idaho

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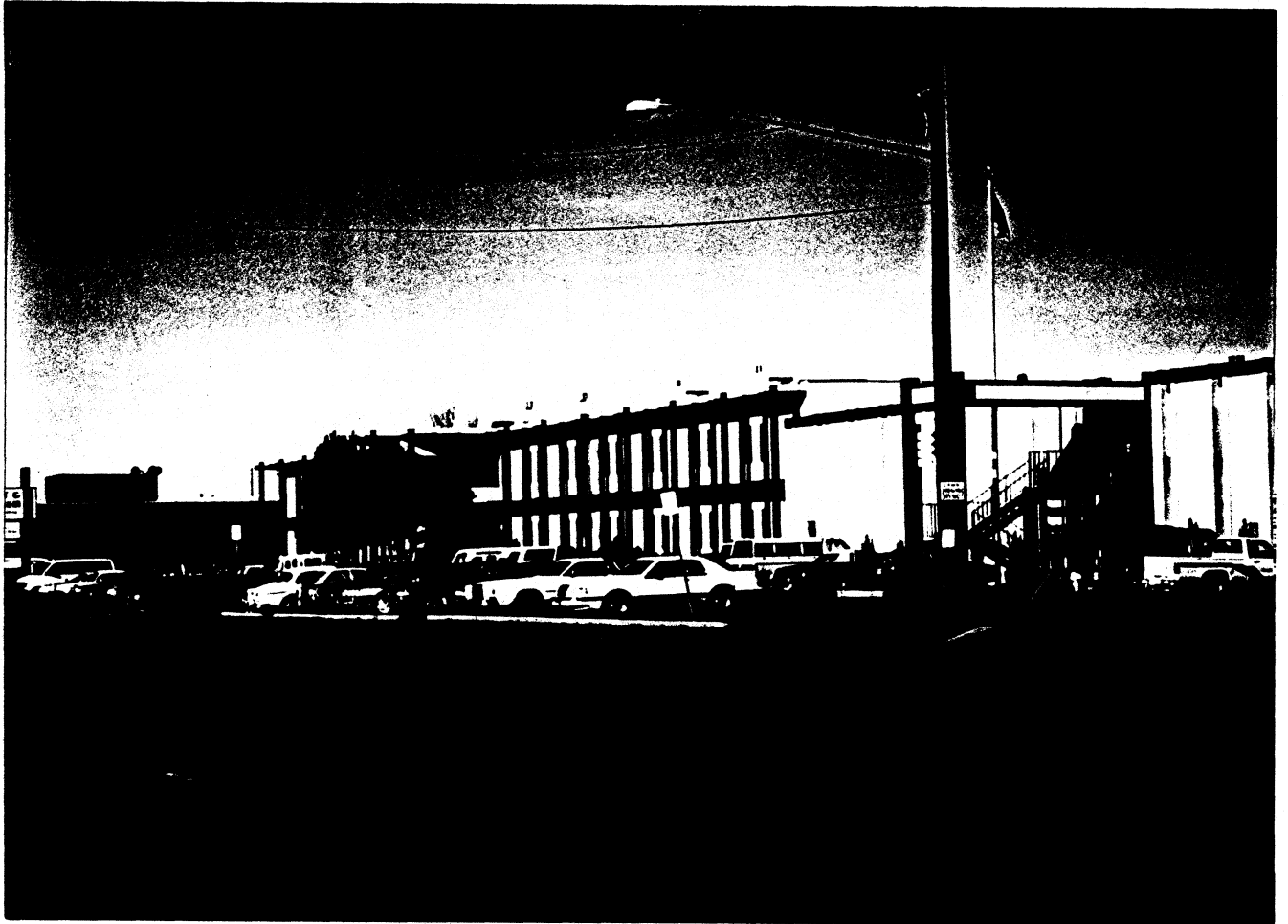
*This is a 1950's photo of the L&L Lumber Company Mill, owned and operated by Jesse and Clarence Lees from 1946 until 1952; which occupied the current hatchery site. Families of the sawmill operators often spent summers at the site. The land, which was owned by the Pierson's, was later sold to Boise Cascade Corporation.*

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## I. INTRODUCTION

Prior to 1982 all Lower Snake River Compensation Plan (LSRCP) business was conducted by the U.S. Fish and Wildlife Service's (FWS) Boise Area Office. In September 1982 the Boise Area Office was closed during the Service's reorganization and the LSRCP Office was established in Boise, Idaho. The LSRCP Office, currently staffed by a Project Leader, Assistant Project Leader, Cooperative Agreement Assistant, and a Secretary, has the responsibility for budgeting, planning and administering operational aspects, operation and maintenance (O&M) and evaluation funds for cooperative agreements under the LSRCP.



*The LSRCP Office is located in the Clint and Graham Building, 4696 Overland Road on the second floor in suite 560.*

The LSRCP program 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 four Snake River Dams, 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. Each dam is approximately 100 feet high and the four dams create a total of nearly 140 miles of reservoir from about 10 miles above the mouth of the Snake River upstream to Lewiston, Idaho. The lower most dam, Ice Harbor, was completed in 1961; the uppermost and last dam to be built, Lower Granite, became operational in 1975.

Between 1959 and 1963, the FWS conducted assessments and provided reports detailing the individual effects on fish and wildlife of the first three projects, Ice Harbor, Lower Monumental, and Little Goose. These reports were based on limited engineering and biological data and, as such, made only general recommendations regarding fish passage and artificial propagation. In a letter dated April 11, 1966, the Walla Walla District, U.S. Army Corps of Engineers (Corps), responsible for overseeing and constructing the four dams, requested that the Service produce a single report which would cover all Lower Snake River projects to meet the latest Fish and Wildlife Coordination Act (FWCA) requirements.

Between 1971 and 1972 the FWS, National Marine Fisheries Service (NMFS) and five fish and wildlife agencies in Oregon, Washington and Idaho collaborated to prepare a final report summarizing effects of all four projects. Based on the detailed FWCA report and additional supplemental reports, the Corps produced a "Special Report" in June 1975 and submitted it to Congress for authorization and funding 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 Walla District, 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, NMFS, and FWS; it stated that the FWS would budget for and administer O&M funding 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 report confirmed the 1977 NMFS/FWS agreement on Page 2, Section 4.d, "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 report noted 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." Consistent with the desires of the Administration and Congress, the Corps proposes to transfer fee titles of LSRCP fish hatcheries and satellite facilities to the FWS as they are completed and become fully operational.

The Corps' estimated cost for construction of the authorized LSRCP off-project fisheries facilities (hatcheries and related satellite facilities) is \$177 million; the FWS cost estimate for annual O&M is \$9.5 million. All anadromous

fisheries compensation and most resident fisheries compensation are allocated to project power costs and are reimbursed to the U.S. Treasury 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 requires expansion or construction of 12 hatcheries and 11 satellite facilities in Idaho, Oregon, and Washington. Idaho Department of Fish and Game (IDFG) will operate four hatcheries (including Clearwater Fish Hatchery after completion), 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 FY1989

Construction activities and large returns of adult steelhead highlighted LSRCP program activities this year. The Corps also continued to transfer facilities to the FWS after sufficient shakedown periods and completion of several projects to make the facilities fully operational.

The Clearwater FH design was completed by the Corps and by mid summer a contract for construction was awarded to Oswood and Morgan Construction Company, Great Falls, Montana. The contract award was celebrated with a ground-breaking ceremony at the site in August 1989, and construction began in the fall. The water supply design package was awarded to Montgomery Engineering, Boise, Idaho, and a 90 percent design level had been reached by the end of FY1989. Construction of the Crooked River Satellite facility, associated with the Clearwater FH, began this year and the satellite should be completed and operational by the summer of 1990. The completion of this facility will round out the full compliment of supporting satellites for the Clearwater FH.

A contract for construction of the Eagle Disease and Diagnostic Laboratory, Eagle, Idaho, was awarded to Caperal Construction Co. of Spokane, Washington, in 1989 with construction to begin in the spring of 1990. The completion of Clearwater FH and Eagle Disease Lab in 1991 will mark the end of construction activities associated with the LSRCP; approximately 12 years after the first facility, McCall FH, was built. The Corps has done an excellent job in constructing first class facilities under the LSRCP. Except for a few design and construction problems that have been noted after several years of operation and experience, little work remains for the Corps to complete their LSRCP obligations. The FWS and State cooperators are negotiating with the Corps to rectify the few problems that remain and as soon as these "clean-up" contracts are completed all facilities will be turned over to the Service.



*The Clearwater Fish Hatchery will be constructed on the site shown in this photo across the North Fork of the Clearwater River from the Dworshak NFH.*

Adult steelhead returns continued their upward trend, and all indications by the end of September were that this might be a record year or a close second to the 1986-1987 record returns. According to biologists, a large percentage of the returning steelhead were made up of "two" and "three" salt fish, and that between 80 and 85 percent of the returning steelhead had adipose fin clips indicating that they were raised at a fish hatchery.

Biologists attribute this years strong run to several factors: the large number of steelhead smolts successfully reared in mitigation hatchery facilities and subsequently barged downriver and released below Bonneville Dam by the Corps in 1986 and 1987; favorable survival conditions in the ocean; and ideal late summer water flows and temperatures in the Columbia and Snake Rivers that allowed fish to move quickly upriver and into Washington, Oregon and Idaho streams.

LSRCP facilities continued to produce and release large numbers of salmon, steelhead and rainbow trout as part of their mitigation responsibility. In

FY1989 nearly 16,500,000 fish, weighing approximately 1,800,000lbs. were released from LSRCP facilities. Magic Valley FH, in only its third full year of operation, produced approximately 509,000lbs. of steelhead smolts for the Salmon River drainage.

### III. STATION AND COOPERATOR OPERATIONS

The Lower Snake River Compensation Plan Office located in Boise, Idaho negotiated cooperative agreements with and administered funds to four State agencies, two Indian Tribes, the University of Idaho, and the FWS for operation and maintenance of fish hatcheries, hatchery operation studies and to conduct hatchery effectiveness evaluation studies and fish health programs. A total of \$5,256,839 was contracted to WDF, WDW, ODFW and IDFG and transferred to Dworshak NFH, Hagerman NFH and Dworshak Fish Health Center for operation and maintenance and fish health monitoring of 11 hatcheries and 10 associated satellite facilities. An additional \$1,112,679 was contracted to the same four State cooperators, Nez Perce and Umatilla Tribes, Dworshak Fisheries Assistance Office, Idaho Cooperative Fish and Wildlife Research Unit and the Seattle National Fisheries Research Center for hatchery effectiveness and evaluation studies. In addition the LSRCP Office administered one of the largest Youth Conservation Corps (YCC) programs in the country with 48 enrollees employed for an average of eight weeks. Total payroll and materials for this youth assistance program was \$74,000.

A total of 16,422,905 salmon, steelhead trout weighing 1,837,234 pounds were stocked from LSRCP facilities in FY1989. Below are brief summaries of hatchery and evaluation activities in FY1989. Table's 1 through 4 provide further data on funds obligated, fish stocked and mitigation goals.

#### Clearwater Anadromous Fish Hatchery - Idaho

Clearwater FH will be the last of the 12 hatcheries to be built as part of the LSRCP. The hatchery to be operated by the IDFG will be built across the North Fork of the Clearwater River from Dworshak National Fish Hatchery (NFH). It is designed to produce 1,369,500 spring chinook smolts weighing 91,300lbs. and 2,500,000 steelhead smolts weighing 350,000lbs.

To date, the Corps has purchased all the land (17.5 acres) needed for the hatchery site. The design of the hatchery (except for water supply features) is well underway and construction is scheduled to begin this fall. The water supply design has undergone preliminary design and review and must receive approval from the North Pacific Division. All fish hatchery construction design has been completed. A contract to construct was awarded this summer, and a ground-breaking ceremony was held August 18, 1989. Construction should be completed by mid-1991.

As proposed, the Clearwater FH will receive its entire water supply from Dworshak Reservoir via two pipes. The primary (and largest) line will take water from just below the reservoir's surface while a secondary (smaller) line will receive cold water from an intake deep below the water surface. A distribution tank near the hatchery will allow mixing of the water from the



two lines to select proper temperatures for various uses at Clearwater FH and provide a water supply line to Dworshak NFH (assuming a partial water supply for that facility is approved).

Several entities have submitted applications for issuance of a permit to study construction of a hydroelectric power plant off the secondary (or smaller) line using water requested for municipal use. The plan for power development can proceed independently of the hatchery design.

Three satellite facilities are associated with the hatchery: Red River, which was completed in November 1986; Powell, completed this summer and Crooked River, scheduled for completion in early 1990. Red River and Powell are now being operated as rearing, release, and trapping facilities using excess fish from either Sawtooth FH or Dworshak NFH. Crooked River will begin operation in a similar fashion even though Clearwater FH will not be on line when it is completed.

Red River trapped 101 adult spring chinook and 5 jacks this year, approximately 26 percent of the 394 adults collected last year; and 153,411 eggs were collected from 27 females. All eggs were shipped to Kooskia NFH for incubation. A total of 127 adults and 27 jacks were trapped at Powell, but because of construction all were released upstream. About 291,200 spring chinook smolts were volitionally released in the fall from the Red River rearing pond.

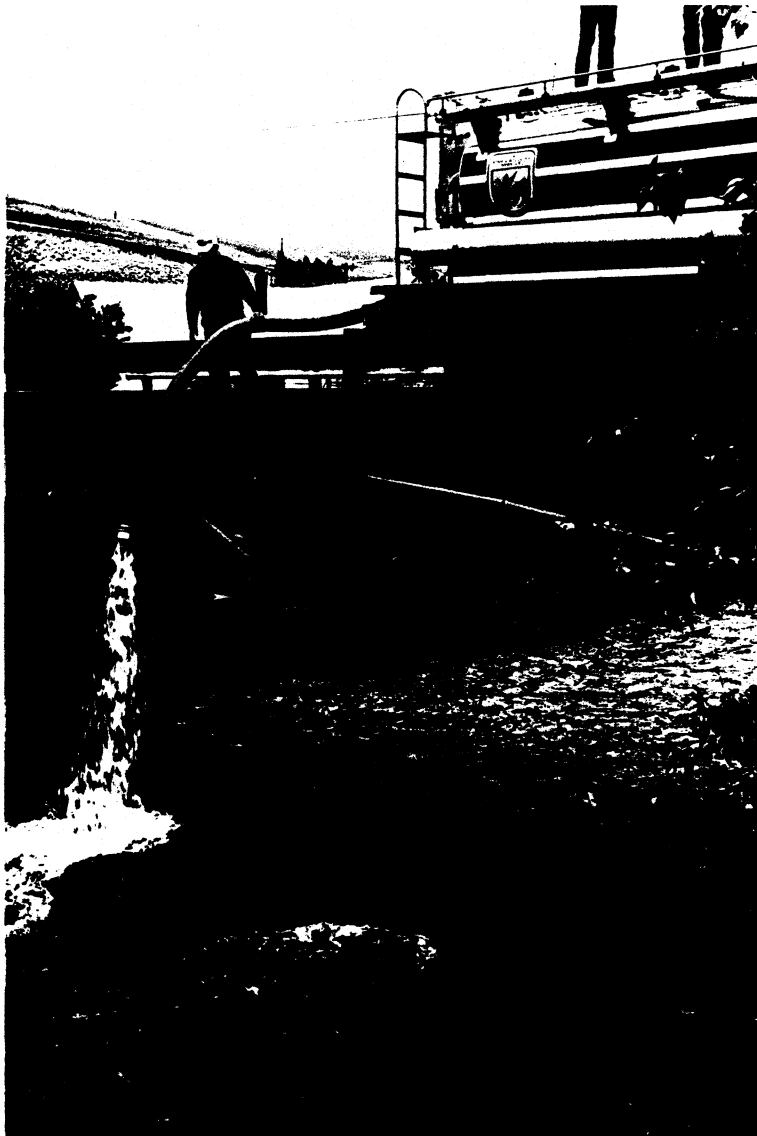
#### **Magic Valley Fish Hatchery - Idaho**

Located on the Snake River near Filer, Idaho, the hatchery operated by IDFG was completed in August 1987 at a cost of about \$10,800,000. It is designed to produce 2,000,000 steelhead smolts weighing 291,500lbs. annually.

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 the 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 (both completed) will serve as the juvenile release and adult trapping sites for the hatchery program. Magic Valley FH completed its second rearing season this year, and released approximately 2,200,000 steelhead smolts in April 1989, weighing 509,100lbs.

#### **McCall Fish Hatchery - Idaho**

The hatchery was completed in 1981 at a cost of \$5,453,000. Operated by IDFG, it is located along the North Fork Payette River near McCall, Idaho, with adult trapping facilities on the South Fork of the Salmon River (salmon do not have access to the Payette River system). McCall is designed to produce 1,000,000 summer chinook smolts weighing 61,300lbs. annually.



*Salmon and steelhead are released directly from LSRCP hatcheries or satellites after they are acclimated for various periods of time. A large number are stocked directly into streams at designated release sites. In 1989 approximately 500 separate trips were necessary to stock over 16,000,000 fish weighing nearly 2.0 million pounds.*

The hatchery has achieved considerable success with its summer chinook program, trapping 2,690 in 1986, 2,705 in 1987, and 2,393 in 1988. Typical of the low chinook run throughout the basin, only 939 fish (444 adults and 495 jacks) were trapped this year. In 1989, the hatchery took approximately 801,319 green eggs which will be substantially less than what is required to produce the desired smolts in FY1990.

The hatchery planted 975,000 brood year (BY) 1987 summer chinook salmon smolts weighing 46,850lbs. in the South Fork Salmon River in March 1989; this is

slightly less than the hatchery's goal of 1,000,000 smolts. An additional 501,883 BY1988 fry were planted in May and 290,000 BY1988 fingerlings were planted in August to reach the desired hatchery density for this lot. Some BKD related mortalities were experienced this year during CWT operations, but total mortality for the year was relatively low. McCall FH also has a concurrent federally-approved trout production program which is funded entirely by the IDFG.

In addition to the LSRCP program, the State conducts a FWS-approved sockeye salmon restoration project at the Federally-owned hatchery. That project is funded by the National Marine Fisheries Service.



*Although the adult chinook returns to upriver areas were low coast wide in 1989 some of the largest fish seen in recent years were trapped at Sawtooth FH. The largest chinook returns to Sawtooth were 4 feet long.*

### Sawtooth Fish Hatchery - Idaho

Sawtooth FH is operated by IDFG, located on the upper Salmon River near Stanley, Idaho and was completed in January 1985 at a cost of \$9,322,000. In addition to rearing 2,235,000 spring chinook salmon smolts weighing 149,000lbs. 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 NFH and Magic Valley FH and also serves as a stream release site.

The adult steelhead return to Sawtooth FH in 1989 was 994, about 20 fish more than last year, but less than half of the steelhead return of 2,187 in 1987. The East Fork Satellite station trapped 379 steelhead, 175 more than last year and 155 more than in 1987.

Spring chinook trapping and spawning ended in September with a total of 888 chinook trapped this year (412 were jacks) compared to 1,488 trapped in 1988. The East Fork trapped only 128 spring chinook this year compared to 548 in 1988. The adult return to Sawtooth FH and East Fork Satellite facility was typical of the low numbers that returned basinwide.

All BY1987 spring chinook were released in March 1989. Releases included 1,101,600 smolts into the Salmon River at the hatchery; 305,300 smolts into the East Fork; and 198,200 smolts into the Yankee Fork River. BY1987 fall fingerling plants (in October 1988) totaled 990,400 at Sawtooth FH. An additional 139,000 BY1988 fingerlings averaging 76 fish per pound (fpp) were released into the Salmon River this spring.

### Irrigon/Wallowa Hatcheries - Oregon

Irrigon FH is located on the Columbia River near Umatilla, Oregon. Operated by the ODFW, the hatchery was completed in October 1985 at a cost of \$8,117,000. Collector wells supply water for the entire program of 1,677,000 steelhead smolts (weighing 279,600lbs.). An expansion of ODFW's Wallowa FH was completed in May 1985 at a cost of \$2,206,000. 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 1989 a total of 1,162 steelhead returned to the Wallowa FH which was approximately 56 percent of the number of returns in 1988.

Two other acclimation, advanced rearing, and trapping sites, satellites of the Irrigon FH, were in operation in 1989. Big Canyon Satellite is located at the mouth of Big Canyon Creek on the Grande Ronde River. It was completed in April 1987 at a cost of \$1.8 million and is capable of holding and releasing 225,000 smolts. Eighty-five adults returned to Big Canyon in 1988 and 216 adults returned 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. The satellite was completed and became operational in August 1987 at a cost of 1.78 million; the site has been used for trapping and releasing for several

years. In 1987, 730 steelhead returned to the trap; in 1988, 286 summer steelhead were trapped; and this year 322 adults returned to the Little Sheep Creek weir.

Releases for 1989 of Irrigon-reared fish included about 545,711 Wallowa stock steelhead from the Wallowa FH rearing ponds, 249,456 Imnaha stock steelhead from the Little Sheep Creek site, 224,696 Wallowa stock from the Big Canyon site, and 644,104 at various stream sites.

#### Lookingglass Fish Hatchery - Oregon

This hatchery is located on Lookingglass Creek north of Elgin, Oregon, and was completed in November 1982 at a cost of \$6,324,000. The hatchery is operated by the ODFW and is designed to produce 1.4 million spring chinook smolts weighing 69,600lbs. Two satellites, Big Canyon Creek (discussed above) and a renovation of Oregon's Imnaha trapping site, which was completed last year, are a part of the hatchery program.

Adult spring chinook trapping went well this year with a total of 437 fish collected at the Imnaha trap (288 adults and 149 jacks) and 1,053 adults and 52 jacks returning to the Lookingglass trap. The Lookingglass return was about 41 percent of the 1988 return. A total of 1,467,700 eggs were taken from females spawned at both facilities.

BY1987 spring chinook releases from Lookingglass FH totaled 818,186. These releases included 417,354 Rapid River stock into Lookingglass Creek in April 1989, 86,310 Rapid River stock into Lookingglass Creek in November 1988, 172,202 Lookingglass stock from the Big Canyon Creek acclimation pond, and 142,320 Imnaha stock from the Imnaha River Satellite facility after acclimation. An additional 126,700 zero-age, BY1988 Rapid River stock fingerlings at 36.2 fpp were released into Lookingglass Creek.

Some rearing problems are being experienced at Lookingglass FH which may require some additional raceway space, additional warm (well) water for inside rearing, and more water to the raceways. The Corps, FWS-LSRCP Office Coordinator, and ODFW personnel are currently working out the details for hatchery modifications.

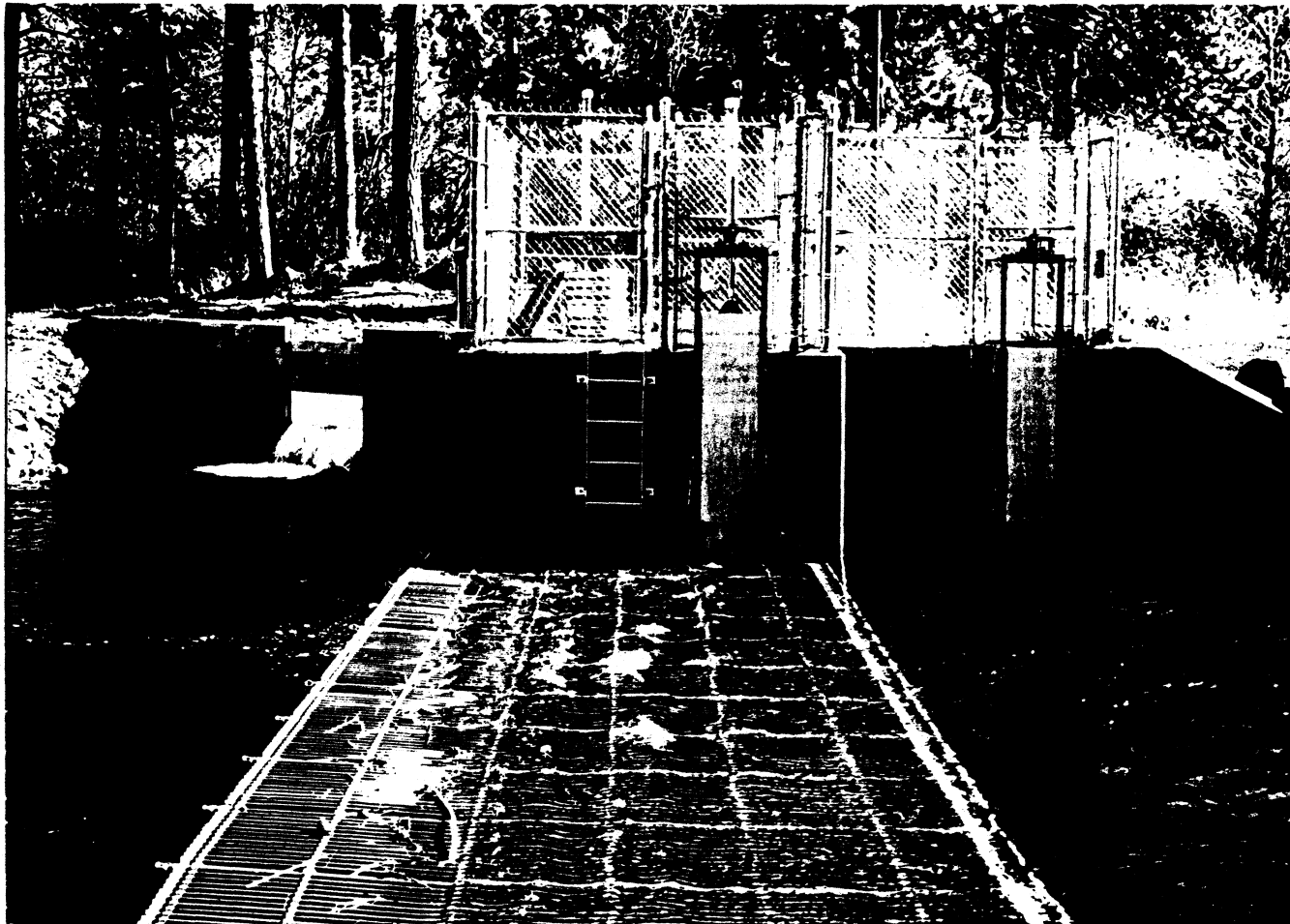
#### Lyons Ferry/Tucannon Fish Hatchery Complex - Washington

Located at the confluence of the Palouse and Snake Rivers, the Lyons Ferry facility is two hatcheries in one. Phase I was completed in November 1983 and is being operated by WDW. It is designed to produce 1,169,500 steelhead trout smolts weighing 116,400lbs. and 45,000lbs. of rainbow trout.

Phase II of Lyons Ferry was completed in November 1984 and is being operated by WDF. It is designed to produce 9,162,000 fall chinook smolts weighing 101,800lbs., and 132,000 spring chinook smolts weighing 8,800lbs.

A renovation of Tucannon State Fish Hatchery was completed in November 1984 to rear an additional 41,000lbs. of rainbow trout for WDW and to serve as an adult trapping and smolt release site for WDF's Tucannon River spring chinook

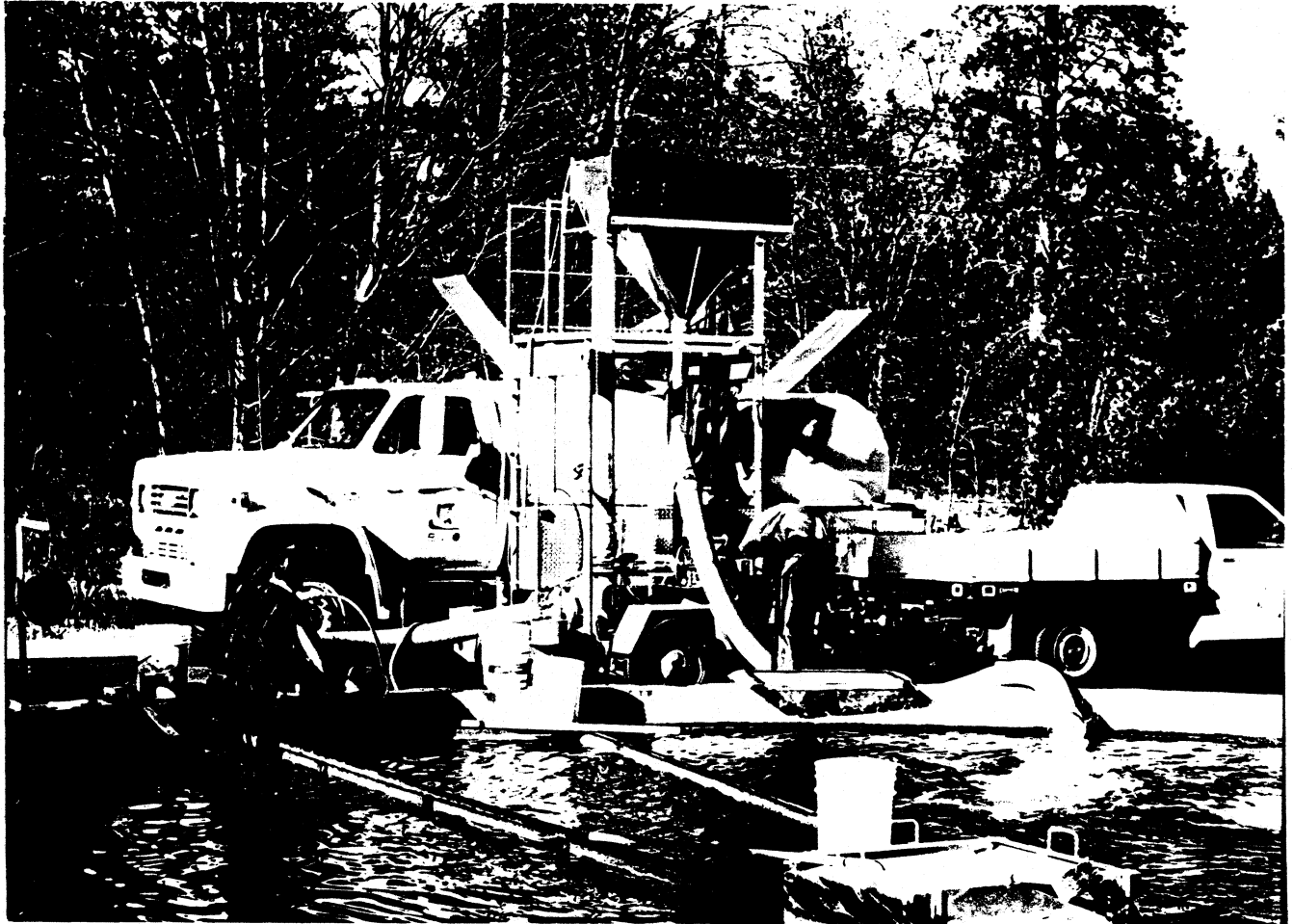
program. The remaining 7,000lbs. of rainbow trout production stipulated in the compensation plan (the total requirement is 93,000lbs.) is to come from stream enhancement structures funded by the Corps, and constructed by WDW. The WDW personnel operate the Tucannon FH in cooperation with WDF as a satellite of Lyons Ferry Phases I and II.



*A new adult fish trap and weir, designed by the Corps of Engineers from a combined Alaska and Japanese concept, was installed in the Tucannon River this year. This floating weir, a relatively new technology, will be used to trap spring chinook salmon adults for enumeration, spawning and release upstream. Floating weirs are self cleaning, have the capability to self adjust to varying flows and velocities and are easily installed each year.*

Constructed at a cost of \$20,503,000, the hatcheries along with the Phase I (steelhead) satellite facilities at Cottonwood Creek, Dayton Pond, and Curl Lake are complete. Some problems still exist, however, which need to be addressed. For example, suspended manganese in the water supply system at Lyons Ferry, particularly in the Phase II raceways, appears to be a problem for juvenile fall chinook. The manganese may be irritating the gills and

causing gill hyperplasia and fusion. In the past, pond losses in early spring under light loading densities have been over 8 percent in some raceways. This year the WDF conducted tests with various loading densities to determine the cause of the losses and help define the potential impact of the problem. The results of these tests were inconclusive and there was no apparent relationship between loading densities, manganese, and bacterial gill disease. Additional tests and further investigations will be conducted this year. Straying of Lyons Ferry steelhead adults also continues to be a major problem for WDW's steelhead program.



*Washington Department of Wildlife designed a new 1,500 gallon aluminum insulated fish hauling tank in 1989. The tank, built by a contractor, will be used jointly by Tucannon and Lyons Ferry Steelhead and Chinook Fish Hatcheries for their resident trout, salmon and steelhead stocking.*

The temporary weir on the Tucannon River at the Tucannon FH failed in May 1987 when high flows caused the streambed to scour beneath the rack. Concern over continued problems during high flows has caused the WDF and WDW to request the Corps to construct a more permanent facility. Discussions occurred in 1988 to select a new site for installation of a more permanent weir. The Corps designed a floating type weir which was installed this fall. This new weir should be able to handle the spring flows.

Spring chinook returns to the Tucannon trap and weir totaled 87 in 1989, down substantially from the 273 adults trapped last year. Thirty-one females were spawned in five egg takes resulting in an egg take of 148,000. This egg take should meet production requirements this year.

This year adult fall chinook were trapped at the Lyons Ferry FH and at Ice Harbor Dam and transported to Lyons Ferry FH for holding and spawning. A total of 1,178 adult fall chinook were collected at the dam, the second highest number of fish transported in the 13 years of trapping. An additional 563 adults and 531 jacks volunteered to the hatchery ladder.

Because of the large numbers of stray steelhead that return to the Lyons Ferry ladder in the fall (when it remains open for fall chinook returns) and spring, all steelhead are checked for Lyons Ferry brands and a portion of the early returns (including branded fish) are selected for spawning in the fall with the remaining fish collected in the spring. In FY1989, 243 female steelhead were spawned for a take of 1.26 million eggs. A severe outbreak of IHN occurred at Lyons Ferry FH this year and all steelhead were destroyed or stocked into land-locked lake systems. The source of infection remains somewhat of a mystery in view of the fact that all disease prevention protocol was followed and the hatchery operates on a total closed water system. Approximately 66 percent of the losses have been made up from other sources in Washington and Idaho. Lyons Ferry FH will be unable to meet its smolt production goal in 1990.

Releases from Lyons Ferry FH were below the goals for fall chinook, at the goal for spring chinook and near the goal for steelhead. The BY1987 spring chinook released into the Tucannon River was 152,165 yearlings. The fall chinook releases totaled 962,901; 413,017 BY1987 yearlings and 549,884 zero-age BY1988 fingerlings (averaging 82 fpp). Some fall chinook were released directly from the facility while others were loaded onto barges and released below Ice Harbor Dam.

About 861,000 smolts and 279,700 presmolt steelhead were released from Lyons Ferry FH, hauled to the three satellite ponds, or trucked directly to streams. Lyons Ferry and Tucannon FH's combined to rear and release about 458,650 catchable (8 to 9 inch) rainbow trout for Washington lakes and streams.

#### 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 facilities for LSRCP spring chinook production was completed by the Corps in November 1982 at a cost of \$1,539,000. The facility is designed to produce 1,600,000 spring chinook smolts weighing 90,000 pounds and is operated by the FWS.

Spring chinook runs into the Clearwater River were showing an increase due to hatchery production last year. In FY1989, 1,542 adults and 156 jacks returned to the Dworshak NFH ladder. The estimated hatchery egg take of 3.5 million green eggs should be sufficient for Dworshak's program.



Incidence of Bacterial Kidney Disease (BKD) found in BY1987 spring chinook was evident again this year through most of the production cycle, but mortality was minimal. Improved diets and maintaining target smolts sizes at 18 to 20 fpp appears to have lessened the disease problem. Dworshak NFH personnel released 1.25 million BY1987 chinook smolts into the North Fork Clearwater River and another 400,330 at the Powell Satellite site and other areas. Approximately 356,244 BY1988 fingerlings were also outplanted as part of a hatchery supplementation program, and additional 206,459 zero-age spring chinook (BY1988) were released into the Clearwater River at the hatchery as part of an experimental zero-age program.

#### Hagerman National Fish Hatchery - Idaho

Hagerman NFH, located on a 59 F spring water supply east of Hagerman, Idaho, was expanded by the Corps to rear 2,400,000 steelhead smolts weighing 340,000lbs., while retaining the capacity to produce 100,000lbs. of fish for FWS production commitments for programs other than LSRCP. The \$6,980,000 expansion was completed in April 1984 and the facility is operated by the FWS.

Hagerman NFH received BY1989 steelhead "A" eggs from Sawtooth FH totaling 1.5 million and 2,492,000 BY1989 "B" eggs from Dworshak NFH. Approximately 1.6 million "B" steelhead fingerlings were transferred back to Dworshak NFH in a move to recover losses due to IHN. Other excess BY1989 steelhead totaling 296,000 were transferred to Niagara Springs FH, and 238,000 excess BY1989 fingerlings were transferred to the LSRCP Lyons Ferry FH in Washington to help make up for their IHN losses.

Hagerman NFH released nearly 1.5 million BY1988 steelhead smolts into various streams in the Salmon and Clearwater River basins. Fish health for the entire history of steelhead production for BY1988 was excellent.

#### IV. LSRCP OFFICE OPERATIONS

A total of \$6,871,518 was obligated for LSRCP programs in FY1989. This total included \$1,112,679 for LSRCP Evaluation Studies (\$138,599 from carry-over monies), \$202,000 for Boise Office Management and Coordination, \$74,000 for Youth Conservation Corps (YCC) (salaries and benefits), \$226,000 for the Regional Office (\$102,000 from carry-over monies), and the balance (\$5,256,839) for hatchery operations and maintenance. Eleven cooperative agreements were drafted and finalized during this fiscal year to distribute the evaluation and operation and maintenance funding to non-federal entities.

Once again the LSRCP YCC Program was the largest in the Region. The LSRCP Office had 48 enrollees at 17 facilities. A total of \$74,000 was spent on the program for salaries and supplies.

The LSRCP Office entered into a cooperative agreement with the National Fish and Wildlife Foundation, Washington, D.C. for the production of a 28 minute video to tell the story of the development of the program. A cinematographer will begin filming hatchery and evaluation activities in Washington, Oregon and Idaho in the spring of 1990.



*The Boise LSRCP staff from left to right Tammy Froscher, Lori Arden, Ed Crateau and Dan Herrig.*

The Boise LSRCP Office also contracted with Alf and Associates to produce six page, full color hatchery brochures for McCall FH in Idaho and Irrigon FH in Oregon. The Corps has agreed to print 100,000 copies of each brochure.

#### V. EVALUATION STUDIES

In 1989 all operating agencies and two Indian Tribes had fully operational evaluation studies underway. By the end of the fiscal year, a total of \$1,112,679 had been obligated for 13 studies being conducted by the IDFG, ODFW, WDW, WDF, FWS, and the Nez Perce and Umatilla Tribes. Below is an overview of the evaluation program in FY1989 followed by a synopsis of each Cooperator's evaluation program.

A pattern for regular Evaluation Study Committee (ESC) meetings was established in 1985 and continued in 1989. 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. Two ESC meetings were conducted in FY1989 along with several

partial committee meetings to discuss specific topics. In lieu of the regular summer meeting, the LSRCP evaluation studies coordinator met individually with each agency coordinator to discuss project activities, problems, needs, concerns, etc. Several three-party meetings which included LSRCP Office, operating agency, and Indian Tribe personnel were also held to make certain that all parties were informed of the other's plans.

Few major equipment purchases were made by coordinators in FY1989. Operating agencies had acquired most needed microcomputer hardware in 1986 and 1987 and most have hard disks and sufficient software. Although software and computer brands vary, all computers are IBM compatible and, where practical or necessary, data report formats are similar to allow easy comparison of data among agency programs. Interchange of data (Dbase III files, primarily) has been occurring and will continue. Equipment expenses in FY1989 by cooperators included a vehicle, one computer, a printer, a digitizer, a modem, wet suits, field (radio tag) data loggers, some software, and miscellaneous office furniture.

#### IDFG's Evaluation Study Program

Because of the large production program in Idaho and large geographic area encompassed by the LSRCP, IDFG has chosen to divide their study program into several statements of work and budgets. The Hatchery Evaluation Study was initiated in 1982 and is being conducted to ensure that accurate and adequate monitoring of hatchery practices occurs so the most cost effective mode of operation for each hatchery is implemented. The major tasks include monitoring and evaluation of hatchery loading and size, time, and location of release studies. These studies are long-term because constant monitoring is required to identify problems before they result in catastrophic fish losses and to determine what hatchery rearing and release practices will result in the best adult returns. Recent study results have indicated that fall releases of spring chinook from upper Clearwater River rearing ponds appear to be a viable alternative where spring releases are not possible. Other studies have discovered potential problems with current brood stock selection criteria at hatchery weirs; new studies have been identified to address this problem (see FWS Cooperative Programs section below).

In late 1984 Idaho began an angler survey to assess the LSRCP contribution to Idaho's steelhead fishery, to estimate the escapement of LSRCP fish, to recover information on marked fish, and to obtain data for managing the fishery while protecting wild stocks. This survey is the major means of recovering adult steelhead tagged as juveniles under other evaluation studies. The study, called Hatchery-Wild Composition of the Idaho Steelhead Harvest, was funded through 1989 and will be continued annually (with some modifications) until compensation goals have been met, and periodically thereafter. Data collected under this project have shown that LSRCP stocks in Idaho are harvested at a rate of 60 to 80 percent. Harvest estimates showed 13,000 to 14,000 LSRCP-produced steelhead were harvested in the 1985-1986 and 1986-1987 seasons, respectively. Smolt-to-adult return rates have exceeded one percent in recent years.

As in 1987 and 1988, the process of reading tags and analyzing marks was funded in 1989 as a separate evaluation study while the actual tagging costs remained a part of each hatchery's budget. The study, entitled Coded Wire Tag Analyses, will be an ongoing effort even though it will be combined with the overall hatchery evaluation study in 1990. In 1989 about 10,000 tags (many recovered under the Harvest Study described above) were removed from fish and read at IDFG's Lewiston lab.



*Almost 2 million LSRCP salmon and steelhead were coded-wire tagged in 1989 to estimate their survival to escapement.*

#### **ODFW's Evaluation Study Program**

In contrast to IDFG's program, ODFW conducts nearly all of their evaluations under one "umbrella" study, An Evaluation of the LSRCP Program in Oregon. The ODFW began a few evaluations under this study in 1983 but full-scale studies did not begin until FY1984. Their evaluation program encompasses monitoring and evaluating hatchery rearing practices; studing size, time, and location of releases; marking juveniles and adults (CWTing, branding) and analyzing marks; monitoring some disease studies; and conducting creel studies to determine LSRCP contribution to Oregon's steelhead fishery and to recover tagged fish. In addition, the principal investigator for this study coordinates the broodstock selection, egg-taking procedures, and outplanting program for Oregon's LSRCP program, currently the only anadromous hatchery program in NE Oregon. ODFW studies in 1988 and earlier documented a very low return of Wallowa stock steelhead to the hatchery and fishery. Investigators were not able to determine where the fish were going once they passed Lower Granite Dam. To help answer this question, radio tags were implanted in Wallowa stock

fish (identified by their unique brands) at Lower Granite Dam to allow tracking the fish during the winter of 1987 and 1988. The tracking data indicated few fish entered Snake River tributaries (e.g. Grande Ronde R.) until the early spring (February-March). The harvest rate in the Snake River is low compared to the harvest rates of tributaries; therefore, returning fish to the tributaries in fall and early winter is more desirable. The ODFW and WDW will monitor the returns in the next couple years before deciding if a change in stock is necessary to facilitate a better harvest rate of hatchery-produced fish.

Two short-term studies were initiated by ODFW in 1984 and continued through 1988: Evaluation of the Benefits Provided by Presmolt Releases in the Grande Ronde and Evaluation of Benefits Provided by Reprogramming Spring Chinook Smolts from Lower Columbia Hatcheries. Both are short term (about 4-year) studies involving CWTing, tag recovery, and analyses of returns. The presmolt study will help determine the efficacy of releasing fry and presmolts in the summer and fall. No fingerlings were tagged or released in 1989, and the last adults marked for this project will return in 1991. The reprogramming study will help determine the efficiency of bolstering the LSRCP program by releasing Carson stock smolts in the Grande Ronde and Imnaha River systems. Because of the availability of Upper Snake River stocks, no Carson stocks were released in 1987, 1988, or 1989. All activities with this project in 1989 were related to CWT recovery and analysis of pre-1987 releases.

#### WDF's Evaluation Study Program

The Department of Fisheries field evaluation program was initiated in 1985 when a principal investigator was hired and stationed at Lyons Ferry FH; the Lyons Ferry FH Evaluation-Salmon program had its first full year of studies in 1986. WDF's evaluation program is similar to Oregon's in that all major evaluations are being conducted 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 program is being built entirely with native fall and spring chinook stocks, special attention is being paid to quantifying and monitoring genetic variables in each population.

A smolt trap, first constructed and operated on the Tucannon River (jointly with WDW) in 1986 to monitor the numbers, timing, size, and condition of out-migrating spring chinook and steelhead, was moved upriver to improve its operation in 1987. Trap operation was continued in FY1989. A major study initiated in 1989 involved radio tagging and tracking wild adult spring chinook above the hatchery weir to determine movement, spawning time, and location, survival, and spawning success. In 1990 biologists hope to use radio tags to mark wild and hatchery returns trapped at a new weir to determine their interactions above the weir. In 1989 WDF also assumed responsibilities for trapping and hauling fall chinook from Ice Harbor Dam; an activity the Idaho Cooperative Fish and Wildlife Research Unit (CFWRU) at the University of Idaho did in past years.

## WDW's Evaluation Study Program

Much like ODFW and WDF, the bulk of the WDW's evaluation program has been and will continue to be conducted under one study, Lyons Ferry FH Evaluation Study - Steelhead. The 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).

The hatchery evaluations and related field studies at Lyons Ferry FH have been underway since 1983, when the steelhead and trout production programs were initiated. Major concerns which have surfaced as a result of recent evaluations have been the poor brood stock returns to the Lyons Ferry ladder, large numbers of residuals below satellite release facilities, and low returns to the Tucannon, Touchet, and Walla Walla Rivers. Studies were initiated in 1986 and continued in 1989 to determine what is needed to improve homing of adult fish back to the ladder and to release sites. Surveys to determine contribution of WDW-reared, LSRCP steelhead to Washington fisheries have shown that, although adult returns to the Snake River often exceed one percent, large portions of the Lyons Ferry FH and Tucannon-released fish are returning above Lower Granite Dam--well above their release site. WDW collaborated with ODFW in conducting the radio tagging study mentioned above to determine where the Lyons Ferry and Tucannon River adults are wintering. Data indicated some Lyons Ferry and Tucannon River adults that migrate above Lower Granite do drop back to the dam in the spring and, if they do not make it below the dam, attempt to spawn in small tributaries near the dam. In a related study initiated in 1988, steelhead presmolts outplanted to the three conditioning ponds were sampled before outplanting, midway through the conditioning period, and at release to determine the process and degree of smoltification. This problem of adults not returning to their release sites will continue to receive emphasis by WDW in their LSRCP evaluation studies.

In lieu of 7,000lbs. of hatchery capacity for resident trout, WDW was funded by the Corps to build instream improvement structures for natural fish propagation. In FY1984 and ending in FY1985, the LSRCP Office and the Corps jointly funded an evaluation of the status of the structures and of their success in compensating for resident trout losses. In 1989 data were collected on the current condition and use of the habitat structures and a creel survey was conducted to determine angler use and success. These data will be used to determine the efficacy of this mitigation measure.

## 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 facilities and because their primary concerns are for the compensation of tribal fisheries, their projects are oriented toward evaluating the implementation and success of the LSRCP program rather than solving fish culture problems.

The Nez Perce Tribe initiated their Nez Perce Tribe LSRCP Evaluation Study in 1989 to develop tribal stocking and outplanting priorities, to monitor tribal

harvest, to evaluate effects of hatchery plants on native production, and to assist IDFG, ODFW, and FWS in their evaluation studies.

Previous tribal studies have indicated general agreement with IDFG and ODFW plans for the LSRCP steelhead. Some conflicts with the spring chinook planting program have surfaced and must be resolved.

The Confederated Tribes of the Umatilla Indian Reservations (CTUIR) became direct cooperators in the LSRCP Program for the first time in FY1987. (They were subcontractors for the Nez Perce Tribe in 1986.) The CTUIR extended their FY1988-funded study into FY1989; their objectives are to 1) finalize their analysis of how the LSRCP program addresses their tribal needs in the Grande Ronde, Imnaha, and Tucannon River basins; 2) assist the State agencies (ODFW and WDF) with their ongoing LSRCP evaluation studies; and 3) develop a five-year plan for 1988-1992 tribal involvement in LSRCP studies. The CTUIR initiated studies with 1989 funds in late FY1989 and will combine 1989 and 1990 funds to 1) assess smoltification stresses of steelhead released at Wallowa FH and spring chinook at Lookingglass FH, 2) develop scale analysis techniques with ODFW, 3) review methods to accelerate maturation of salmon adults to promote larger zero-age releases, and 4) monitor success of adult salmon outplants. The CTUIR biologist assigned to the LSRCP program will work for the LSRCP-ODFW research coordinator.

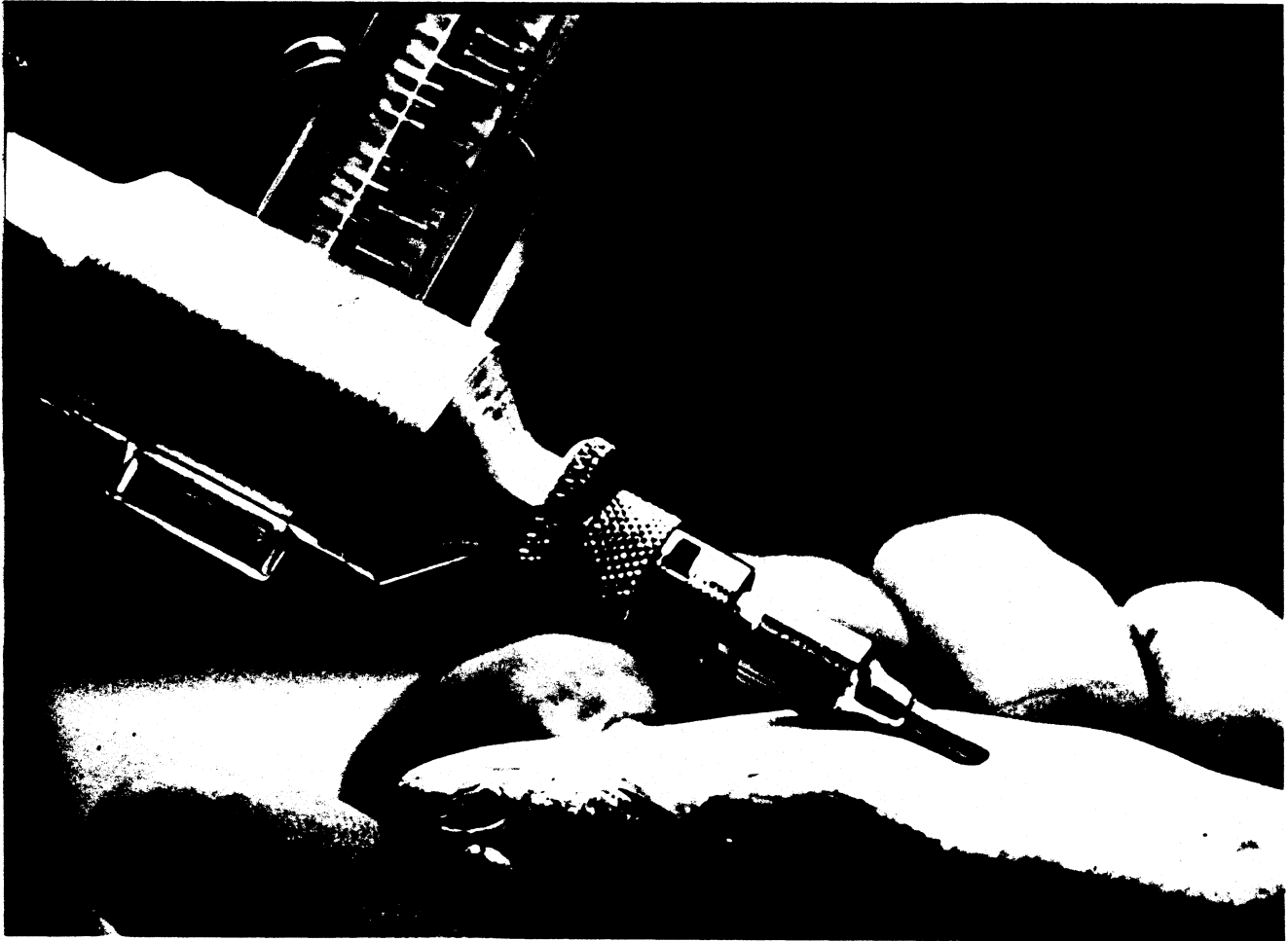
## VI. FWS COOPERATIVE PROGRAMS

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.

The Dworshak Fisheries Assistance Office (DFAO) was funded by the LSRCP program in FY1989 to conduct hatchery monitoring and evaluation studies at Dworshak (spring chinook) and Hagerman NFH's. DFAO's program was similar to those conducted by the State agencies. Their study, Evaluation and Technical Coordinator for FWS LSRCP Hatchery Programs, is a long-term effort designed to 1) aid NFH's with the development of a database system for hatchery management, 2) define and solve cultural and management problems affecting LSRCP success, 3) provide interagency coordination, and 4) determine fishery contribution and escapements of Dworshak and Hagerman NFH LSRCP programs. The LSRCP funds were also 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.

New LSRCP-funded studies were initiated in 1990 with the CFWRU and with the Seattle National Fisheries Research Center (NFRS). The CFWRU study will employ a graduate student to determine interaction and spawning success of natural and hatchery-produced salmon adults released above hatchery weirs in two to three streams in Idaho. There is some concern that contribution and return of hatchery-produced adults is low and random selection of adults at weirs may be "mining" the natural runs at some sites. The Seattle NFRS study will define the post-release impacts of BKD on spring chinook salmon from Dworshak NFH and Sawtooth FH. Lightly and heavily infected BKD smolts are

being compared using CWTag and PIT tags to assess migration timing and success and fishery contribution and hatchery return rates.



*Passive integrated transponders (PIT tags) are inserted into the body cavities of smolts to monitor their emigration from the Snake and Columbia Rivers and their return as adults.*

#### VII. OTHER COOPERATIVE PROGRAMS

The State of Idaho is 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 IDFG sockeye salmon program which is funded by the NMFS.

The State of Oregon utilized several raceways at Irrigon FH to hold fall chinook salmon smolts scheduled for release in eastern Oregon.

Wallowa FH shipped 500,000 eyed steelhead eggs to Lyons Ferry FH in Washington as part of ODFW's cooperative LSRCP effort with WDW in the Grand Ronde Basin.



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

#### 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 was completed on the Imnaha Satellite facility in 1988. The release and trapping facility was operated this year as part of the Looking-glass FH program for spring chinook propagation.

Construction was completed at Little Sheep Creek Satellite facility of Irrigon Fish Hatchery, in August 1987; a cleanup contract has been extended into FY1989. The release and trapping facility is being operated as part of the Irrigon/Wallowa program for steelhead propagation.

As noted above in the operations section, Clearwater FH design has been completed, the contract was awarded this summer and was celebrated with a ground-breaking ceremony in August. Construction is scheduled to begin this fall. The water supply facilities are at the 90 percent design level, and the construction date for the pipeline has not been established. Design and/or construction activities continued on one of the hatchery's three satellite facilities. Construction was completed on the Red River Satellite in November 1986. A Design Memorandum for the Powell Satellite was issued in June 1987 and construction of this facility was initiated in late FY1988. The Powell facility was completed this summer. The Crooked River Satellite is being constructed at this time and should be completed in mid-1990.

A site selection report was completed for the Eagle Disease Diagnostic Laboratory, Idaho, in FY1987. Design was well underway in FY1989 and the facility is now scheduled for a construction start in early 1990.

Pertinent data relating to hatchery design and construction schedules are included in Table 3; approximate facility locations are identified on the LSRCP facility map (Figure 1).

#### IX. STAFFING

A total of 4.0 permanent full time equivalents (FTE) staff years were utilized in FY1989. No temporary employees were utilized during the year.

In FY1989 the LSRCP continued to sponsor a YCC program at a cost of \$74,000. The program was conducted on 17 state and federal LSRCP hatcheries and evaluation study projects and included 48 YCC student enrollees and crew leaders. Once again the program was well received by the cooperating

agencies; it not only accomplished needed station work, but also provided environmental awareness and training for local youths.



*Project leaders of LSRCP facilities have become dependent upon the YCC Program for the extra assistance they receive during the busy field season. Marie Lowry, a YCC enrollee from Kooskia, Idaho participated in spawning spring chinook at the Red River Facility a Satellite of the Clearwater Fish Hatchery.*

**LSRCP Boise Office employees as of September 30, 1989:**

Edouard J. Grateau, LSRCP Coordinator, GS-13  
Daniel M. Herrig, Evaluation Studies Coordinator, GS-12  
Lori R. Arden, Cooperative Agreement Assistant, GS-7  
Tammy A. Froscher, Secretary/typist, GS-5

## X. FUTURE OUTLOOK

Although still in its infancy, the Lower Snake River Compensation Plan Program is well underway with only one hatchery, Clearwater FH, not yet constructed. The Corp contractor is planning to begin construction this fall with a completion date expected in early 1991. All satellite facilities serving to support full hatchery production, by providing broodstock trapping and holding capabilities and smolt acclimation and release ponds, should be completed in 1990.

The Corps has done an excellent job in constructing and equipping LSRCP hatcheries and satellites and, in the past 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. For example, the Irrigon FH located in northeast Oregon was designed around a well water supply system of 25,000 gpm at full production. Since operation of this facility began in 1987 the water supply has diminished to approximately 21,000 gpm and when the hatchery is at full capacity the entire 25,000 gpm is needed. The Corps has agreed to rectify the marginal situation by drilling another well to supply an additional 5,000 gpm.

The Corps is considering a plan to alleviate production problems at Lookingglass FH, Oregon with some modifications of the present facility. Lastly, discussions are now underway regarding water quality problems at Wallowa FH in Oregon and what can be done to improve the supply. Negotiations to correct deficiencies in the Red River Satellite rearing pond in Idaho are also underway between the FWS, Corps and State of Idaho.

Hatchery effectiveness 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. Funding for this phase of the LSRCP program has fallen behind the needs over the last few years as more facilities have come on line and funding levels have remained static. There has been a substantial improvement in the FY1990 funding level which should provide sufficient money to continue an adequate hatchery evaluation program.

We are extremely optimistic about the future of the LSRCP Program and the general trends indicate increases in the return rates of steelhead which exceed model predictions. The chinook salmon return rates to the basin are currently below the level used to design the LSRCP facilities. Improved adult chinook return rates are expected as a result of changes in production, release strategies, disease treatment and prevention, and improvements in smolt emigration. As one phase or part of the LSRCP is achieved we may shift emphasis to a less successful part of the program. As an example; if the current steelhead adult return rate trend continues, more emphasis may be placed on increasing chinook salmon production as an interim measure to offset the low adult return rate.

XI. MEETINGS AND TOURS IN FY1989

- 10/18/88 Meeting with Joe Webster and Dave Goldthwaite, Regional Fishery Evaluation, Boise (Ed Crateau)
- 10/18/88 Meeting with Joe McMichael to discuss Eagle Lab, Lookingglass, and Wallowa FH's construction problems, Boise (Ed Crateau)
- 10/21/88 Meeting with IDFG on Subbasin Planning on Salmon River, Boise (Dan Herrig)
- 11/03/88 Dworshak NFH Coordination Meeting, Ahsahka, ID (Dan Herrig)
- 11/07/88 Acting Division II Manager for John Miller, 11/7-11/10, Portland, OR (Ed Crateau)
- 11/07/88 Evaluation Study Committee Meeting at Billy Creek Ranch on the Snake River, 11/7-11/10 (Dan Herrig)
- 11/14/88 Property Inventory at Red River Satellite, ID (Ed Crateau, Tammy Froscher)
- 11/15/88 Inspected site of Powell Satellite Facility, ID (Ed Crateau, Tammy Froscher)
- 11/16/88 Property Inventory at Dworshak NFH and Dworshak FAO, ID (Ed Crateau, Tammy Froscher)
- 11/17/88 Meeting on Co-management issues on Umatilla and Irrigon FH's, with Rich Carmichael and Don Faulhaber (ODFW), Joe McMichael and Pat Warren (Corps) at Walla Walla, WA (Ed Crateau)
- 11/28/88 Fisheries Information Work Group 11/28-12/2 in Washington, D.C. (Ed Crateau)
- 11/30/88 BPA Procurement Meeting and Workshop, Boise, ID (Dan Herrig)
- 12/08/88 Meeting with Corps on Tucannon Weir Design, Walla Walla, WA (Ed Crateau)
- 12/12/88 Meeting with Alf and Associates and Bill Hutchinson (IDFG) on Sawtooth FH brochure, Boise, ID (Ed Crateau)
- 12/13/88 Anadromous Symposium meeting with FWE and Fort Collins personnel, Boise, ID (Ed Crateau, Dan Herrig)
- 12/20/88 Power Council Supplementation TWG Meeting, Portland, OR (Dan Herrig)
- 01/04/89 Meeting with Alf and Associates on Sawtooth FH brochure, Boise, ID (Ed Crateau)

01/04/89 Pit tag workshop with IDFG at Magic Valley FH, Filer, ID (Dan Herrig)

01/11/89 FWS and IDFG Coordination Meeting with Nez Perce Tribe, Lewiston, ID (Ed Crateau, Dan Herrig)

01/17/89 Meeting with Express Printing on Sawtooth FH brochure, Ketchum, ID (Ed Crateau)

01/19/89 Meeting with Dick Kuehner on LSRCP traveling exhibit, LSRCP videotape, and hatchery brochures, Portland, OR (Ed Crateau)

01/23/89 Upper Level Management Planning meeting 1/23-1/24, Sacramento, CA (Dan Herrig)

01/24/89 Delivery and setup of computer by Robert Vega, Boise, ID (Lori Arden)

01/24/89 Meeting with Corps on illustrations for Sawtooth FH brochure printing; various other topics, Walla Walla, WA (Ed Crateau)

01/31/89 Presentation to University of Idaho gradute student seminar class, Moscow, ID (Dan Herrig)

02/01/89 Meeting with Corps and ODFW regarding Lookingglass FH, Walla Walla, WA (Ed Crateau)

02/16/89 Hagerman NFH Coordination Meeting, Hagerman, ID (Ed Crateau, Dan Herrig)

02/21/89 Evaluation Studies Meeting with Tim Cochnauer and Steve Yundt, Boise, ID (Ed Crateau, Dan Herrig)

02/28/89 LSRCP Coordination Meeting with ODFW, Nez Perce and Umatilla Tribes, La Grande, OR (Dan Herrig)

03/01/89 Meeting on Russian River Assignment with Jerry Grover, Portland, OR (Dan Herrig)

03/02/89 Spoke at Boise Lyons Club on LSRCP Program, Boise, ID (Ed Crateau)

03/06/89 Review ozone treatment systems for possible incorporation in LSRCP hatchery plans, 3/6-3/10 at various locations in California (Ed Crateau)

03/16/89 Clearwater FH 95% completion meeting with Corps, Walla Walla, WA (Ed Crateau)

03/16/89 Dworshak NFH Coordination Meeting, Orofino, ID (Dan Herrig)

04/06/89 Meeting with IDFG on Annual Reports, Boise, ID (Ed Crateau)

04/10/89 Russian River Memorandum of Understanding (MOA) trip, 4/10-4/13 at various locations in California (Dan Herrig)

04/17/89 Fisheries Information Work Group 4/17-4/21, Corpus Christi, TX (Ed Crateau)

04/19/89 Evaluation Studies Committee Meeting 4/19-4/20, Lewiston, ID (Dan Herrig)

05/02/89 Meeting with IDFG and Nez Perce Tribe on spring chinook stocking, Lewiston, ID (Ed Crateau)

05/09/89 Briefed Regional Director, Marv Plenert and ARD-AFF, Bill Shake on status of the LSRCP Program, Boise, ID (Dan Herrig)

05/11/89 Meeting with Jerry Grover and Bob Gable regarding Russian River MOA, Portland, OR (Dan Herrig)

05/18/89 Slide presentation of LSRCP facilities to the Sunriver Anglers, Sunriver, OR (Ed Crateau)

05/23/89 Meeting with IDFG and Idaho Fish and Wildlife Coop Unit regarding evaluation studies, Moscow, ID (Ed Crateau, Dan Herrig)

05/31/89 Marking planning meeting with IDFG, Boise, ID (Dan Herrig)

06/01/89 Real property inventory of McCall FH, McCall, ID (Ed Crateau, Tammy Froscher)

06/12/89 Meeting with Crops, Walla Walla, WA (Ed Crateau)

06/12/89 Russian River MOA meeting at various locations in California (Dan Herrig)

06/19/89 Project Leaders Meeting in Reno, NV (Ed Crateau, Dan Herrig)

06/21/89 Property inventory of Sawtooth FH and East Fork Satellite facility, Stanley, ID (Tammy Froscher, Lori Arden)

06/28/89 Property inventory of Magic Valley FH, Filer, ID (Tammy Froscher, Lori Arden)

06/22/89 Property inventory at Hagerman NFH, Hagerman, ID (Lori Arden)

07/10/89 Meeting with Regional Office and Dworshak NFH and FAO personnel at Billy Creek Ranch on the Snake River, ID (Ed Crateau, Dan Herrig)

07/18/89 Property inventory of Lyons Ferry FH (WDW), Lyons Ferry FH (WDF), and Tucannon FH, WA (Lori Arden)

- 07/31/89 Selway River float trip with IDFG 7/31-8/8 (Ed Crateau)
- 08/08/89 Anadromous Fish Workshop in Boise, ID (Dan Herrig)
- 08/16/89 Tour of possible office sites with GSA, Boise, ID (Ed Crateau)
- 08/16/89 Meeting with ODFW and Umatilla Tribe regarding FY90 evaluation studies, LaGrande, OR (Dan Herrig)
- 08/19/89 Groundbreaking for Clearwater FH, Asahka, ID (Ed Crateau)
- 08/21/89 Meeting with John Byrne and CGS on traveling exhibit, Portland, OR (Ed Crateau)
- 08/21/89 Meeting with IDFG and Nez Perce Tribe, Lewiston, ID (Dan Herrig)
- 08/22/89 Meeting with Mark Schuck (WDW), Umatilla and Nez Perce Tribes, Lewiston, ID and Dayton, WA (Dan Herrig)
- 08/23/89 Meeting with IDFG and Corps regarding purchasing office supplies and equipment for Clearwater FH, Boise, ID (Ed Crateau)
- 08/23/89 Spawning surveys with ODFW, Enterprise, OR (Dan Herrig)
- 08/30/89 Meeting with WDF and WDW regarding 1990 LSRCP contracts, Olympia, WA (Ed Crateau)
- 09/06/89 Hagerman NFH Coordination Meeting, Hagerman, ID (Ed Crateau, Dan Herrig)
- 09/12/89 Meeting with ODFW and WDF, LaGrande, OR and Dayton, WA (Dan Herrig)
- 09/19/89 Property inventory of Irrigon, Lookingglass, and Wallowa FH's in OR (Tammy Froscher)
- 09/26/89 North Pacific Fish Passage Development and Evaluation Program, Kennewick, WA (Ed Crateau)

**XII. TRAINING**

Edouard J. Crateau

- Bio-Engineering Symposium 10/24 - 10/26, Portland, OR
- EEO Training 10/31 - 11/4, Portland, OR
- Pre-Retirement Seminar 3/22 - 3/23, Portland, OR
- EEO Training 6/5 - 6/9, Portland, OR
- EEO Training 8/28 - 8/29, Reno, NV

Daniel M. Herrig

Upper Level Management Training 10/3 - 10/14, Washington, D.C.  
Upper Level Management Training 12/5 - 12/9, Washington, D.C.  
Upper Level Management Training 4/24 - 4/28, San Francisco, CA  
EEO Training 7/31 - 8/1, Boise, ID

Lori R. Arden

Fundamentals of Supervision 10/19 - 12/7, BSU, Boise, ID  
Personal Property Utilization and Disposal Workshop, GSA, Boise, ID  
Basics of Personal Property Management, 4/3 - 4/7, Denver, CO

Tammy A. Froscher

English Usage Review 10/10 - 11/7, BSU, Boise, ID  
Self-Esteem and Peak Performance Seminar, Boise, ID  
Preparation of Travel Vouchers Update, 8/2 - 8/4, 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, FY1983, Hagerman National Fish Hatchery. U. S. Fish and Wildlife Service, Hagerman, Idaho. 8 pp.
- Bruhn, D. 1985. Annual Report, FY1984, Hagerman National Fish Hatchery, U.S. Fish and Wildlife Service, Hagerman, Idaho. 2 pp.
- Bruhn, D. 1986. Annual Report, FY1985, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 6 pp.
- Bruhn, D. 1987. Annual Report, FY1986, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho.
- Bruhn, D. 1988. Annual Report, FY1987, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 13 pp.
- Bruhn, D. 1988. Annual Report, FY1988, Hagerman National Fish Hatchery. U.S. Fish Wildlife Service, Hagerman, Idaho. 18 pp.
- Bruhn, D. 1989. Annual Report, FY1989, Hagerman National Fish Hatchery. U.S. Fish and Wildlife Service, Hagerman, Idaho. 19 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.
- Lientz, J. 1988. Annual Report FY1987, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 30 pp.
- Lientz, J., C. Hesson, and E. Steiner. 1988. Annual Report FY1988, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 10 pp.
- Lientz, J. 1989. Annual Report FY1989, Dworshak Fish Health Center. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 53 pp.
- Olson, W. 1982. Annual Report, FY1981, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 47 pp.
- Olson, W. 1983. Annual Report, FY1982, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 47 pp.
- Olson, W. 1984. Annual Report, FY1983, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 50 pp.

- Olson, W. 1985. Annual Report, FY1984, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 50 pp.
- Olson, W. 1986. Annual Report, FY1985, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 51 pp.
- Olson, W. 1987. Annual Report, FY1986, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 45 pp.
- Olson, W. 1988. Annual Report, FY1987, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 63 pp.
- Olson, W. 1988. Annual Report, FY1988, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 65 pp.
- Olson, W. 1990. Annual Report FY1989, Dworshak National Fish Hatchery. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 66 pp.

U.S. Fish and Wildlife service - Evaluation Studies

- Bjornn, T.C., C.M. Moffitt, J.D. Varley, D. Diggs, R. Austin, J. McClain, and J. Lientz. 1984. Annual Progress Report, Bacterial Kidney Disease in Chinook Salmon as Related to Hatchery Practices and Methods, 1982-1983 (0009-1514). U.S. Fish and Wildlife Service, Boise, Idaho. 68 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.H. and D. Diggs. 1985. Annual Report, FY1984, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 4 pp.
- Miller, W.H. and D. Diggs. 1985. Annual Report, 1985, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 6 pp.
- Miller, B. and D. Diggs. 1986. A Review of Coded-wire Tagged Fish Released From Dworshak, Kooskia, and Hagerman NFH's, Idaho, 1976-1986. U.S. Fish and Wildlife Service, Dworshak Fisheries Assistance Office, Ahsahka, Idaho. 101 pp.
- 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.
- Miller, W., Coley, T., and R. Roseberg. 1988. Annual Report, FY1987, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho 32 pp.

Miller, W. 1989. Annual Report, FY1988, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 30 pp.

Miller, W. 1989. Annual Report, FY1989, Dworshak Fisheries Assistance Office. U.S. Fish and Wildlife Service, Ahsahka, Idaho. 37 pp.

Moffitt, C.M. and J.A. Schreck. Accumulation and depletion of orally administered erythromycin thiocyanate in tissues of chinook salmon. Transactions of the American Fisheries Society. 117:394-400.

Schreck, J.A. and L.M. Moffitt. 1987. Palatability of Feed Containing Different Concentrations of Erythromycin Thiocyanate to Chinook Salmon. The Progressive Fish Culturist. Vol. 49 (4), October 1987. pp. 241-247

Smith, C. E. and M. E. Mueller. 1984. The Effects of Diet and Vitamin Supplementation on the Occurrence of Spring Thing in Summer Chinook Salmon. U.S. Fish and Wildlife Service, Bozeman, Montana. 13 pp.

#### Idaho Department of Fish and Game - Operations & Maintenance

Ainsworth, B. 1988. Magic Valley Steelhead Hatchery, Annual Report, 1986 Brood Year. Idaho Dept. of Fish and Game, Filer, Idaho. 4 pp.

Ainsworth, B. 1989. Magic Valley Steelhead Hatchery, Annual Report, FY1989. Idaho Dept. of Fish and Game, Filer, Idaho. 8 pp.

Alsager, R. 1989. Sawtooth Fish Hatchery, Annual Report FY1989. Idaho Dept. of Fish and Game, Stanley, Idaho. 8 pp.

Alsager, R. 1989. Sawtooth Fish Hatchery, East Fork Satellite, 1989 Spring Chinook Salmon Run Report. Idaho Dept. of Fish and Game, Stanley, Idaho. 10 pp.

Frew, T. 1985. Annual Report, McCall Hatchery, 1 Oct. 1984 - 30 Sept. 1985, (85022). Idaho Dept. of Fish and Game, McCall, Idaho. 4 pp.

Frew, T. 1986. Annual Report, McCall Summer Chinook Salmon Hatchery, 1984 Brood Year. Idaho Dept. of Fish and Game, McCall, Idaho. 26 pp.

Frew, T. 1988. Annual Report, McCall Summer Chinook Salmon Hatchery, Brood 1985 Production Report. Idaho Dept. of Fish and Game, McCall, Idaho. 20 pp.

Hutchinson, W. G. 1983. Annual Report, McCall Hatchery, 1 Oct. 1982 - 30 Sept. 1983, (80002). Idaho Dept. Fish and Game, McCall, Idaho. 3 pp.

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.

- Hutchinson, W. G. 1985. Annual Report, McCall Summer Chinook Hatchery, 1 Oct. 1980 - 30 Sept. 1981 (80002). Idaho Dept. Fish and Game, McCall, Idaho. 28 pp.
- Hutchinson, W. G. 1985. Annual Report, McCall Summer Chinook Hatchery, 1 Oct. 1981 - 30 Sept. 1982 (80002). Idaho Dept. Fish and Game, McCall, Idaho. 30 pp.
- McGehee, J. 1989. Clearwater Fish Hatchery, Annual Report, FY1989. Idaho Dept. of Fish and Game, Kamiah, Idaho. 4 pp.
- McPherson, D. 1989. McCall Summer Chinook Hatchery Annual Report, FY1989. Idaho Dept. of Fish and Game, McCall, Idaho. 6 pp.
- Moore, B. 1983. Annual Report, FY1982, Sawtooth Salmon Trap. Idaho Dept. Fish and Game, Stanley, Idaho. 5 pp.
- 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.
- Rogers, T. L. 1986. Sawtooth Fish Hatchery and East Fork Satellite, 1984 Chinook Salmon Brood Year Report and 1985 Steelhead Brood Year Report. Idaho Dept. Fish and Game, Stanley, Idaho. 22 pp.
- 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.
- Vaughn, R. L. 1984. Annual Report, FY1983, Magic Valley Steelhead Hatchery. Idaho Dept. Fish and Game, Filer, Idaho. 5 pp.
- Vaughn, R. L. 1985. Annual Report Magic Valley Steelhead Hatchery, 1 Oct. 1983 - 30 Sept. 1984 (84044). Idaho Dept. Fish and Game, Boise, Idaho. 6 pp.
- Vaughn, R. L. 1986. Annual Report, FY1985, Magic Valley Steelhead Hatchery. Idaho Dept. Fish and Game, Filer, Idaho. 4 pp.
- Wimer, L. 1985. Annual Report, McCall Summer Chinook Salmon Hatchery, 1 Oct. 1979 - 30 Sept. 1980 (80002). Idaho Dept. Fish and Game, McCall, Idaho. 25 pp.

#### Idaho Department of Fish and Game - Evaluation Studies

- Ball, K. 1986. Evaluation of Hatchery - Wild Steelhead Harvest for September 1, 1984 through November 30, 1984. Idaho Dept. Fish and Game, Salmon, Idaho. 38 pp.

- Ball, K. 1986. Evaluation of the Hatchery - Wild Composition of Idaho Salmon and Steelhead Harvest for December 1, 1984 to October 1, 1985. Idaho Dept. Fish and Game, Salmon, Idaho. 62 pp.
- Ball, K. 1988. Evaluation of the Hatchery-Wild Composition of Idaho Salmon and Steelhead Harvest for October 1, 1985 to December 31, 1986 (86505). Idaho Dept. of Fish and Game, Salmon, Idaho. 99 pp.
- Ball, K. 1989. Evaluation of the Hatchery-Wild Composition of Idaho Salmon and Steelhead Harvest for October 1, 1986 to December 31, 1987 (87501). Idaho Dept. of Fish and Game, Salmon, Idaho. 84 pp.
- Cochnauer, T. and S. Elam, 1989. Fish Hatchery Evaluations - Idaho for July 1, 1987 through September 30, 1988 (87501 and 88501). Idaho Dept. of Fish and Game, Boise, Idaho (Draft)
- Hall-Griswold, J. and T. Cochnauer, 1989. Identification of LSRCP Hatchery-Reared Fish Stocks, Annual Report, FY1987 (87501). Idaho Dept. of Fish and Game, Lewiston, Idaho. 132 pp.
- Hutchinson, W. G., and A. J. Chacko. 1985. Evaluation of Five Diets on the Occurrence of the Spring Thing. Idaho Dept. Fish and Game, McCall, Idaho. 15 pp.
- Hutchinson, W. G. 1986. McCall Summer Chinook Nutrition Evaluation Study, Final Report. Idaho Dept. Fish and Game, McCall, Idaho. 9 pp.
- Partridge, F. E. 1984. Fish Hatchery Evaluations - Idaho, Oct. 1982 - Sept. 1983 (83268). Idaho Dept. Fish and Game, Boise, Idaho. 52 pp.
- Partridge, F. E. 1985. Effects of Steelhead Trout Smolt Size on Residualism and Adult Return Rates (83065). Idaho Dept. Fish and Game, Boise, Idaho. 26 pp.
- Rohrer, R. L. and F. E. Partridge. 1985. Fish Hatchery Evaluations Idaho, 1 Sept. 1983 - 30 Sept. 1984 (84098). Idaho Dept. Fish and Game, Boise, Idaho. 24 pp.
- Rohrer, R. L. and J. A. Davis. 1986. Fish Hatchery Evaluations - Idaho for October 1, 1984 to September 30, 1985 (85059). Idaho Dept. Fish and Game, Boise, Idaho. 37 pp.
- Rohrer, R. 1986. Fish Hatchery Evaluations - Idaho for October 1, 1985 through June 30, 1986 (86505). Idaho Dept. of Fish and Game, Boise, Idaho. 19 pp.
- Rohrer, R. 1988. Fish Hatchery Evaluations - Idaho for July 1, 1986 through June 30, 1987 (86505 and 87501). Idaho Dept. of Fish and Game, Boise, Idaho. 27 pp.

Thurrow, R. 1985. Evaluations of the South Fork Salmon River Steelhead Fishery Restoration Program, 1 Sept. 1984 - 31 Jan. 1985 (84132). Idaho Dept. Fish and Game, Boise, Idaho. 22 pp.

Thurrow, R. 1985. South Fork Salmon River Fishery Restoration, 1 Feb. 1985 - 30 Sept. 1985 (85066). Idaho Dept. Fish and Game, Boise, Idaho. 32 pp.

Thurrow, R. 1987. Evaluation of the South Fork Salmon River Steelhead Trout Fishery Restoration Program, Completion Report (86505). Idaho Dept. of Fish and Game, Boise, Idaho. 155 pp.

White, M. and T. Cochnauer, 1989. Salmon Spawning Ground Survey, 1988. Idaho Dept. of Fish and Game, Boise, Idaho. 48 pp.

#### Oregon Department of Fish and Wildlife - Operations and Maintenance

Bauer, J. 1985. Annual Report Lookingglass Hatchery, 1 Oct. 1983 - 30 Sept. 1984 (83062). Oregon Dept. Fish and Wildlife, Portland, Oregon. 2 pp.

Bauer, J. 1985. Annual Report Irrigon and Wallowa Hatcheries, 1 Oct. 1983 - 30 Sept. 1984 (84063). Oregon Dept. Fish and Wildlife, Portland, Oregon. 2 pp.

Bauer, J. 1986. FY1985 Report of Operations of Irrigon, Wallowa and Lookingglass FH's. Oregon Dept. Fish and Wildlife, Portland, Oregon. 5 pp.

Bauer, J. 1987. FY1986 Report of Operations for Irrigon, Wallowa and Lookingglass Fish Hatcheries. Oregon Dept. of Fish and Wildlife, Portland, Oregon. 5 pp.

Bauer, J. 1988. FY1987 Report of Operations for Irrigon, Wallowa and Lookingglass Fish Hatcheries. Oregon Dept. of Fish and Wildlife, Portland, Oregon. 8 pp.

Christianson, C. 1989. FY1988 Report of operations for Irrigon, Wallowa, and Lookingglass Fish Hatcheries. Oregon Dept. of Fish and Wildlife, Portland, Oregon. 8 pp.

Lichatowich, T. 1989. FY1989 Report of Operations for Irrigon, Wallowa, and Lookingglass Fish Hatcheries. Oregon Dept. of Fish and Wildlife, Portland, Oregon. 8 pp.

Stratton, M. 1984. Annual Report Lookingglass Hatchery, 1 Oct. 1982 - 30 Sept. 1983 (83062). Oregon Dept. Fish and Game, Portland, Oregon. 1 page

**Oregon Department of Fish and Wildlife - Evaluation Studies**

- Carmichael, R. W. and E. J. Wagner. 1984. Evaluation of Lower Snake River Compensation Plan Facilities in Oregon - FY1983 (83269). Oregon Dept. Fish and Wildlife, Portland, Oregon. 4 pp.
- Carmichael, R. and R. T. Messmer. 1986. Evaluation of Lower Snake River Compensation Plan Facilities in Oregon - FY1984 (84118, 84119, 84120). Oregon Dept. Fish and Wildlife, Portland, Oregon. 31 pp.
- Carmichael, R., R. Messmer, and B.A. Miller. 1989. Annual Progress Report, Evaluation of LSRCF Facilities in Oregon, April 1, 1986 through June 30, 1987 (86520). Oregon Dept. of Fish and Wildlife, Portland, Oregon. 48 pp.
- Carmichael, R., B. Miller, and R. Messmer. 1986. Annual Progress Report Evaluation of Lower Snake River Compensation Plan Facilities in Oregon, April 1, 1985 through March 31, 1986 (85069, 85070, 85071). Oregon Dept. of Fish and Wildlife, Portland, Oregon. 45 pp.
- Carmichael, R., B. Miller, and R. Messmer. 1989. Summer Steelhead Creel Surveys in the Grande Ronde, Wallowa, and Imnaha Rivers for the 1987-88 Run Year (87513). Oregon Dept. of Fish and Wildlife, LaGrande, Oregon. 21 pp.
- Carmichael, R., B. Miller, and R. Messmer. 1989. Migrational Patterson of Wallowa Stock Summer Steelhead Adults in the Grande Ronde and Snake Rivers during the 1987-88 Run Year (87513). Oregon Dept. of Fish and Wildlife, LaGrande, OR. (Draft)
- Royce, R. and R. Carmichael. 1986. Grande Ronde River Spring Chinook Production Plan -- WORKING DRAFT. Oregon Dept. Fish and Wildlife, Portland, Oregon. 35 pp.
- Royce, R. and R. Carmichael. 1986. Imnaha River Spring Chinook Production Plan -- WORKING DRAFT. Oregon Dept. Fish and Wildlife, Portland, Oregon. 28 pp.

**Washington Department of Fisheries - Operations and Maintenance**

- Atkins, L. 1987. Annual Report FY1987, Lyons Ferry Salmon Hatchery (86502 - FY1987). Washington Dept. of Fisheries, Olympia, Washington. 7 pp.
- Ringe, R. and R. Bugert. 1989. Fall Chinook Salmon Trapping at Ice Harbor Dam in 1989 (89525). Washington Dept. of Fisheries, Dayton, Washington. 7 pp.
- Ross, Carl. 1985. Annual Report Lyons Ferry Salmon Hatchery, 1984. Washington Dept. of Fisheries, Olympia, Washington. 4 pp.

Ross, C. 1986. Lyons Ferry Hatchery FY1985 Annual Report. Washington Dept. of Fisheries, Olympia, Washington. 11 pp.

Ross, C. 1986. Operations Reports, Lyons Ferry Salmon Hatchery. August 1, 1985 through July 31, 1986. Washington Dept. of Fisheries, Olympia, Washington. 20 pp.

Ross, C. and K. Hopper. 1989. Lyons Ferry Salmon Hatchery, Annual Report, FY1989. Washington Dept. of Fisheries, Olympia, Washington. 14 pp.

#### Washington Department of Fisheries - Evaluation Studies

Bugert, R., P. Seidel, P. LaRiviere, D. Marbach, S. Martin, and L. Ross. 1989. Lower Snake River Compensation Plan, Lyons Ferry Evaluation Program, 1988 Annual Report (88519). Washington Dept. of Fisheries, Olympia, Washington. 84 pp.

Foster, R. W. 1981. Snake River Fall Chinook Egg Bank Program, 1 Oct. 1980 - 30 Sept. 1981 (81002). Washington Dept. of Fisheries, Olympia, Washington. 3 pp.

Hopley, B. 1984. Completion Report Snake River Fall Chinook Egg Bank Program, 1 Oct. 1982 - 30 Sept. 1982 (82027). Washington Dept. of Fisheries, Olympia, Washington. 5 pp.

Hopley, B. 1984. Completion Report Snake River Fall Chinook Egg Bank Program, 1 Oct. 1982 - 30 Sept. 1983 (82027). Washington Dept. of Fisheries, Olympia, Washington. 5 pp.

Hopley, B. 1984. Closing Report, Snake River Fall Chinook Egg Bank Program, 1 Oct. 1983 - 30 Sept. 1984 (82027). Washington Dept. of Fisheries, Olympia, Washington. 6 pp.

Seidel, P. 1984. Lower Snake River Compensation Hatchery Evaluation Study (82064). Washington Dept. of Fisheries, Olympia, Washington. 23 pp.

Seidel, P. and B. Bugert. 1985. Lower Snake River Compensation Plan, Hatchery Evaluation Study (84097). Washington Dept. of Fisheries, Olympia, Washington. 22 pp.

Seidel, P., R. Bugert, R. S. Kirby, and L. Ross. 1986. LSRCP Lyons Ferry Evaluation Project, 1985 Annual Report (85072). Washington Dept. of Fisheries, Olympia, Washington. 54 pp.

Seidel, P. and R. Bugert. 1987. LSRCP Lyons Ferry Salmon Evaluation Program, 1986 Annual Report (86521). Washington Dept. of Fisheries, Olympia, Washington. 51 pp.

Seidel, P., R. Bugert, P. LaRiviere, D. Marback, S. Martin, and L. Ross. 1988. Lyons Ferry Salmon Evaluation Program, 1987 Annual Report (87512). Washington Dept. of Fisheries, Olympia, Washington. 106 pp.



**Washington Department of Wildlife - Operation and Maintenance**

- Fischer-Benzon, H. von. 1984. Lyons Ferry Operating Statistics, 1 Oct. 1982 - 30 Sept. 1983 (83061). Washington Dept. of Wildlife, Olympia, Washington. 2 pp.
- Fischer-Benzon, H. von and W.N. Hubbard. 1985. Tucannon Hatchery Operating Statistics, 1 Oct. 1983 - 30 Sept. 1984 (83061). Washington Dept. of Wildlife, Olympia, Washington. 3 pp.
- Fischer-Benzon, H. V. and W. N. Hubbard, 1986. Lyons Ferry - Tucannon FH's Operating Statistics for October 1, 1984 to October 1, 1985. Washington Dept. of Wildlife, Olympia, Washington, 5 pp.
- Harty, H.R. and W.N. Hubbard. 1989. Annual Report - Lyons Ferry and Tucannon Trout Hatcheries, October 1, 1987 to September 30, 1988. Washington Dept. of Wildlife, Olympia, Washington. 12 pp.
- Harty, H. and T. Holder. 1989. Lyons Ferry Fish Hatchery Annual Report, FY1989. Washington Dept. of Wildlife, Starbuck, Washington. 14 pp.
- Hubbard, W. 1989. Tucannon Fish Hatchery, Annual Report, FY1989. Washington Dept. of Wildlife, Pomeroy, Washington. 6 pp.

**Washington Department of Wildlife - Evaluation Studies**

- Fuller, R. K. 1986. Instream Habitat Improvement in Southeastern Washington, Final Report. Washington Dept. of Wildlife, Olympia, Washington. 94 pp.
- Hallock, D. and G. Mendel. 1985. Annual Report Instream Habitat Improvement in Southeastern Washington (84121). Washington Dept. of Wildlife, Olympia, Washington. 113 pp.
- Mendel, G. and K. Aufforth. 1985. Annual Report, Fall 1984 and Spring 1985 Steelhead Creel Surveys for the Snake and Lower Grande Ronde Rivers (84096). Washington Dept. of Wildlife, Olympia, Washington. 31 pp.
- Mendel, G., G. A. Lambacker, and M. L. Schuck. 1987. Fall 1985 and Spring 1986 Snake River Steelhead Creel Surveys, Part I: 1985-86 Annual Report (85073). Washington Dept. of Wildlife, Olympia, Washington. 95 pp.
- Mendel, G. W., G. A. Lambacker, and M. L. Schuck. 1988. Fall 1986 and Spring 1987 Snake River Steelhead Creel Surveys, Part I: 1986-87 Annual Report (86522). Washington Dept. of Wildlife, Olympia, Washington. 77 pp.
- Mendel, G. and R. Ross. 1988. Instream habitat improvement in Southeast Washington -- A Summary; with guidelines for construction. Washington Dept. of Wildlife, Olympia, Washington. 30 pp.

- Mendel, G. and M. Schuck. 1989. Migration Patterns of Wallowa Stock Hatchery Steelhead in the Snake and Grande Ronde Rivers of Washington. Washington Dept. of Wildlife, Dayton, Washington. 33 pp.
- Ross, R. and G. Mendel. 1987. Instream Habitat Improvement in S.E. Washington, Addendum to 1986 Final Report. Washington Dept. of Wildlife, Olympia, Washington. 21 pp.
- Schuck, M. 1985. Lyons Ferry Evaluation Study, 1983 Annual Report (83266). Washington Dept. of Wildlife, Olympia, Washington. 31 pp.
- Schuck, M. L. and G. W. Mendel. 1986. Assessment of Production from Lyons Ferry/Tucannon Complex, and Estimates of Return of Marked Fish to LSRCP Streams in Washington. Lyons Ferry Evaluation Study, Part II (84096). Washington Dept. of Wildlife, Dayton, Washington. 54 pp.
- Schuck, M. L. and G.W. Mendel. 1987. Lyons Ferry Evaluation Study, Part II 1985-86 Annual Report (85073). Washington Dept. of Wildlife, Olympia, Washington. 110 pp.
- Schuck, M.L., G.W. Mendel, and S.A. Nostrant. 1988. Lyons Ferry Evaluation Study, Part II: 1986-87 Annual Report (86522). Washington Dept. of Wildlife, Olympia, Washington. 127 pp.
- Schuck, M., G. Mendel, and S. Nostrant. 1989. Lyons Ferry Evaluation Study, 1987-88 Annual Report (87514). Washington Dept. of Wildlife, Dayton, Washington. 66 pp.
- Schuck, M., A. Viola, and S. Nostrant. 1990. Lyons Ferry Evaluation Study, 1988-89 Annual Report (88502). Washington Dept. of Wildlife, Dayton, Washington. (Draft) 68 pp.

#### Nez Perce Tribal Studies

- Cowley, P. K., B. Hill, and D. B. Johnson. 1987. A Method for Evaluating the Progress of the LSRCP in Meeting It's Goals - Revised (86510). Nez Perce Tribe, Lapwai, Idaho. 49 pp.
- Kucera, P. A. 1987. Nez Perce Tribal Review of the Salmon River, Lower Snake River Compensation Plan Working Paper (87502). Nez Perce Tribe, Lapwai, Idaho. 75 pp.
- Kucera, P. 1989. Nez Perce Tribal Review of the Imnaha River, Lower Snake River, Lower Snake River Compensation Plan Working Paper (87502). Department of Fisheries Management, Nez Perce Tribe, Lapwai, ID. 49 pp.
- Mauney, J. 1989. A Survey of the Nez Perce Subsistence Fishery for Chinook Salmon, North Fork Clearwater River, Idaho, 1988. Department of Fisheries Management, Nez Perce Tribe, Lapwai, ID. 49 pp.

Table 1. LOWER SNAKE RIVER COMPENSATION PLAN ACTIVITIES FOR 1989

INSTALLATION/PROGRAM	FUNDING LEVELS	SPECIES <sup>a</sup>	TYPE <sup>b</sup>	NUMBER OF FISH STOCKED <sup>c</sup>	POUNDS OF FISH STOCKED <sup>c</sup>
<b>STATE OF IDAHO</b>					
McCall SFH	\$302,914	SuCS	Smolts	975,000	46,850
South Fork Satellite			Fingerlings	290,000	5,891
Sawtooth FH	\$725,342	SpCS	Smolts	2,290,200 <sup>d</sup>	106,634
			Fingerlings	139,000	1,829
East Fork Satellite		SpCS	Smolts	305,300	15,490
Magic Valley FH	\$562,654	STT	Smolts	2,202,800 <sup>e</sup>	509,100
Clearwater Anadromous	\$210,700	SpCS	Smolts	400,329 <sup>f</sup>	20,133
Red River Satellite		SpCS	Smolts	291,200	11,420
<b>STATE OF OREGON</b>					
Lookingglass FH	\$399,378	SpCS	Smolts	503,664 <sup>g</sup>	31,626
			Fingerlings	126,700 <sup>h</sup>	3,500
Imnaha Satellite			Smolts	142,320	8,895
Big Canyon			Smolts	172,202	12,275
Irrigon FH	\$900,240	STT	Smolts	644,104 <sup>i</sup>	121,815
		STT	Fingerlings	52,283	1,078
Wallowa FH		STT	Smolts	545,711	121,105
Little Sheep Satellite		STT	Smolts	249,456	47,067
Big Canyon Satellite		STT	Smolts	224,696	39,475
<b>STATE OF WASHINGTON</b>					
Lyons Ferry FH (Dept. of Fish)	\$436,226	SpCS	Smolts	152,165 <sup>j</sup>	16,907
		FCS	Smolts	413,017	37,547
			Smolts	549,884 <sup>k</sup>	6,738
Lyons Ferry FH (Dept. of Wildlife)	\$799,054	STT	Smolts	861,033 <sup>l</sup>	165,558
			Fingerlings	279,760 <sup>l</sup>	6,367
Tucannon FH Satellite	\$136,481	RBT	Catchables	288,369 <sup>m</sup>	48,722
		RBT	Catchables	170,279 <sup>n</sup>	57,911
<b>FISH &amp; WILDLIFE SERVICE</b>					
Hagerman NFH	\$550,000	STT	Smolts	1,478,830 <sup>o</sup>	299,425
Dworshak NFH	\$201,000	SpCS	Smolts	1,653,252 <sup>o</sup>	88,498
			Smolts	206,459 <sup>o</sup>	2,683
			Fingerlings	356,244	2,695
Dworshak Fish Health Center	\$ 32,850				
YCC Program	\$ 74,000				
Regional Office	\$226,000				
LSRCP Management/Coord.	\$202,000				
<b>EVALUATION STUDIES<sup>o</sup></b>					
	\$1,112,679				
<b>TOTAL OBLIGATED</b>					
	\$6,871,518				
		<b>Species Summary:</b>			
		FCS	Yearlings	413,017	37,547
			Zero-age	549,884	6,738
		SuCS	Smolts	975,000	46,850
			Fingerlings	290,000	5,891
		SpCS	Smolts	6,575,739	314,561
			Fingerlings	621,944	8,024
		STT	Smolts	6,206,630	1,303,545
			Fingerlings	332,043	7,445
		RBT	Catchables	458,648	106,633
		<b>TOTALS</b>		16,422,905	1,837,234

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

<sup>b</sup> Fry releases are not included in the table.

<sup>c</sup> Smolt releases are from facilities listed unless otherwise noted; all fingerlings releases are offsite.

<sup>d</sup> Includes 198,200 released into the Yankee Fork and 990,400 released in October from Sawtooth FH.

<sup>e</sup> Released at Sawtooth FH, East Fork, and several upper and lower Salmon River sites.

<sup>f</sup> Fish reared at Dworshak NFH and released at the Crooked River and Powell satellite locations.

<sup>g</sup> Includes fall releases totaling 86,310.

<sup>h</sup> Experimental 0-age spring smolt release.

<sup>i</sup> Released offsite at various locations.

<sup>j</sup> Released from Tucannon FH.

<sup>k</sup> Zero-age smolts.

<sup>l</sup> Released from hatchery, three satellite locations, and directly into streams.

<sup>m</sup> Released at Sawtooth FH, East Fork, and several Clearwater River sites.

<sup>n</sup> Includes 400,329 smolts outplanted to several tributaries.

<sup>o</sup> Includes costs for all FWS, Tribal, and State studies.

Table 2. LOWER SNAKE RIVER COMPENSATION PLAN EVALUATION STUDIES

<u>Cooperator/Study</u>	<u>1989 Funds</u>	<u>Species Studied</u>
<u>Idaho Dept. of Fish and Game</u>		
Hatchery Evaluations	\$267,972	Chinook, Steelhead
<u>Oregon Dept. of Fish and Wildlife</u>		
Hatchery Evaluation	\$249,990	Chinook, Steelhead
Pre-smolt Release (tagging)	7,067	Chinook
Reprogramming Smolts (tagging)	6,668	Chinook
Subtotal	\$263,725	
<u>Washington Dept. of Fisheries</u>		
Lyons Ferry Evaluation	\$224,325	Chinook
<u>Washington Dept. of Wildlife</u>		
Lyons Ferry Evaluation	\$150,168	Steelhead, resident trout
<u>Nez Perce Tribe</u>		
LSRCP Production Plan Evaluations	\$ 43,489	Chinook, Steelhead
<u>Umatilla Confederated Tribes</u>		
LSRCP Evaluation Project	\$ 23,500	Chinook, Steelhead
<u>Dworshak Fisheries Assistance Office (FWS)</u>		
Hatchery Coordination	\$ 61,500	Chinook, Steelhead
<u>Idaho Coop. Fish and Wildlife Res. Unit (FWS)</u>		
Spawning Interactions	\$ 58,000	Chinook
<u>Seattle National Fisheries Research Center</u>		
BKD Study	\$ 20,000	Chinook
TOTAL	\$1,112,679	

Table 3. Pertinent Data for Lower Snake River Fish and Wildlife Compensation Plan Fish Hatchery Facilities

Hatchery (Operator) <sup>a</sup>	Fish Type	Pounds	Construction Cost (\$1,000)	Satellite Facilities	Date of Completion	
Lookingglass (ODFW)	Spring Chinook	69,600	6,324	Big Canyon Creek Imnaha	Nov. 82	
			1,805		Apr. 87	
			818		Jul. 89	
Irrigon/Wallowa (ODFW)	Steelhead	279,600	8,117	(Wallowa) <sup>b</sup> Little Sheep Creek (Big Canyon Creek)	Oct. 85	
			2,206		May 85	
			1,780		Aug. 87	
			1,809			
Lyons Ferry:			20,503 <sup>c</sup>			
Phase I (WDW)	Steelhead	116,400		Cottonwood Dayton Pond	Nov. 83	
	Trout	45,000				
	Trout	41,000	540	Tucannon Hatchery Curl Lake	Feb. 85	
			828		Oct. 86	
			2,775		Nov. 84	
			143		Feb. 85	
Phase II (WDF)	Fall Chinook	101,800			Nov. 84	
	Spring Chinook	8,800				
Sawtooth (IDFG)	Spring Chinook	149,000	9,322	East Fork Salmon R.	Jan. 85	
			1,386		Nov. 83	
Dworshak (FWS)	Spring Chinook	70,000	1,539		Nov. 82	
Clearwater (IDFG)	Steelhead	350,000	20,500	Red River Crooked River Powell	Dec. 91	
			759		Nov. 86	
			2,177		May 90	
Magic Valley (IDFG)	Steelhead	291,500	10,753	(Sawtooth) (East Fork)	May 89	
					1,239	Aug. 87
Hagerman (FWS)	Steelhead	340,000	6,980	(Sawtooth) (East Fork)	Apr. 84	
McCall (IDFG)	Summer Chinook	61,300	4,615	South Fork Salmon R.	Sep. 81	
			838		Jul. 80	
Eagle Lab (IDFG)	Disease diagnostic		1,300		Mar. 91	

- <sup>a</sup> 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

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

<sup>c</sup> Total cost of Lyons Ferry Phases I and II

Table 4. Adult return goals and hatchery or trap rack returns of LSRCP hatcheries operating in 1989 (total return estimates to the Snake River basin are not available).

Species/Hatchery	Adult Return Goals to Snake River	Hatchery/Trap Rack Returns <sup>1</sup>
Summer Chinook		
McCall FH/South Fork	8,000	939
Spring Chinook		
Sawtooth FH/East Fork	19,232	1,016
Lookingglass FH/Imnaha	9,072	1,542
Dworshak NFH	9,000	1,698
Lyons Ferry/Tucannon	1,152	87 <sup>2</sup>
Clearwater FH	12,200	260
Fall Chinook		
Lyons Ferry FH <sup>3</sup>	18,300	2,272
Steelhead Trout		
Irrigon/Wallowa FH <sup>4</sup>	11,184	1,700
Lyons Ferry FH	4,656	243 <sup>5</sup>
Hagerman NFH/Magic Valley FH <sup>6</sup>	25,260	1,373

<sup>1</sup> Chinook returns include jacks.

<sup>2</sup> Returns to Powell and Red River traps only.

<sup>3</sup> Includes ladder returns plus Ice Harbor trapping results.

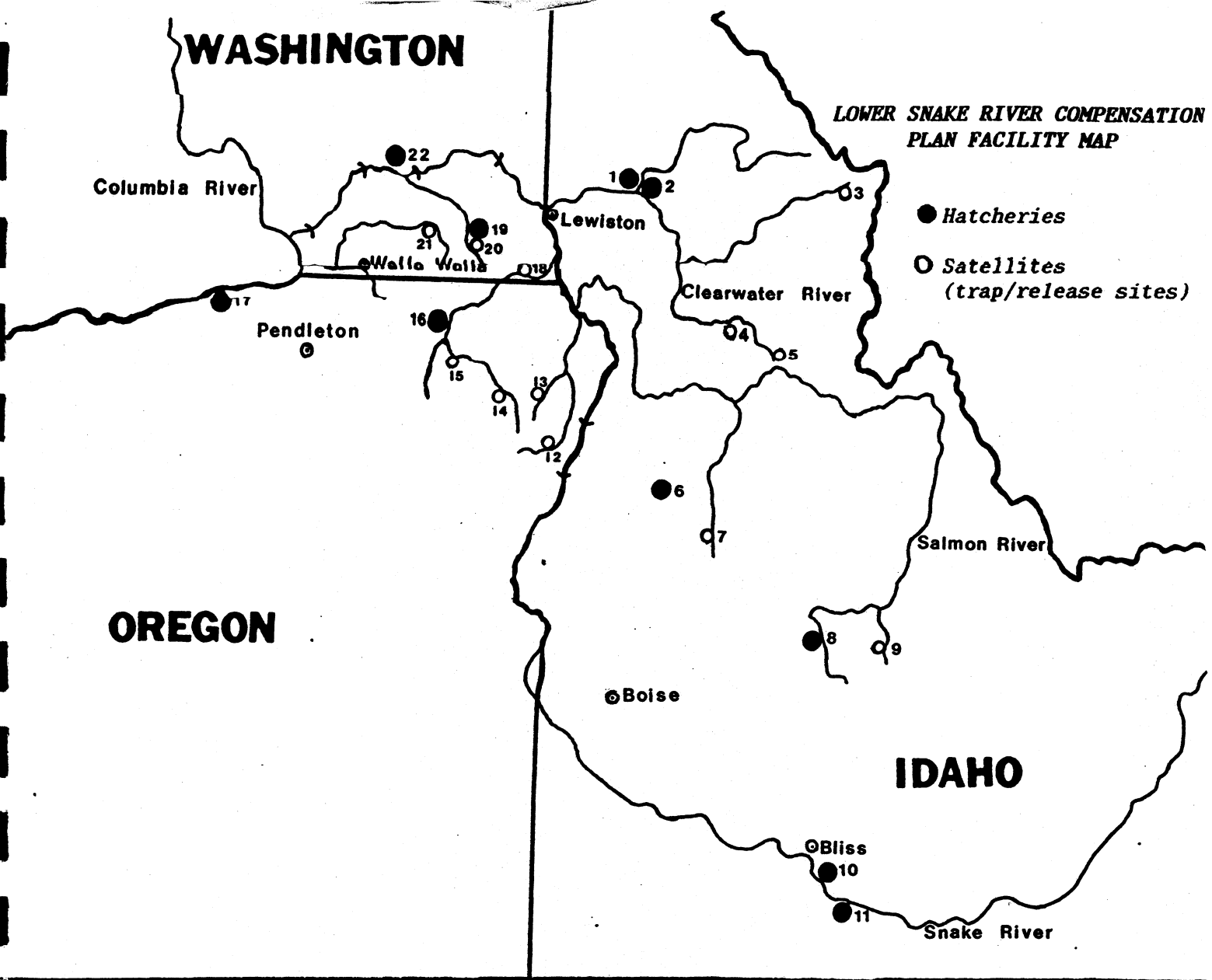
<sup>4</sup> Includes returns to Wallowa, Big Canyon, Little Sheep traps.

<sup>5</sup> Ladder is only open for short period, many captures are strays.

<sup>6</sup> Includes returns to East Fork, Sawtooth FH racks.

# WASHINGTON

## LOWER SNAKE RIVER COMPENSATION PLAN FACILITY MAP



OREGON

IDAHO

### 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