ANNUAL REPORT

FISCAL YEAR 1990

DWORSHAK NATIONAL FISH HATCHERY

AHSAHKA, IDAHO

Project Leader	Date 12/14/90
Associate Manager	Date 1-5-91
Acting Assistant Regional Director	Date 1-8-91

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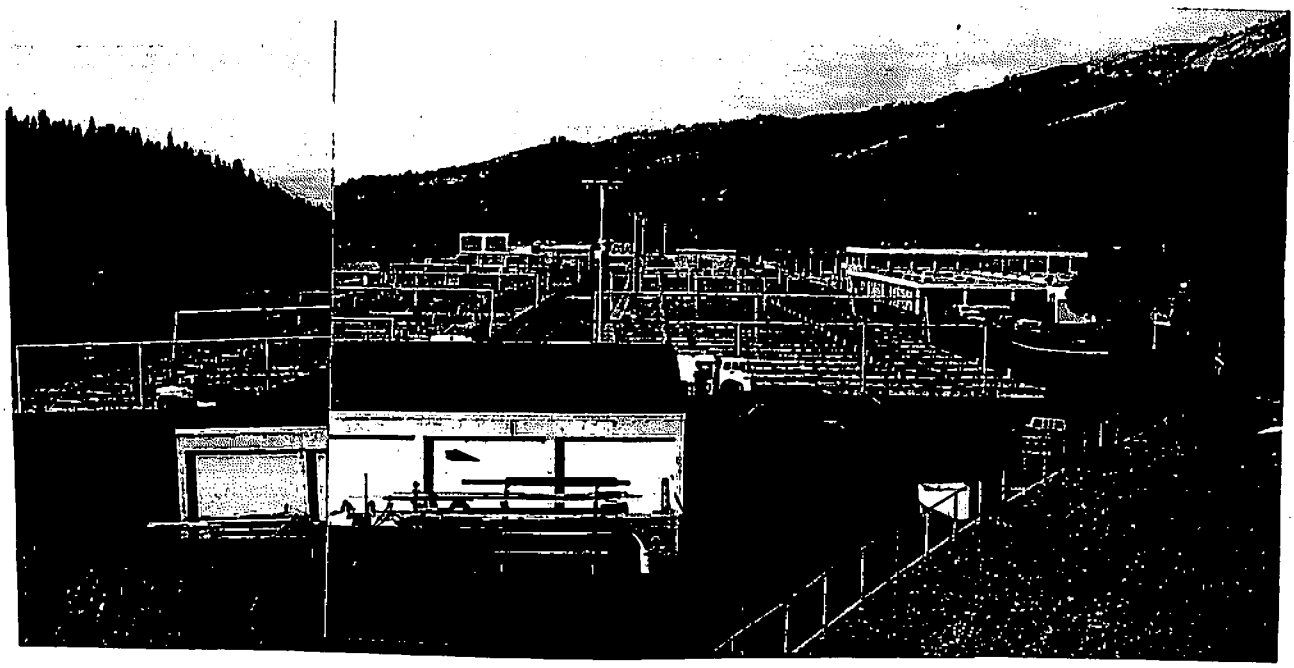
INTRODUCTION

Dworshak National Fish Hatchery is located at the confluence of the North Fork of the Clearwater River and the main stem Clearwater River near the unincorporated town of Ahsahka, in north central Idaho. The site is 3 miles west of Orofino (population 3,800) on the north bank of the Clearwater River, 1 mile downstream from Dworshak Dam. Land was purchased by the U.S. Army Corps of Engineers (COE) in 1967 from several owners with title remaining with the COE.

Construction of the Dworshak hatchery was included in the authorization for Dworshak Dam and Reservoir, Public Law 87-874, dated 23 October 1962. Design and construction was by the COE with administration and operation by the U.S. Fish and Wildlife Service (FWS). Purpose of the hatchery is to mitigate for steelhead losses caused by Dworshak Dam and Reservoir.



Operations began in 1969 with completion of the first phase of construction. This provided a total reuse system for 25 ponds and a single-pass system for 59 ponds. A second phase in 1972 placed all ponds on recycled flow. The hatchery has option to operate the outside ponds on either single pass or recycled flow; the latter option used only for heating water during the winter months for added growth in steelhead production. Subsequent construction has modified many of the earlier features. New design concepts continue to be incorporated into the hatchery.

Additional construction, completed in 1982 under the Lower Snake River Compensation Plan (LSRCP) expanded facilities to rear spring chinook salmon. First release of chinook yearling smolts occurred in spring 1983.

Egg incubation units consist of 58 vertical (16 tray) Heath incubators, 204 colanders and 128 hatching jars for a total eyed egg capacity of 7.5 million steelhead or 5 million spring chinook.

There are 128 inside nursery tanks used for fingerling production, 84 Burrows ponds for steelhead smolts and 30 raceways for spring chinook smolt production. In addition, there are nine (9) adult holding ponds (17'x75') of which six (6) are modified into twelve (12) 8'x75' raceways to hold rainbow production.

Steelhead and rainbow trout are mitigation production assigned to the hatchery with construction of Dworshak Dam. Steelhead and spring chinook are released into the Clearwater River drainage and rainbow into Dworshak Reservoir. As the result of Dworshak's Infectious Hematopoietic Necrosis Virus (IHNV) disease status, rainbow trout production has been assigned elsewhere since 1983 for stocking Dworshak Reservoir. Costs for this program remains with the Dworshak hatchery. Spring chinook are presently being reared in 12 raceways previously identified for rainbow production. This additional rearing space allows for an increased chinook production capacity of 400,000 smolts weighing 20,000 pounds.

Total production capacity is as follows:

Steelhead	2.3 million	450,000 pounds (200 mm)
Spring Chinook	1.7 million	90,000 pounds (140 mm)

Kooskia National Fish Hatchery (KNFH), located 35 miles upriver, has operated as a complex with Dworshak since 1978 to produce spring chinook smolts. Steelhead fingerlings have, since 1982, been added to their program in an effort to manage around Dworshak's IHNV disease problem. Fish are returned to Dworshak at 250 per pound.

This report covers the period of hatchery activities from October 1, 1989 to September 30, 1990.

STATION HIGHLITES

Operating funds (1935 account) transferred from the Corps of Engineers (COE) were $1,106,000. An amount of $14,000 (8610 account) was used from quarters rental reimbursements for a total of $1,120,000. In addition, $50,000 was budgeted to the Dworshak Fish Health Center (FHC) for their assistance and $50,000 to the Idaho Fishery Resource Office (FRO) for continuation of a broodstock evaluation study. Included in the hatchery's funding was a transfer of $14,500 to Hagerman National Fish Hatchery (HNFH) for the production and distribution of rainbow trout for stocking Dworshak Reservoir; a mitigation responsibility of Dworshak hatchery. Also, $5000 was transferred to Kooskia National Fish Hatchery (KNFH) for pumping costs to rear Dworshak steelhead fingerlings, another $29,200 to HNFH for rearing and transporting steelhead fingerlings (Brood Year 1990) to Dworshak in summer 1990. The total cost, $48,700 for the above programs, represents Dworshak's share of expenses to rear rainbow and steelhead trout at other hatchery locations in an effort to manage around IHN virus disease. Fish marking costs totalled $58,000 including $48,000 to ad-clip 2.7 million steelhead fingerlings and $10,000 for coded-wire tagging of contribution groups.

The Lower Snake River Compensation Plan (LSRCP) funded $210,000 (4710 account) for production of spring chinook salmon. The Youth Conservation Corps (YCC), an 8-week summer work program, was also funded by the LSRCP.

Total hatchery operation and maintenance funding, excluding FHC, FRO and YCC, was $1,330,000. Salaries accounted for 51 percent of this total or $705,400.

A total of 21.2 staff years were employed during the year. Permanent employees represented 19.2 and temporaries 2.0 years. Another 1.4 staff years were covered by high school students employed part-time and 1.4 years through staffing of an 8-week YCC program.

Feed conversion was 1.63 (less than 2 pounds of food to produce 1 pound of fish gain) for spring chinook and 1.35 for steelhead. Feed cost per pound of fish produced was $0.70 for chinook and $0.40 for steelhead; a reduction of $0.13 for chinook from the previous year as a result of a decrease in feed costs and a lower conversion.

The hatchery's gain in steelhead production was 378,314 pounds for the year (10/01/89 - 9/30/90) compared to last year's production of 265,942 pounds gained primarily from Brood Year 1988's program released as smolts in spring 1989. This year's increased production was reflective of Brood Year 1989's program being successfully reared in absence of fish health problems in the outside ponds. Dworshak released 2,663,550 steelhead smolts, weighing 400,106 pounds, both off site and directly from the hatchery.

Spring chinook production of 92,093 pounds compared favorably with the previous year of 95,930 pounds. Sufficient returns of spring chinook adults to Dworshak and Kooskia hatcheries assured meeting egg requirements for the fourth successive year beginning with 1987.

Ending the reporting year of September 30, 1990, Dworshak was holding 1.5 million spring chinook fingerlings Brood Year 1989, for a planned yearling smolt release in spring 1991 of 1.4 million, down 300,000 to accommodate a density study. Nearly 3 million eggs collected from Brood Year 1990 adult returns were in incubators. Steelhead fingerlings on station were 2.76 million to meet a scheduled smolt release of 2.3 million the following spring. Success of this program was attributed to a loss of less than 15 percent to IHN virus in Dworshak's nursery rearing.

Ladder operation was begun on October 11, 1989 to collect early arriving adult steelhead in the river. The ladder was shut down on October 27 when 558 fish were counted. The ladder resumed operation on February 13.

A record number of steelhead, 2,329, entered Dworshak's fish ladder during a 72-hour period ending on February 16. A holdover of 558 fish, collected in October, representing an early segment of the run, were spawned during the month. The ladder was reopened on February 22 and remained open until final closure on May 8, the last spawning date. A total of 10,,613 fish returned via Dworshak's ladder and nearly 11.3 million eggs were collected.

The 1989-90 steelhead run into the Clearwater River provided some of the best fishing in many years. A record 16,000 fish were caught by anglers in the Clearwater during the fall season, alone, as reported by Idaho Department of Fish and Game. Ideal river temperatures and water flows contributed to the early fall return. These fish, as smolts, representing Dworshak's spring 1987 release, reached the collection facilities at Lower Granite Dam and Little Goose Dam and were captured in impressive numbers for transporting though a remaining series of dams on the Lower Snake and Columbia rivers.

Sport fishing continued to be a general topic of conversation in the area as steelhead catch rates remained high through the winter. Numerous news articles reported on the fishing successes. Public television, of Boise, spent time at the hatchery in February to video the spawning activities and to interview Manager Olson on hatchery operations. A 30-minute segment appeared in March on "Idaho Recreation Report." Idaho Statesman reporters newspaper were also on station in February along with The Lewiston Tribune reporting news stories on the steelhead returns and spawning operations.

Adipose clipping of 2.7 million steelhead fingerlings in production at Dworshak was begun on October 2 and completed in January. Several coded-wire tagged groups were included for a contribution study.

Kerry Grande, Fishery Biologist (trainee) at Dworshak, was selected as a team member to begin the "Visioning" process initiated by the Regional Office (Fisheries). Kerry attended several meetings in Portland with team members to develop a "Vision" statement.

Regional Director Marv Plenert, Assistant Regional Director (Fisheries) Bill Shake, and Fishery Associate Manager Dan Diggs, visited Dworshak on October 11-12. Mr. Plenert talked to station employees giving them a perspective of the Service and answering questions of regional and national interest.

Several Corps engineers from the Walla Walla District Office were at the station on October 17-19. Purpose of their visit was to meet with staff members regarding major maintenance projects at Dworshak. A preliminary report was prepared by the Corps to address the rehab/modernization items needing attention. Costs are estimated at $15-20 million if ozone water treatment is included.

In celebration of Idaho's centennial year, a flag depicting the 100-year anniversary of statehood was purchased to be flown during the 1990 centennial year. Local news media reported on the flying of the state flags by all government agencies in the Orofino area.

Selector gates at Dworshak Dam were removed on December 14, 1989 causing water temperatures to drop from 46°F to 41°F. Dworshak's System II heated reuse was activated in late November and maintained at 54°F until April 19 prior to release of steelhead smolts. System III was changed over to reuse on January 30, 1990 and continued until April 11. Selector gates were reinstalled on April 24 when warmer water temperatures became available.

Dworshak's steelhead smolts were outplanted April 16-25. A total of 1.5 million fish weighing 219,000 pounds was distributed to six planting sites in the Clearwater Basin. Some 6100 miles were covered in 46 trips. Hiring of four temporary Motor Vehicle Operators became necessary when the Corps of Engineers (COE) could not furnish drivers as in past years. Another 1.4 million fish were released directly from the site in early May.

Additional outplantings of the excess adult steelhead were scheduled to begin on April 18 to waters in the Clearwater Basin. However, this year's program took an unexpected drop in returns in the latter weeks of adult collection. Fish returning after April 10 were less than 10 percent of the final number to Dworshak. Based upon the past 10 years (1980-1989), 40 percent of Dworshak's return was collected after April 10 until shut down of the ladder in early May. To avoid another similar situation as in Brood Year 1990, we will begin holding any excess fish several weeks in advance of planned outplanting.

Replumbing of the incubator room in 1989 made two different temperatures available to egg incubators. Using a recently developed computer program, it was possible to track and manipulate temperature units for the various egg takes. This enabled merging certain egg takes and managing others so that eye-up occurred on specific desired dates.

Some 2.5 million eyed steelhead egg shipments were made to Kooskia, Hagerman and Magic Valley State Hatchery in accordance to prior scheduled commitments.

Early concern over lack of snow in December and January was soon dispelled when the snow pack reached near normal levels with increased snowfall beginning in February. Below normal precipitation in March through May improved with increased rainfall in June.

An iodine study to reduce the incidence of IHN virus in Dworshak's water supply was highly successful. Reducing the level of iodine to 0.25 mg/L maintained healthy fish during the study period. The study will be repeated in 1991 to further explore its use in Dworshak's water.

A Youth Conservation Corps (YCC) 8-week program employing six enrollees and one crew leader assisted in several work projects during the summer. This program has been made available to the hatchery through LSRCP funding since 1983. Prior to YCC and since 1977, the station has been actively involved in the Young Adult Conservation Corps (YACC) program. The YCC program, alone, has contributed over 25,000 hours of work to the project since initiated.

Dworshak's second annual kokanee fishing derby was held on Dworshak Reservoir May 11. A great time was enjoyed with 240 fish caught in 3 hours of evening fishing. Family and friends enjoyed a fish fry the following day. Another successful hatchery kokanee derby (phase II) was held on June 8 with 48 participants. A fish fry again followed in Dworshak's housing area.

Dworshak's steelhead losses in the nursery tanks from IHN virus were considerably reduced from previous years. Less than 15 percent mortality occurred in a population of 2 million fish started at the hatchery. Excess production, identified at Hagerman NFH, would not be returned to Dworshak as originally scheduled.

A Corp's Plan of Study (POS) was prepared by the Walla Walla District for addressing Dworshak's disease problems. The Service requested a 21,000 gpm water supply be treated with ozone for disease control with an additional 6400 gpm of reservoir water for egg incubation and early nursery rearing. In late August approval was received that Dworshak would obtain 6400 gpm water from the reservoir water supplying the new Clearwater Hatchery. Water would be available from two different temperature zones furnishing desired temperature for egg incubation and early nursery rearing.

Ladder operation for collection of spring chinook adults was begun on May 18. Spawning of the brood fish ended on September 13 with an estimated 4.9 million eggs collected from a return of over 3100 fish to Dworshak and Kooskia. Success of the program again assures the two hatcheries of meeting their yearling smolt requirement for the fourth successive year and also continue to provide fingerling production to the three LSRCP satellite facilities of Red River, Crooked River and Powell.

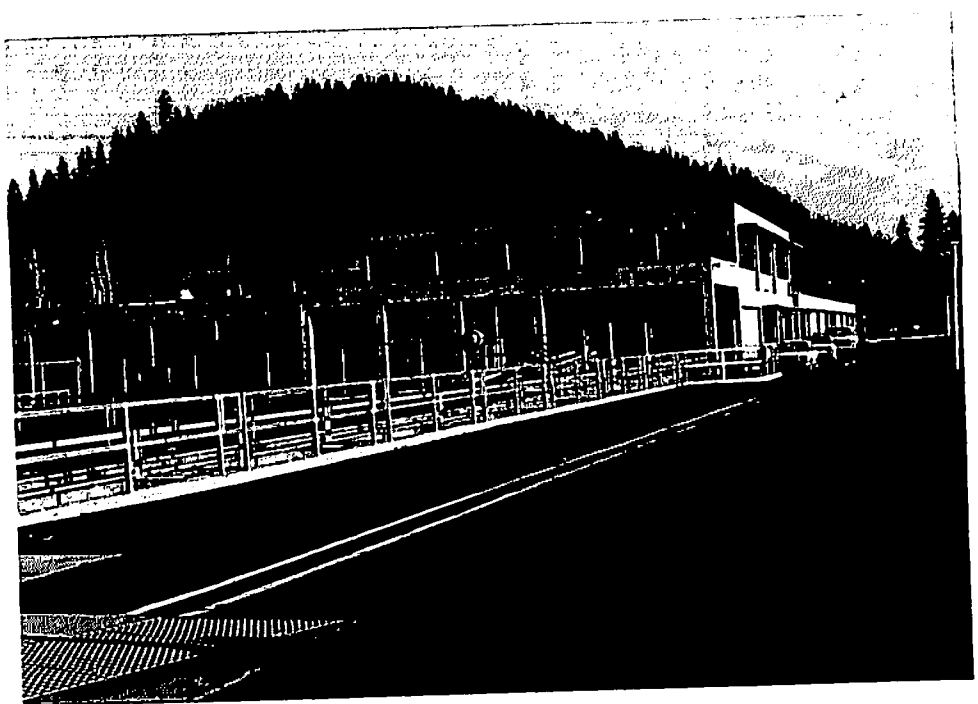
Dworshak's water supply was dropped in temperature from 54°F to 48°F beginning on September 4, ending September 21, in a test by the Fish Passage Center to move adult steelhead upriver. Water from Dworshak Reservoir was also increased in flow during the month. There appeared to be little change in fish movement as the result of these efforts. Steelhead continue to hold below Ice Harbor Dam with early numbers over the Snake River dams remaining low to cause some concern for returns in 1990-91 to the Clearwater.

Highlighting a few of the major work activities was the installation of an electric boiler in Mechanical No. 1 including all wiring and buss work; completion of cedar panelling on interior walls of the hatchery visitor area; construction of a storage and office work area in the upstairs hatchery lobby; assistance in placement of new visitor displays and information signs, and continuation of the hatchery perimeter fencing.

The station continues its approach towards a safe free work environment with only a few minor injuries reported for medical attention. Regular safety meetings were held with a chairperson and committee actively participating during the year.

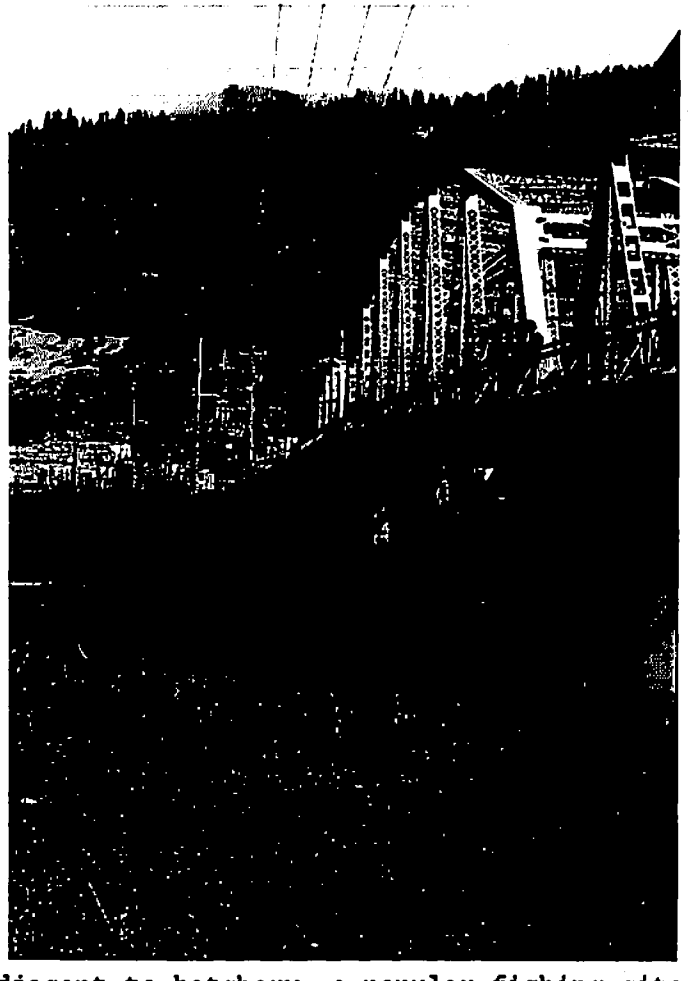
STATION HIGHLITES PHOTOS

Regional Director Marv Plenert and Assistant Regional Director (Fisheries) Bill Shake at a meeting with station personnel.



Main hatchery building with adjacent brood fish holding ponds and crowding channels.

Spring chinook salmon fishing in vicinity of hatchery--a first in several decades for a sport fisheries.



Highway bridge adjacent to hatchery--a popular fishing site for steelhead and spring chinook salmon.

NEWSPAPER CLIPPINGS

LEWISTON MORNING TRIBUNE

Thursday, December 28, 1989

For steelhead anglers, this year's catch makes this season one of the ...

KEEPERS

By Bill Loftus
of the Tribune

The fall's steelhead run has already earned its niich in the record books as the largest to find its way up the Snake River since counting be...

calendar year total stands at 132,559, slightly less than the 134,519 counted in 1988.

Those records are slightly ...

hours

"I'm sure that the ...

Thursday, February 8, 1990

LEWISTON MORNING TRIBUNE

Spawning, ladder operation to begin at hatchery

AHSAHKA — U.S. Fish and Wildlife Service workers Tues... begin sorting through ... than 300 ... at

eggs for its own needs.

Each batch of eggs will be tested for IHN virus. Many of the eggs testing negative for the virus will be shipped to Kooskia ... national fish

Idaho, will once again play back-up roles to Dworshak against another devastating outbreak of IHN disease.

Eggs testing positive for IHN will be kept at Dworshak, partly because their loss to the disease would simply follow past year's results. Fish and Wildlife Service biologists ... the survivors ... said a strain of

LEWISTON MORNING TRIBUNE

Thursday, February 8, 1990

Steelhead catch spawns smiles among anglers, shop owners alike who are...

BENT ON SUCCESS

ROFINO — Fishing tackle dealer Stu Kestner had a hard time saying steelhead without a grin Tuesday. ... He was even able to laugh at a plummeting catch rate, meaning anglers had to fish twice as long to catch a steelhead as last week's eight-hour average on the lower Clearwater River.

This year's statistics, Kestner notes, are all relative. Most years, 15 hours a fish would be ... excellent fishing.

lands his third fish of the afternoon after an aerial ... the Ah...

cement abutment leading to Dworshak Dam.

After a week without ca... steelhead, Holloway had to shift out of his norm... patterns. "Usually I'... ing the mornings. I'... come back out an... ternoon."

The move pa... er took the ji... oet a few m... half-dozen ... rail with ... the roe... Ho... fish ... re...

LEWISTON MORNING TRIBUNE

Thursday, February 22, 1990

Hatchery hits rush

AHSAHKA — Dworshak National Fish Hatchery, or rather the steelhead migrating there to spawn, began spring with a rush.

U.S. Fish and Wildlife Service crews expected to finish today sorting through an estimated 1,700 steelhead that entered the hatchery's tanks during the 72 hours its fish ladder was o... last week.

Wayne Olson, h... ager, said the ... Feb. 1...

Dworshak hatchery collects more fish, faster than ever

By Bill Loftus
of the Tribune

Dworshak National Fish Hatchery officials find themselves treading carefully in a flood of steelhead that threatens to overwhelm them.

If it does, however, food bank officials throughout Idaho will enjoy the result. This year promises to be a better year for those who depend on the bounty of Dworshak's steelhead.

... first 72 hours of operation ... ladder this year, the ... Ahsahka collected ...

doubt about it," ... manager Wayne ... had that ... here in ...

caused by a flood control drawdown of Dworshak Reservoir ... Idaho Fish and Game ... officials.

... water means steel... have to change ... more steelhead ... into the hatch...

the department's regional fishery manager at Lewiston.

High water gives steelhead a bigger edge over anglers and a fish fights often ends with a straightened hook because of the powerful fish and powerful current, Bowler said.

Fish that aren't caught by anglers find their way into the hatchery. If the hatchery doesn't

See Hatchery, Page 6A

Steelhead for the Hungry

1989	4,034
1988	2,832
1987	3,320
1986	2,999

The Dworshak National Fish Hatchery gives surplus steelhead to Idaho food banks

Monday, February 26, 1990

LEWISTON MORNING TRIBUNE

Thursday, April 5, 1990

LEWISTON MORNING TRIBUNE

Dworshak steelhead collection going well

By Bill Loftus
of the Tribune

Dworshak National Fish Hatchery has been getting steelhead at a record pace for much of the spring. Steelhead anglers on the Clearwater River, however, didn't fare as well.

The 1,100 steelhead ... the hatchery Tue... Wednesday brou... total to 4,17...

LEWISTON MORNING TRIBUNE

Thursday, March 1, 1990

Outdoors

Hatchery jumping with steelhead

Dworshak collection of spawning steelhead continues to surprise

By Bill Loftus

"Steelhead again surprised officials at Dworshak National Fish Hatchery at Ahsahka this week, ... by a lesser margin than last ...

... fishers sorted through ... eration only 72 hours.

A new wrinkle in Dworshak's operations begins today with a shipment of ... transferred steelhead from a fish trap at Hells Canyon Dam, but none have come from Dworshak.

had slowed dramatically during the past week.

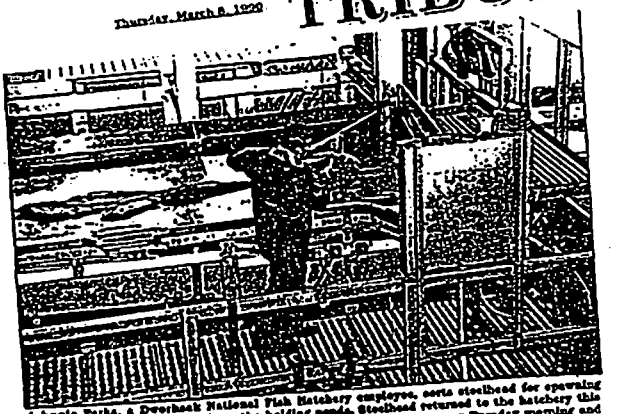
Streufert said officials estim... 500 steelhead were swimming ... pond before the spawning actually began.

Of the fish colle... week, 370 were ...

The Steelhead Capital of the World

CLEARWATER TRIBUNE

Thursday, March 8, 1990



Johanie Parks, a Dworshak National Fish Hatchery employee, sorts steelhead for spawning as they rise on the elevator from the holding ponds. Steelhead returned to the hatchery this year in record numbers. Spawning is carried out at the hatchery every Tuesday morning and visitors are welcome to watch this interesting operation.

STEELHEAD, 1989-90: AS GOOD AS IT SEEMED

Steelhead fishermen on the Clearwater River may have smile lines permanently embedded in their faces after the season that ended last month. The results of a Fish and Game survey of steelhead anglers confirm what everyone suspected: The 1989 run into the Clearwater will go down as one of the best in decades.

Anglers caught a record 16,000 steelhead in the Clearwater during the fall season alone, which ran from Oct. 15 through the end of the year.

While the catch for the spring season hasn't bee tabulated yet, regional fisheries manager Bert Bo predicted the combined total will easily exceed the 1985-86 seasons, which totalled 20,000 previous high harvest since the pre-dam er

"We probably picked up another 10,0 so the 1989-90 seasons are almost he said.

For sportsmen familiar wit cycle of Idaho's steel aspect of last season that led to a rel Clearwater.

The good r steelhea Ocean Littl ir

8–Clearwater Tribune - Orofino, ID - July 26, 1990

Olson says fishing year a success

Wayne Olson, manager of Dworshak National Fish Hatchery, spoke of activities at the hatchery at the July 18 meeting of the Orofino Chamber of Commerce

Olson reported a good Chinook run with over 2400 fish already collected

the Idaho Department of Education. Chinook carcasses are not given to the program, however, as they are inedible after spawning.

The IHN virus has not been a major problem this

Kestner. He reported on the meeting of directors noting that the Clearwater Challenge Raft Race was successful and fared better financially this

also

LEWISTON MORNING TRIBUNE Thursday, May 1, 1991

Chinook running strong

Sport-fishing season on Clearwater may be in offing

By Bill Loftus
of the Tribune

Idaho Fish and Game Commissioners may formally consider setting chinook salmon fishing dates today or Friday for the Little Salmon and Clearwater rivers.

Fish and Game biologists tentatively have proposed opening a chinook fishing season on the Little Salmon south of gins May 12.

e department has also proposed g a chinook season on the Clearune 15, said Steve Huffaker, 4 Game Department Fisheries hief at Boise.

fate of the Clearwater s roposed for both a er and the 1 rea

—whether the fish show up in sufficient numbers.

In a mid-April commission meeting at Twin Falls, department biologists recommended fishermen get the green light if the run totaled 4,400 adult salmon at Ice Harbor Dam by May 1.

By the end of counting Monday, the total at Ice Harbor had climbed to 7,452 adult chinook, nearly double the total needed to trigger setting a se

Based on a computer pr May 1 total at Ice Ha some 26,000 chi Granite h run

have been cautious about predicting this year's salmon run, in part because of last year. Encouraged by chinook counts at Columbia River dams, the de partment was enthusiastic about prospects for the first Clear on season in more th

But the sa Colum

Lewiston Tribune
8-16-90

IHN hasn't gripped Dworshak fish

By Bill Loftus
of the Tribune

The annual run of Dworshak National Fish Hatchery's tragic bout with a lethal steelhead disease apparently will be staged this year.

Olson said

Olson added.

"If you get this far along and the fish are at a size now where I would really be doubtful that we would see any high losses," he added.

In past years, IHN hit hardest during June and July when the young fish were still less than two inches long and still in

tanks.

Region 2

IDAHO FISH & GAME

WILDLIFER

Idaho Department of Fish and Game 1540 Warner Avenue/Lewiston, Idaho 83501 (208) 743-6502

JULY 1990

News Contact: Red Nichols

CHINOOK, STEELHEAD COLLECTION SETS ALL-TIME RECORDS

In a year when Idaho anglers enjoyed one of the best steelhead runs in history and with barely a month's layoff were back catching chinook salmon in the Clearwater River for the first time in a decade, there was yet another landmark event: this spring, steelhead and chinook smolts migrated downstream toward the Pacific Ocean in record numbers.

FISH AND FISH EGG DISTRIBUTION SUMMARY

Station: DWORSHAK NFH, ID

Fiscal Year: 1990

Species	Fish or Fish Egg Number	Fish		Management Area	State	Agency
		Total Weight	Length			
Spring chinook salmon	350	18	5.3	UNIVERSITY O	ID	University
Steelhead	25	300	32.5	IDAHO	ID	International
Steelhead	429	5,148	32.5	IDAHO	ID	International
Steelhead	101	1,212	32.5	IDAHO	ID	International
Steelhead	925,000	0	0.0	KOOSKIA NFH	ID	Fish and Wildlife Service
Spring chinook salmon	236,019	13,035	5.7	IDAHO	ID	International
Spring chinook salmon	256,883	14,277	5.7	IDAHO	ID	International
Steelhead	350,000	0	0.0	MAGIC VALLEY	ID	State Government
Rainbow trout	5,077	53	3.1	IDAHO	ID	Indian Tribal (non BIA)
Rainbow trout	29,578	247	2.7	IDAHO	ID	State Government
Steelhead	1,205,000	0	0.0	HAGERMAN NFH	ID	Fish and Wildlife Service
Rainbow trout	2,491	29	3.2	IDAHO	ID	Indian Tribal (non BIA)
Steelhead	480	37	6.0	NMFS	OR	National Marine Fisheries Service
Spring chinook salmon	1,270,519	69,245	5.7	IDAHO	ID	International
Steelhead	287,830	40,828	7.4	IDAHO	ID	International
Steelhead	374,040	53,272	7.4	IDAHO	ID	International
Steelhead	210,836	31,116	7.5	IDAHO	ID	International
Steelhead	214,633	31,306	7.5	IDAHO	ID	International
Steelhead	900,000	0	0.0	MAGIC VALLEY	ID	State Government
Steelhead	209,847	32,334	7.6	IDAHO	ID	International
Steelhead	251	3,012	32.5	IDAHO	ID	International
Steelhead	681,000	0	0.0	KOOSKIA NFH	ID	Fish and Wildlife Service
Steelhead	1,385,500	0	0.0	HAGERMAN NFH	ID	Fish and Wildlife Service
Steelhead	199,700	29,900	7.5	IDAHO	ID	International
Steelhead	6,000	0	0.0	OREGON	OR	University
Steelhead	1,166,664	181,350	7.6	IDAHO	ID	International
Spring chinook salmon	965	7	2.9	IDAHO	ID	Bureau of Indian Affairs
Spring chinook salmon	247,093	1,731	2.9	POWELL REARI	ID	State Government
Spring chinook salmon	236,811	2,153	3.1	CROOKED RVR	ID	State Government

FISH CULTURE OPERATIONS

Steelhead Trout Production
- Brood Year 1989 -

Steelhead production for Brood Year 1989 exceeded the scheduled mitigation of 2.3 million smolts by 300,000 when 2.66 million fish were released in spring 1990. The fish weighed 400,106 pounds and averaged 192 mm in length at release time.

As can be seen in Table 1 below, the young steelhead fingerlings returned to Dworshak had relatively high survival rates. The Kooskia returnees had already experienced the worst of IHNV, suffering less than 10 percent overwinter loss to the disease at Dworshak. Not a single pond of fish returned from Hagerman was ever confirmed with the disease.

Table 1. Relative survival of STT fingerlings at Dworshak by early-rearing station - STT Brood Year 1989.

Early-rearing Station	Initial Dworshak No.	Appxmt. Date On Station	Release No.	Survival
Dworshak	3,100,655	7/1/89	627,296	20.2 %
Kooskia	417,789	7/1/89	370,388	88.6 %
Hagerman	1,626,432	9/1/89	1,665,866	102.4 %*

			2,663,550	

*Inventory gain of 3-4 percent.

System 1

This 25 pond system was made up of 21 ponds of fish returned from Hagerman at about 33 fish/lb (FPP), and four ponds of fish returned from Kooskia. The fish from Kooskia had initially been put into Dworshak's nursery in an ozonated water supply. They were ponded in System 1 in the fall of 1989. While these fish did experience a mild IHNV episode, overall losses were fairly low. As mentioned above, the STT returned from Hagerman never did break with the virus, although several other slight health problems persisted over an extended period.

Parasites were a significant problem in this system in the winter months, most predominantly Trichodina, fungus, and myxobacteria. Repeated and persistent treatments, especially for the Trichodina with formalin, eventually reduced mortality and cured the problems.

Growth, fish health, and feed conversion in System 1 was quite good overall, with conversion averaging 1.41 (Table 2). The fish put on excellent growth in late 1989, but then slowed considerably as water temperatures dropped to the low 40s. The Length Deviation Index (LDI) indicates relative uniformity of

pond to pond lengths and which increases as uniformity decreases, was an excellent 1.72 for the system at time of release. System 1 was kept on raw water supply, as has been the recent practice, for the entire rearing program.

IDFG marking crews ad-clipped and inventoried most ponds in October and November 1989, with final inventory numbers averaging three percent above book values. Coded-wire tagging and the accompanying final ad-clipping were accomplished by State-furnished crews in January 1990. Although lower plasma sodium levels were present at the time, no evident harm came to the fish by being marked so late.

At the time of release fish health was generally quite good with April mortality dropping to 0.1. Released STT smolts averaged 195 mm in length (6.31 FPP), with slightly more than half the population being outplanted and the other half directly released.

Table 2. System 1 steelhead performance -- 1989-90.

Month		1st of Month Number	1st of Month No/Lb	Growth (in.)	Mortality (%)	Temperature (°F)
October	89	793,230	18.2	0.52	0.3	53.4
November	89	850,241	13.9	0.50	0.2	48.0
December	89	853,493	10.9	0.24	0.3	43.6
January	90	852,426	9.7	0.17	0.6	41.6
February	90	846,288	9.0	0.25	0.7	40.5
March	90	840,730	8.1	0.34	0.3	40.6
April	90	838,036	7.0	0.31	0.1	41.8
Release		836,930	6.3	-	-	-

System 2

All of the STT fingerlings which were reared early at Dworshak and survived a massive IHNV outbreak in the nursery were ponded in System 2 this year. As reported above in Table 1, only 20 percent of the 3.1 million initial feeding fry actually made it to release. The fish in this system suffered persistent health problems whether it was from a debilitating bout with IHNV, or the fact that continual attempts were made to maximize the growth of these latter take fish to achieve a 200 mm length.

Icthyopthirius spp. (Ich) was a chronic problem requiring treatment in various ponds from October through January. Together with Bacterial Gill Disease (BGD), Ich caused nine percent losses in two ponds in January. Repeated treatment with formalin for Ich and with Chloramine-T for BGD eventually restored afflicted fish populations to reasonably good health. IHNV also persisted causing chronic and occasionally acute losses through March. In conjunction with smolting changes that the fish were undergoing at the time, mortality in March increased to 1.6 percent. Nonetheless, by release in early May monthly mortality had dropped to less than one percent.

The fish in System 2 came entirely from the last three takes, Takes 10, 11, and 12. As a result, production was one to two months behind schedule regarding length over the complete rearing cycle. The system went on reuse on November 15 to give the fish the higher temperatures and the chemically-enhanced water supply conducive to better growth. The fish did make it to 181 mm (7.87 FPP) at release time. As seen below in Table 3, the fish attained monthly growths averaging well over one-half inch per month. The table demonstrates the slightly elevated mortality which plagued the system's fish this year.

Table 3. System 2 Steelhead Performance -- 1989-90.

Month		1st of Month Number	1st of Month No/Lb	Growth (in.)	Mortality (%)	Temperature (°F)
October	89	540,231	219.0	0.85	3.1	53.4
November	89	661,700	86.7	0.62	0.0	51.4
December	89	678,789	51.8	0.54	1.4	54.1
January	90	669,026	34.4	0.71	1.5	54.0
February	90	660,296	21.8	0.70	0.5	54.4
March	90	656,763	14.8	0.74	1.6	55.0
April	90	645,842	10.3	0.53	1.0	52.0
Release		627,296	7.9	-	-	-

The feed conversion rate of 1.34 was slightly lower than that of the two other STT systems.

IDFG marking crews ad-clipped and inventoried most of System 2 in October and November, finishing up with CWT marking in January. Pond 44 was freeze-branded, as well, for fish passage purposes. Pond marking inventories averaged 4.2 percent over book values, indicating that fairly accurate estimates of pond populations had been maintained.

More than one-half of System 2's population was trucked out by COE distribution units for outplanting in late April. The remainder was direct released on May 3. The LDI for the system overall at release was 3.5, showing a fair amount of length uniformity for the system's fish. The fact that the fish handled hauling stress very well was another indicator that fish health had improved considerably by outplanting time. Elevated temperatures in the reuse system had been discontinued on April 19 and chemical additions ceased April 30.

System 3

Approximately 75 percent of the fish in System 3 had been returned from Hagerman at 40 to 50 FPP. The remainder were the survivors of Kooskia's first major outbreak of IHNV and had been initially ponded in System 1. Overall, these fish performed quite well with minimal health problems. These fish were

fed as much feed as they would efficiently consume to take advantage of the warm water prevailing in fall 1989. By November 1, fish were already 21 FPP (Table 4), a good month and a half ahead of a target size of 38 FPP. Their large size made it possible to delay the activation of the reuse system until January 30.

Table 4. System 3 steelhead trout performance -- 1989-90.

Month		1st of Month Number	1st of Month No/Lb	Growth (in.)	Mortality (%)	Temperature (°F)
October	89	1,102,751	39.6	0.92	0.1	53.4
November	89	1,169,333	21.7	0.60	0.1	48.2
December	89	1,189,537	15.5	0.31	0.1	43.6
January	90	1,196,722	13.3	0.37	0.3	41.7
February	90	1,203,412	11.1	0.55	0.1	52.0
March	90	1,201,790	8.7	0.58	0.1	52.0
April	90	1,201,160	6.8	0.16	0.1	47.1
Release		1,199,324	6.4	-	-	-

System 3's general good health is reflected in the consistently low monthly mortality rates shown in Table 4, an overall feed conversion of 1.36 and limited treatment necessary to clear up parasite and bacterial problems. Although formalin treatments were administered to seven ponds for Trichodina spp. and Chloramine-T to three for subsequent bacterial problems, losses were minimal. Three ponds with Trichodina spp. were "treated" by non-treatments, as controls to the seven receiving formalin baths. The three non-treated ponds' problems cleared up in a similar fashion to the improvement observed in formalin treated ponds.

As in Systems 1 and 2, these fish also received inventories and ad-clips during October and November with final CWT marking and freeze-branding in January 1990. Inventories were four to five percent above book values.

The system was taken off chemicals and temperature on April 11 to prepare the fish for outplanting and for direct release. More than half the fish were outplanted from April 16 to April 25 at an average length of 192 mm (6.67 FPP). STT smolts released directly from the system on May 3 and 4 averaged 198 mm (6.39 FPP). The LDI for all releases from System 3 was 3.62, demonstrating fairly low variation between average pond lengths.

Marking

A considerable number of STT were marked, sampled, and/or released for a variety of purposes. Bonneville FAO used over 400 STT for testing the bypass facilities at Little Goose Dam. IDFG freeze branded and released one entire pond of steelhead for a trap assessment study. The National Fisheries Research Center at Seattle sampled STT out of all three systems for fish passage studies and IDFG PIT-tagged fish the end of April for related studies.

Distribution

Releases of steelhead smolts began on April 16, 1990, with upriver outplants and continued through May 4, when direct releases into the main stem of the Clearwater River were completed. As mentioned earlier, almost 2.7 million STT smolts were released (Table 5), well over the mitigation requirement of 2.3 million smolts.

Table 5. Distribution Summary - Steelhead Smolts, Brood Year 1989 (April 16 - May 4, 1990).

Release Type/System	Number	Weight	No./Lb.	Length (in/mm)
Outplants (4/16-25/90):				
System 1	469,703	73,003	6.43	7.63/194
System 2	379,244	48,613	7.80	7.16/182
System 3	647,939	97,140	6.67	7.54/192
Subtotal/Avg	1,496,886	218,756	6.84	7.48/190
Direct (5/3-4/90):				
System 1	367,227	59,536	6.17	7.74/197
System 2	248,052	31,120	7.97	7.10/180
System 3	551,385	90,694	6.08	7.77/197
Subtotal/Avg	1,166,664	181,350	6.43	7.63/194
GRAND TOTAL/AVGS	2,663,550	400,106	6.66	7.54/192

Four temporary truck drivers furnished by the hatchery outplanted STT in COE distribution units from April 16 through 25 (Table 6). In 46 trips to six different streams, 1.5 million steelhead smolts were outplanted, a total second only to the 1.7 million outplanted in 1986. Outplanted STT averaged 6.84 FPP.

Table 6. Smolt Outplanting Summary - STT Brood Year 1989 (April 16 - 25, 1990).

Site	Number	Weight	FPP	---Length--- inches	mm
S.F. Clwtr. R.	287,830	40,828	7.05	7.40	188
Clear Creek	374,040	53,272	7.02	7.41	188
Newsome Creek	210,836	31,116	6.78	7.50	190
Crooked River	214,633	31,306	6.86	7.47	190
American River	209,847	32,334	6.49	7.61	193
Eldorado Creek	199,700	29,900	6.68	7.53	191
TOTALS/Avg.	1,496,886	218,756	6.84	7.47	190

As shown in Table 7, Systems 1 and 3 were only slightly short of the targeted 200 mm average length. System 2, composed of late egg take fingerlings, fell short of target but still attained an average of 181 mm at release.

Table 7. Distribution Summary By System - STT BY 1989 (April 16 - May 4, 1990).

System	Number	Wt.	No/Lb	----Length----- in	mm
1	836,930	132,539	6.31	7.68	195
2	627,296	79,733	7.87	7.13	181
3	1,199,324	187,834	6.39	7.65	194
Grand Ttl	2,663,550	400,106	6.66	7.54	192

- Brood Year 1990 -

A thorough summary of Brood Year 1990's spawning season is referred to in "Spawning Report - Steelhead Trout, Brood Year 1990", dated September 12, 1990.

Summary of Run

The collection of adult steelhead at Dworshak for Brood Year 1990 was somewhat sporadic, primarily due to a desire to collect the very early spectrum of the run, as was done for Brood Year 1989. The initial opening was from October 11 to October 27, 1989, during which time 558 adult STT entered the trap. The ladder reopened February 13, closed three days later because of too many fish in the trap, then reopened again on February 22, 1990. It remained operating until completion of spawning on May 8.

In near-record numbers, 10,613 adult STT returned to Dworshak this year, more than enough to allow sufficient eggs to be taken for the various programs (Table 8). Some 31.5 percent of the adults were males and 68.5 percent were females, values approximating historical averages. The run was dominated by II-ocean fish, which constituted over 93 percent of all returning adults. Pre-spawning mortality totaled 37 fish out of 558, or 6.6 percent of the fish on hand the first day of spawning.

Table 8. Age and Sex Structure Summary - STT Adults Brood Year 1990.

	Males		Females		Totals	
	No.	(%)	No.	(%)	No.	(%)
I-ocean	420	(86.2)	67	(13.8)	487	(4.6)
II-ocean	2,783	(28.1)	7,118	(71.9)	9,901	(93.4)
III-ocean	140	(65.1)	75	(34.9)	215	(2.0)
	3,343	(31.5)	7,260	(68.5)	10,603	(100.0)*

*Total in run = 10,613 (10 were unmeasured, unsexed).

Spawning Summary

Over 11 million green eggs were taken this brood year in 13 egg takes using 1,632 females and 831 males (Table 9). This total was more than enough to meet mitigation needs, but also to ship eggs to other federal and state hatcheries. Eggs per female were 6,911 and eye-up was 84.1 percent, which produced 8.6 million eyed eggs. Only 1.1 million eggs were culled as not needed in the production programs or due to IHNV positive identification which negated shipment outside the Clearwater drainage or to other hatcheries. Overall male to female spawning ratio was 1.0:2.0.

Table 9. Spawning Summary - Steelhead Trout Brood Year 1990.

	No. Spawned		Eggs/	Green	Eyed	Eye-	Green Eggs
	Females	Males	Female	Eggs	Eggs	Up(%)	Culled
Totals	1,632	831	6,911	11,278,564	8,561,914	84.1	1,102,388

Note: Eye-up percent is from enumerated eggs only.

Spawning Procedures

Procedures were basically the same as in previous years. Adults were crowded from holding ponds into the channel, then further crowded into the channel basket and dumped into one of two anesthetic bins. The fish were anesthetized with a 200 to 300 mg/l carbon dioxide solution (buffered with sodium bicarbonate), then lifted to the sorting table.

Ripe adults were sent to the spawning table with the females killed by a pneumatic knife at the sorting table. Green and excess ripe adults were returned to holding ponds. Sperm from usable males was placed in a cooler until needed and the fish were sampled for disease. Eggs from one or two females were fertilized with sperm from one or two males and then placed in Heath incubator trays. Eggs were water hardened and iodophored for one hour. Aseptic procedures were employed throughout spawning operations. After eye-up, the eggs were shocked, passed through an electronic egg picker, and then counted. Most eyed eggs were placed into hatching jars over nursery tanks for hatching, although some were put back into incubator trays.

Dworshak FHC sampled all spawned adults for IHNV, using male spleens and female ovarian fluid (Table 10). The high percentage of positive males in the last several egg takes corroborates earlier observations that IHN incidence in adults normally rises substantially in later takes.

Table 10. IHN Incidence in Sampled STT Adults - Brood Year 1990.

		No. Sampled*		IHNV Positive Fish					
				Females		Males		Totals	
Take	Date	Females	Males	No.	%	No.	%	No.	%
1	2/13	117	67	4	3.4	6	9.0	10	5.4
2	2/20	96	95	3	3.1	3	3.2	6	3.1
3	2/27	120	95	7	5.8	3	3.2	10	4.6
4	3/06	137	67	7	5.1	0	0.0	7	3.4
5	3/13	121	68	2	1.7	1	1.5	3	1.6
6	3/20	159	72	3	1.9	3	4.2	6	2.6
7	3/27	160**	84	6**	3.8	4	4.8	na	na
8	4/03	170**	83	0**	0.0	1	1.2	na	na
9	4/10	136**	69	1**	0.7	5	7.2	na	na
10	4/17	150**	69	8**	5.3	6	8.7	na	na
11	4/24	78**	38	3**	7.7	7	18.4	na	na
12	5/01	119**	41	47**	39.5	31	75.6	na	na
13	5/08	66	30	65	98.5	30	100.0	na	na

*Note that usually more fish were sampled than were spawned.
**Two-female pooled samples. E.g., for Take 7 six of 80 samples (160 fish) were positive.

It should be noted that the adults returning to the hatchery in October and held for four months before spawning in February, only 7.4 percent tested positive for IHNV. This is in marked contrast to the 28.0 percent incidence among similarly handled fish from Brood Year 1989. IHNV incidence in females dropped from 38 percent to 5.6 percent.

Egg and Adult Disposition

A great deal of flexibility was exercised this year in determining which eggs were to be shipped elsewhere. Eyed eggs from Take 1 (February 13) through Take 10 (April 17) were assigned to other hatcheries (Hagerman NFH, Kooskia NFH, and Magic Valley SFH), for later return as fingerlings to Dworshak or retained for use in their own production programs (Table 11). Dworshak held any excess eggs from early takes. This allowed Dworshak to retain representatives of the entire spectrum of the run for the first time in several years.

Table 11. Eyed Egg Disposition Summary - STT Brood Year 1990.

TK Date	Eyed Eggs	Dworshak	Kooskia	Hagerman	Magic V.	Destroyed
Totals	8,561,914*	2,279,500	1,606,000	2,590,500	1,250,000	835,914

*After culling unenumerated eggs for IHN, etc. Eggs destroyed were counted eyed eggs.

Carcasses of spawned fish and excess adults were donated to Idaho Department of Education for distribution to commodity programs and to public institutions. A number of excess adults were outplanted in the Payette and Boise Rivers and in Rock Creek by Twin Falls.

Production Methods

As illustrated above, eyed eggs were distributed to several other stations to minimize IHNV loss risks. Fry from 2.1 million eyed eggs were started in Dworshak's nursery this year. As shown in Table 12, losses to the IHN virus were minimal. Losses through September 30 were only 16.4 percent and not all of these were necessarily due to IHNV. Theories proposed for the minimal losses are 1) high flows in the North Fork water supply reduced the virus concentration, 2) the present brood year fingerlings are the offspring of adults which had survived an IHNV epidemic and could, therefore, offer some genetic resistance, or 3) iodophoring eggs at eye-up and hatching the fry in Dworshak hatching jars decreased fry susceptibility to the virus. Fingerlings from Dworshak's nursery are presently in Systems 2 and 3.

Table 12. Loss Summary (30 September 90) - STT Brood Year 1990 (Losses at Dworshak only).

	Dworshak Nursery			Kooskia Returns			Hagerman Returns		
		---Loss (%)---			---Loss (%)---			---Loss (%)---	
	No.	Month	(Cum.)	No.	Month	(Cum.)	No.	Month	(Cum.)
Initial No.	2096780	na	na	373630	na	na	949745	na	na
Mortality:									
May	64477	3.1	(3.1)	na	na	na	na	na	na
June	112094	5.3	(8.4)	1147	0.3	(0.3)	na	na	na
July	88576	4.2	(12.6)	372	0.1	(0.4)	215	0.2	(0.2)
August	25190	1.2	(13.8)	472	0.1	(0.5)	1940	0.2	(0.4)
September	55285	2.6	(16.4)	3214	0.9	(1.4)	10732	1.1	(1.5)
Inventory Loss	262881	12.5	(28.9)	27480	7.4	(8.8)	0	0	(1.5)
Present No.	1484902			340939			937042		

Kooskia experienced tremendous losses in the 1.6 million eyed eggs received. Sac fry were transferred from hatching jars directly to reuse water supply. Evidently, they were unable to handle the high concentration of bacteria in the system resulting in high mortalities. Only 373,000 fingerlings were returned to Dworshak. Since return, these fish have performed quite well with only 8.8 percent cumulative losses through September 30. By fiscal year end, no pond had been confirmed with the virus.

Due to the success of Dworshak's nursery program this year only 950,000 STT were returned from the 1.8 million eyed eggs shipped to Hagerman. Although initial plans were to return all of these fish at 70 FPP, they returned at a variety of sizes because of concerns raised over the proposed timing and fish size at return. The fingerlings, ranging from 30 to 75 FPP, returned from July 10 through August 29. These fish have performed extraordinarily well since their return to Dworshak. Those returned to System 1 were the larger fish and will be kept on raw water until release in Spring of 1991. Fish into System 3 were generally smaller and will be put on reuse with higher temperature.

Table 13 presents a summary of STT inventories in the various systems. Even assuming a worst scenario of a 15 percent loss until release, 2.28 million steelhead smolts would be available in spring 1990. It is anticipated that releases will most likely range between 2.5 and 2.6 million.

Table 13. Inventory Summary - STT Brood Year 1990 (September 30, 1990).

Location	Number	Weight (Lb)	No/Lb	L (in/mm)
System 1	778,331	41,334	18.8	5.34/136
System 2	918,941	11,777	78.0	3.32/84.0
System 3	1,065,611	27,528	38.7	4.20/107
Totals/Avg.	2,762,883	80,639	34.3	4.37/109

Special Studies

IHNV Study:

On April 11, 700,000 eyed eggs from IHNV negative parentage were pooled and mixed for the initiation of a study that was to examine the effects of hatching and rearing STT fingerlings under a variety of conditions. The variables were: 1) an ozonated vs. a raw water supply, 2) disinfecting the eggs at eye-up vs. not disinfecting, and 3) hatching and eyeing up the fry in incubator tray vs. in hatching jars. A fourth set of variables is looking at the influence of early rearing the fish in concrete vs. fiberglass nursery tanks. The test, which was conducted with four replicates of each of the first three variable sets mentioned, ran through mid-July.

At present the only summary of test results that can be given appears in Table 14. Further analysis of the data will hopefully determine what variables or variable combinations had significant effects on fingerling susceptibility to the IHN virus. It should be noted that losses to the virus were exceptionally low this rearing cycle. The only observation that appears significant is that losses were highest, as expected, in the four tanks with a raw water supply and with fingerlings hatched in incubator trays from eggs that were not disinfected at eye-up.

Table 14. Mortality Summary of Steelhead Fingerlings Reared under a Variety of Conditions in Dworshak's Nursery - 1990.

Water Supply	Hatching	Disinfection	Initial Number	Total Mortality	Percent Mortality
Raw	Jar	Yes	84,928	8,417	9.9
Raw	Jar	No	84,755	8,461	10.0
Raw	Incubator	Yes	84,967	15,679	18.5
Raw	Incubator	No	85,236	39,075	45.8
Ozone	Jar	Yes	86,416	3,471	4.0
Ozone	Jar	No	86,261	25,531	29.6
Ozone	Incubator	Yes	86,551	4,899	5.7
Ozone	Incubator	No	86,213	4,982	5.8

Iodophored Eggs:

Another experiment was conducted to examine the effect that extended disinfection of eyed eggs in 100 ppm iodophore would have on subsequent STT fingerling survival. A 15,000 egg group was treated for one hour while another group of equal number was treated for two hours. Because the original intent was to simply observe short term effects, detailed records were not kept on mortality. There seemed to be elevated losses initially, but because no control was run this could not be verified. The two groups were pooled on May 30 and put into Tank 32. The following losses were recorded: June - 3,900 (16.5 percent), July - 2,618 (13.3 percent), and August (1 - 21) - 209 (1.2 percent). A total of 16,907 fingerlings were ponded from this tank on August 21. Some 6,700 fish, or 28.5 percent of the original number tanked, were lost from June 1 to August 21. This compares with total losses from fish early reared in Dworshak's nursery of 13.8 percent. There may be an indication that exposing eyed eggs to one to two hours of iodophor causes elevated fingerling mortality.

Holding Fry in Incubator Study:

Reports in the literature indicate the possible transmission of IHNV from egg shell debris to sac fry that may be incubated in trays. To examine the potential, Take 11 eggs (not disinfected at eye-up) from IHNV-negative parentage were allowed to hatch in incubator trays. Half the fry were moved out to two tanks on raw water immediately after hatching. The other half were transferred to two tanks 11 days later. At ponding, none of the four tanks

had broken with IHNV and no differences were noted between the two treatments. At ponding the four tanks were combined.

STT Rearing in Low-level Iodine:

Testing of iodine continued with the 1990 Brood Year steelhead program. The study began in May 1990 and continued until July 1990. The level of iodine was maintained at 0.14 mg/l for the entire duration of the study. This level was shown to inactivate the IHN virus at the Seattle Research Center. Again, iodine, ozone and a raw water control were tested. Results of this study were that no IHN was found in any of the study tanks. The interesting part of the study is the fact that steelhead trout in iodine appeared to do as well as the ozone and control groups. This level of iodine was not toxic to fish as had been the case in past studies using iodine. Analysis of the mortality data remains to be completed.

With no outbreaks or losses to fish in any of the groups, it cannot be said that iodine at 0.14 mg/l offered protection from the IHN virus. It can be stated that the fish survived and did well in iodine tanks at 0.14 mg/l.

Iodine will again be tested in Brood Year 1991 using steelhead trout at the 0.14 mg/l level. It appears that iodine is another tool that management can use in combating fish diseases. Care must be taken in using iodine and like so many other chemicals, is probably dependent upon the chemistry of water supply (hard vs. soft).

RBT Iodine Study:

Low dosage levels of iodine showed excellent inactivation of the IHN virus in studies conducted at the Seattle National Fisheries Research Center (SNFRC). Based upon these results, testing of iodine at Dworshak continued in November 1989 with rainbow trout as the test species.

In a 3-month study, rainbow trout were reared in the same three water supplies tested with steelhead trout,, iodine, ozone and raw water (control). Although no outbreaks or signs of the IHN virus appeared in the test fish, the fish in the iodine water supply showed signs of stress and some mortality occurred when the iodine level approached or exceeded 0.20 mg/l. Another interesting phenomena occurred during this study. Both raw water control and ozone fish became infected with costia and had to be treated with formalin. The fish in the iodine water supply were clean with no sign of costia. The study was terminated in February 1990.

Rainbow Trout Production

Rainbow trout (RBT) for Dworshak Reservoir have been supplied from another hatchery since 1985 because of Dworshak's IHNV disease status. For the fifth successive year, Hagerman NFH produced the necessary trout to meet mitigation requirements. Hagerman stocked $222,026 RBT weighing 14,350 pounds in early May. The fish were of the Arlee and Shasta strains.

Spring Chinook Salmon Production
- Brood Year 1988 -

On October 1, 1989, a total of 1,777,520 SCS, weighing 44,805 pounds, from Brood Year 1988 were on station. These fish performed quite well for the rest of the fiscal year until release in March and April 1990. Overall, the lot experienced a feed conversion of 1.64, a significant improvement over the previous brood year. Monthly mortality for the last six months was consistently 0.3 percent or lower, approximately half the losses experienced by the previous brood year (Table 15).

Table 15. 1989-90 Spring Chinook Salmon Performance - Brood Year 1988.

Month		1st of Month Number	1st of Month No/Lb	Growth (in.)	Mortality (%)	Temperature (°F)
October	89	1,777,520	39.7	0.47	0.2	53.4
November	89	1,773,248	29.2	0.29	0.1	48.2
December	89	1,775,476	24.5	0.15	0.1	43.6
January	90	1,768,276	22.5	0.08	0.3	41.6
February	90	1,759,921	21.5	0.13	0.2	40.5
March	90	1,751,631	20.0	0.17	0.3	40.7
Release		1,744,329	18.1	-	-	-

Almost half the fish had received a 21-day prophylactic feeding of Erythromycin treated feed in the fall of 1989. No other treatments were given these fish during their outside rearing. Prior to release, symptoms of BKD appeared in several raceways as was the pattern in years past. EIBS was also detected in the lot by the Dworshak FHC just before release. Losses to the disease on station were not evident, however.

Marking and Sampling

A large number of various markings took place in the SCS program this year. Each of the Pascho/Elliott raceways contained fish that had been PIT-tagged and some that had been CWT marked. PIT and CWT marks were also given to fish in the three NMFS photoperiod raceways as well two control raceways. Contribution fish were also CWT marked and freeze-branded. IDFG freeze-branded over 12,000 fish in one raceway and separated them for sequential trap assessment studies. Eventually, 12 rearing units contained PIT-tagged fish, 14 had CWT marked fish in them, and four had freeze-branded fish in them.

Several agencies were also active in sampling fish for various studies. Wally Zaugg, Bryan Beckman, and Steve Hirtzel regularly sampled SCS for smolt quality assessment. Nancy Elder and Aldo Palmisano (NFRC - Seattle, Marrowstone Field Station) collected fish for quality assessment in April. Phil Haner and Mary Beth Free (NFRC - Seattle, Cook Field Station) also sampled fish. And Bruce Monk (NMFS) used 500 SCS for bypass facility assessment.

Distribution

The release of Brood Year 1988 SCS took place from March 26 through April 5, 1990. As shown in Table 16, almost half a million were outplanted and over 1.2 million were direct released for a total of over 1.7 million smolts. While fish health had deteriorated somewhat over the last several months, evidenced by increasing BKD symptoms in several raceways, overall fish health at release was generally good. Fish were released at a fairly uniform 18 FPP, with the Length Deviation Index standing at 2.86. This indicated relatively little variation in average lengths between ponds.

Table 16. Smolt Release Summary - Brood Year 1988 Spring Chinook (March 26 - April 5, 1990).

Site	Number	Weight	No/Lb	Length (in/mm)
Outplant (March 26-28, 1990):				
Powell Rack Site	236,019	13,035	18.1	5.69/144
Eldorado Creek	256,883	14,277	18.0	5.70/145
Subtotal/Avg	492,902	27,312	18.0	5.70/145
Direct (April 4-5, 1990):				
N.F. Clearwtr. R.	1,251,427	68,882	18.2	5.68/144
Totals/Average	1,744,329	96,134	18.1	5.69/144

The Pascho/Elliott SCS were released with the general release on April 4, along with the NMFS photoperiod study fish.

Special Studies

The major study conducted this chinook rearing cycle was the Pascho/Elliott experiment in which three raceways of fish from high-BKD parentage and three from low-BKD parentage were tracked and reared through release. The primary objective of this study is to evaluate outmigration performance regarding barge transportation vs. natural downstream migration. On station performance of the two groups showed greater losses and probably poorer released fish quality in the high-BKD group. These fish had cumulative losses after ponding of over 18 percent while the low-BKD fish experienced losses of approximately four percent.

Approximately half the fish from this brood year received one 21-day feeding of erythromycin treated feed in the fall of 1989. There were no apparent differences between the two groups by release time. In depth analysis of losses or performance have not yet been conducted.

The second year of a NMFS photoperiod study was conducted this year also. Regulated lighting was initiated in early January 1990. In March 2,040 of these fish were moved to Dworshak's nursery with half being put on a heated water supply and the remainder on raw water. These fish were released with the general smolt release in early April.

Idaho FRO also conducted an experiment with approximately 30,000 SCS spawned from adults which had experienced advanced spawning using photoperiod alteration.

- Brood Year 1989 -

Production

As the reporting period began, Brood Year 1989 SCS were eyeing-up in incubators with approximately 2.4 million eyed eggs on station. Most of these fry went on feed in November 1989. As in previous years, chronic losses occurred in scattered tanks in the nursery during November and December, amounting to over five percent of the population. While a thorough analysis of the losses has not been done, it was curious that in both months, losses among the Pascho/Elliott experimental fish were higher than in the general population. Whether this is related to poor water flows during incubation or to elevated temperatures during initial eye-up is unknown.

Abnormally high numbers of feeding fry with distended abdomens were apparent this year. Over time, however, their numbers decreased until these fish were no longer noticeable.

By January 1990, losses had dropped significantly and the young SCS began growing slowly but steadily until spring water temperatures brought greater length gains (Table 17 below). Overall, the lot performed quite well this past fiscal year with a feed conversion of 1.5 and monthly mortalities approximating that of the previous brood year. Aside from eight tanks that were treated for Epitheliocystis spp. in the nursery, no other treatments have been necessary. One prophylactic 21-day feedings of erythromycin treated feed given to the salmon involved in a density study in July with another feeding planned for October.

Table 17. SCS Performance - Brood Year 1989.

Month		1st of Month Number	1st of Month No/Lb	Growth (in.)	Mortality (%)	Temperature (°F)
November	89	Not on the books until month's end				
December	89	2,238,174	1027	0.20	2.4	43.6
January	90	2,186,365	701	0.21	0.9	41.7
February	90	2,129,277	492	0.28	0.3	40.5
March	90	2,109,451	327	0.27	0.3	40.7
April	90	2,097,772	228	0.40	0.2	41.8
May	90	1,998,918	158	0.16	0.4	47.1
June	90	1,960,780	134	0.43	0.4	48.9
July	90	1,549,568	93.3	0.33	2.0	53.2
August	90	1,551,205	70.0	0.43	1.4	53.0
September	90	1,458,191	50.0	0.29	0.3	52.0

Another 124,000 fingerlings were reared from eyed eggs spawned at the Red River Spawning Facility and eyed-up at Kooskia.

Distribution

Despite lower than expected numbers of returning adults this particular brood year, sufficient numbers of eggs were obtained to provide for a 1.4 million smolt program for Dworshak, as well as to provide fingerlings for LSRCP satellite rearing facilities in spring 1990. In June, 486,000 spring chinook fingerlings were transferred from Dworshak to rearing facilities managed by Idaho Department of Fish and Game (Table 18). IDFG personnel using two LSRCP trucks did the hauling. All 105,000 fingerlings from SCS spawned at the Red River Facility in 1989 were taken to the Crooked River facility along with another 130,000 fingerlings from SCS spawned at Dworshak. All fish taken to the Powell facility were also from Dworshak's production.

Table 18. Fingerling Transfer Summary - BY 1989 SCS (June 4 - 5, 1990).

Receiving Site	No.	Wt. (Lbs.)	FPP	L (in)
Crooked River Facility:				
Dworshak Fingerlings	131,129	1,030	127	2.97
Red River Fingerlings	105,682	1,123	94.1	3.28
Subtotals/avg.	236,811	2,153	110.0	3.12
Powell Rearing Facility:				
Dworshak Fingerlings	247,093	1,731	143	2.86
Total/Avg.	486,057	3,884	125	2.99

Special Studies

As of September 30, 1989, there were 220,000 fish in the second Pascho/Elliott BKD segregation experiment. Three raceways of SCS from low-BKD parentage are being raised separately from three raceways of SCS from high-BKD parentage. All three raceways of high-BKD parentage fish show BKD symptoms higher than normal production groups and much higher than fish from low-BKD parentage. During September, for example, they lost 1.4 percent of their population, normal production loss was 0.3 percent, while the "Pascho-lows", as they are referred to, experienced only 0.2 percent losses.

The first year of a multiple-year study examining effects of rearing density rearing on survival (adult returns) began with this brood year. At ponding, over 500,000 fingerlings was divided into high, medium, and low rearing groups. There are 15 at low densities (15,000 per raceway), 6 at medium (30,000 per raceway), and 3 at high (45,000 per raceway). Appropriate numbers of these fish will be marked with CWTs, PIT-tags, or freeze brands to monitor outmigration and to provide information when these fish return as adults. On-station performance of these groups so far shows few significant differences.

- Brood Year 1990 -

Summary of Run

The proposed combined target for the Dworshak-Kooskia Complex of 2,500 adults was easily reached by mid-July. Dworshak's ladder was open from May 18 until September 10, 1990, while Kooskia kept its trap functional from the February opening for steelhead, and collected its first SCS on May 8, 1990. Adults from Kooskia were transported to Dworshak and held with Dworshak adults. The final returning number of adult SCS to the complex was 3,183, with Table 19 below providing the age breakdown.

Table 19. Age Structure Summary - SCS Adults Brood Year 1990.

	Kooskia NFH	Dworshak NFH	Totals
I-ocean	11	7	18 (0.6 %)
II-ocean	921	1892	2,813 (88.4 %)
III-ocean	209	135	344 (10.8 %)
Unmeasured	0	8	8 (0.2 %)
Totals	1,141 (35.8 %)	2,042 (64.2 %)	3,183

Fish returning to Kooskia comprised 35.8 percent of the total run versus Dworshak's 64.2 percent, similar to 1989's proportions. Kooskia returns again displayed a peak return one month earlier than those returning to Dworshak, with Kooskia's peak occurring in June and Dworshak's in early to mid-July.

The male to female chinook ratio was not determinable when the fish first came across the sorting table because of lack of secondary sex characteristics development. However, during the weeks of spawning, male and female numbers became more apparent. Out of 3,123 fish that died or were outplanted or spawned, 1,431 (45.8 percent) were males and 1,692 (54.2 percent) were females, yielding a male to female ratio of 1:1.2.

A total of 306 coded wire tags (CWT) from returning adults were recovered. Two of them from III-salt fish, 302 from II-salts, and two from I-salt adults.

Pre-spawning Summary

Returning brood stock were anesthetized with Tricaine Methanesulfonate (MS-222) and inoculated with Erythromycin Phosphate (20 mg/kg body weight). Open wounds were swabbed with malachite green and fish placed into one of two holding ponds. The adults were treated three times weekly with a one hour flow-through 1 mg/l malachite green treatment. Adult mortality was removed daily, recording sex, size, jaw tag numbers, and fin clips.

Handling procedures kept fungal infections to a minimum and pre-spawning mortality was only 6.8 percent (Table 20) compared to 10.3 percent in 1989. The overall mortality of 11 percent showed excellent survival in the holding ponds and throughout all of spawning this year. This compares with a 23 percent loss in 1989 and a 12.5 percent in 1988.

Table 20. Spawning Mortalities - SCS Brood Year 1990.

Type	No.	Total No. Held	Total (%)
Pre-spawn	194	2,828	6.8
Total	354	3,183	11.1

Spawning Summary

Spawning operations began August 20 and ended on September 13, 1990. Nine egg takes were completed, with a total of 4.8 million green eggs being collected (Table 21). A total of 1,333 females were spawned along with 1,147 males, giving a male to female ratio of 1:1.2.

Table 21. Spawning Summary - Spring Chinook Salmon Brood Year 1990.

	No. Spawned		Eggs/	Green	Eyed		Green Eggs
	Females	Males	Female	Eggs	Eggs	Eye-up	Culled
Totals	1,333	1,147	3,623	4,833,104	4,333,105	94.2%	177,967

Note: Culled green eggs excluded from eye-up percent determination.

The number of eggs per female this year was 3,635, down slightly from 3,701 per female in 1989 and 4,615 in 1988. Whenever II-salt adults predominate in the run, as they did this year, the fecundity averages about 3,700 eggs per female.

The 4.3 million eyed eggs produced reflect an eye-up of 94.2 percent, comparable to 92.8 percent in 1989. Kooskia received 1.4 million of these eggs while the remaining 2.9 million were held at Dworshak. Dworshak also received eyed eggs from three females spawned at the Powell facility.

A comparison of this year's SCS spawning with that of the previous five years is presented below in Table 22. In most respects BY 1990 resembled past years.

Table 22. Comparison of BY 1990 Spawning with Five-year Average - Spring Chinook Salmon.

Brood Year	Adult Returns**	Fmls. (%)	Green Eggs	Eggs /Fml.	Eye-up (%)	II-salt (%)	MORTS Prespawn	MORTS Total
1985	855	62.3	1,587,600*	4,200*	?	?	6.5	31.3
1986	799	50.6	1,241,176	3,760	73.0	63.1	8.8	11.2
1987	2,704	59.3	4,075,666	3,526	92.5	82.1	16.6	19.8
1988	2,567	52.6	4,890,970	4,615	96.0	36.3	9.1	12.3
1989	2,673	48.7	3,516,306	3,701	92.8	76.3	10.3	22.9
Average	1,920	55.0	3,062,344	3,960	89.0	64.0	10.0	20.0
1990	3,183	54.9	4,833,104	3,623	94.2	88.4	6.8	11.1

* Estimates.
** Includes trap mortalities and strays from other hatcheries.

Spawning Procedures

Spawning procedures were taken directly from 1989, and were accompanied by additional extensive health lab sampling for IHNV and BKD.

On a given spawning day all adults were anesthetized with MS-222. Males were sent directly to the spawning table while females were killed using a pneumatic knife. Green females were sent back to the holding ponds along with unnecessary males. Gametes from both males and females were combined, mixed by hand, and put into incubator stacks. Crosses were generally between two males and two females, with exceptions for designated numbers of one-to-one fertilization.

Adult Disease Sampling

Sampling for overall health of the fish was done somewhat differently this year in that nearly all fish were sampled for BKD and IHNV. This was accomplished by sampling kidneys, spleens, and ovarian fluid from all females and some males. The ELISA technique for determining BKD levels in adults was used exclusively this year by the Seattle NFRC (they sampled 50 of the mated single pairs) and the Fish Health Center. Fish whose eggs were designated for Kooskia NFH were all tested for both BKD and IHNV. No eggs from IHNV positive adults were shipped off station.

Eggs from all high-BKD females were culled this year, but eggs from medium-and low-BKD females spawned with high-BKD males were retained. This is being done to help determine any significant difference in on-station performance between the fish that result from these eggs compared to normal production fish.

Subsampling for IPN, VEN, ERM, furunculosis, Myxobolus spp., and Ceratomyxa shasta was also carried out by the Dworshak FHC. IHNV results showed 190 out of 1339 fish sampled (14.2 percent) to be IHNV positive. These values are based solely on Takes 1, 2, 3, 5, 6, and 9 because only these fish were single incubated pairs.

Incubation

Dworshak incubation temperatures averaged between 51°F and 54°F. Strategy for this year was to tank the fry when 50 to 75 percent reached swim-up in the trays.

This year a chiller was engaged in two banks of Heath trays to keep peak water temperatures below 57-60°F. Hopefully, this will prevent the "drop-out" or loss of feeding fry experienced in previous years. Regular flushing of the sand filters was put into practice again, which significantly improved incubator-room water cleanliness. Fungal problems in incubating eggs, in both colanders and incubator stacks, were minimized as a result.

After eye-up, eggs were shocked, picked, counted and placed into Heath trays at 5,000 eggs per tray until hatching and swim-up. Each colander in use incubated the eggs from one female. After eye-up, eggs incubated in colanders were either shipped to their intended recipient or they were placed into trays at 5000 eggs per tray.

Special Studies

Approximately 715,000 green eggs from about 170 females are designated for a density study. This is the second year of the study with the addition this year of beginning in the nursery tanks. Sixteen tanks will contain 11,000 fingerlings, nine tanks will contain 22,000, and six tanks will contain 33,000. Fish from these low, medium, and high density loadings will be transferred to outside raceways at similar loadings in April 1990.

A study is also being conducted which attempts to establish the use of marker alleles in SCS populations for tracking groups of fish. This study is being conducted in cooperation with Dr.Ted Bjornn of the Idaho Coop Fish and Wildlife Unit at the University of Idaho.

Program Objectives

The fecundity rate of 3623 eggs per female in the Dworshak/Kooskia fish was lower than expected but with the 94.2 percent eye-up producing 4.3 million eyed eggs, all production goals should be met (Table 23).

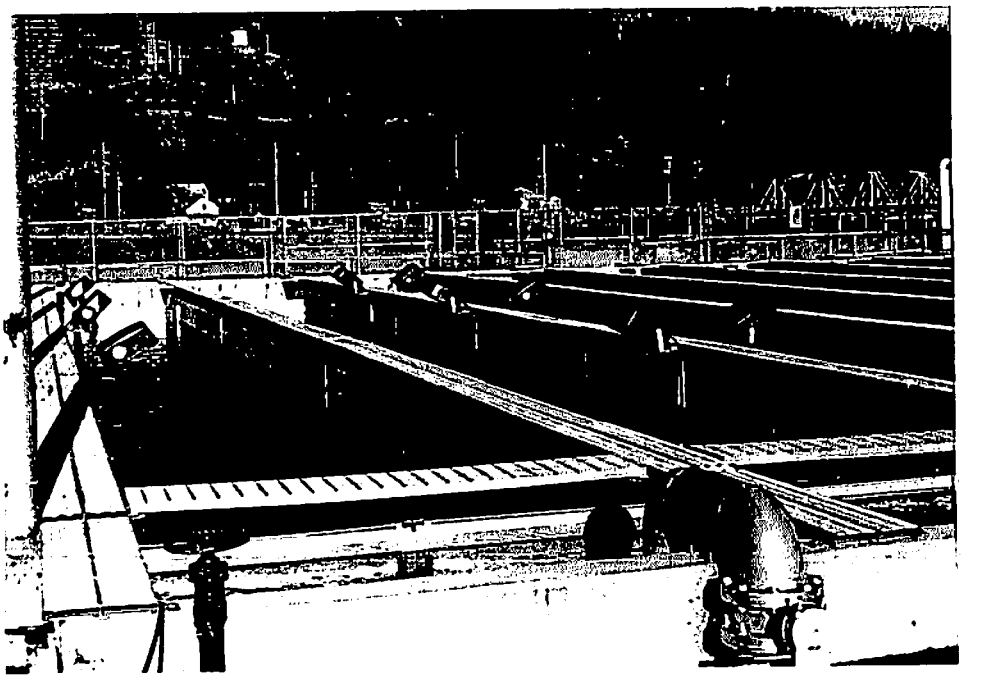
Table 23. Program Objectives - Spring Chinook Salmon Brood Year 1990.

Location	Number at Release	Type of Release	Size at Release	Date of Release
Dworshak	1,400,000	Smolt	20/lb	Apr 92
(2.9M eyed)	800,000	Fingerling	130/lb	Jun 91
Subtotal	2,200,000			
Kooskia	800,000	Smolt	20/lb	Apr 92
(1.4M eyed)	500,000	Fingerling	100/lb	Jun 91
Subtotal	1,300,000	Objectives based on appx. morts of:		
		Eyed to ponding = 14%		
GRAND TOTAL	3,500,000	Ponding to release = 6%		

FISH CULTURE PHOTOS

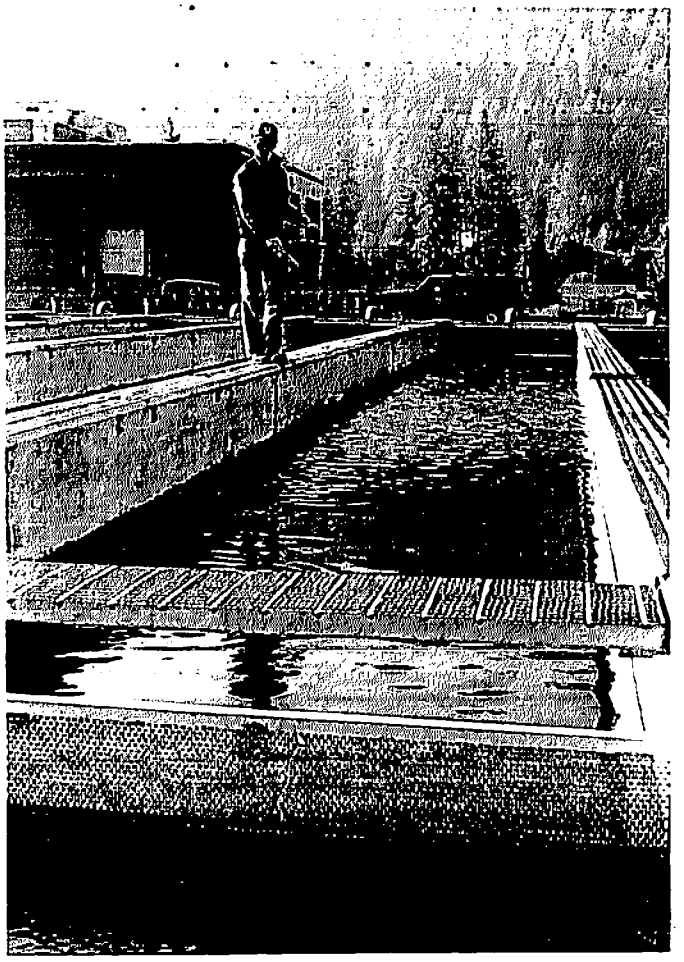
Animal Caretaker, Ron Oatman, sample counting spring chinook fingerlings.

Monthly sample counting of spring chinook production.

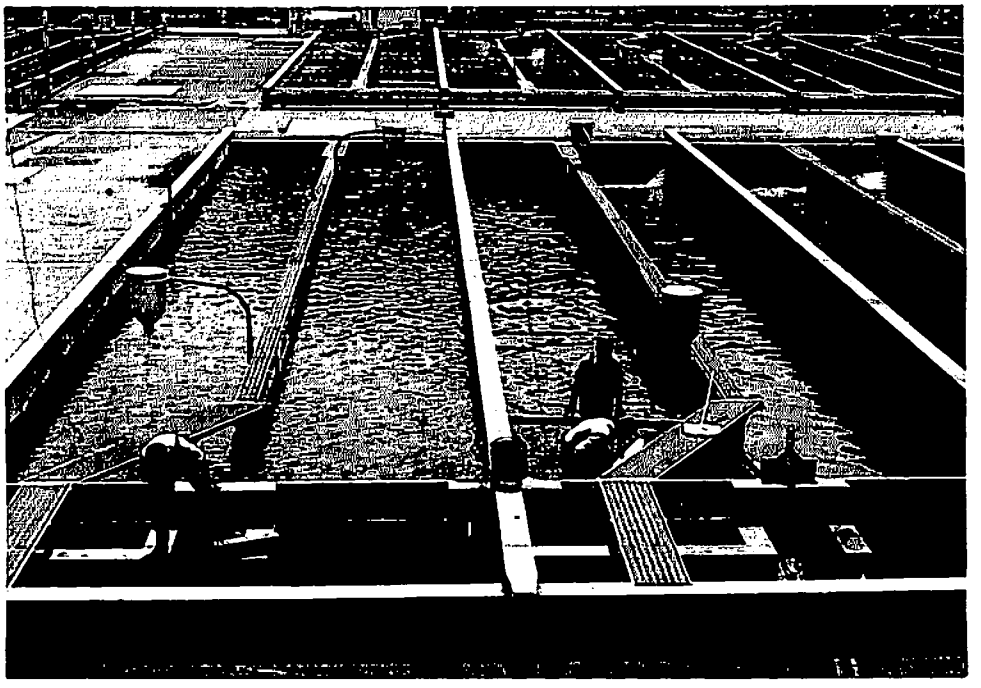


A National Marine Fisheries Service (NMFS) photoperiod study on spring chinook to advance smoltification.

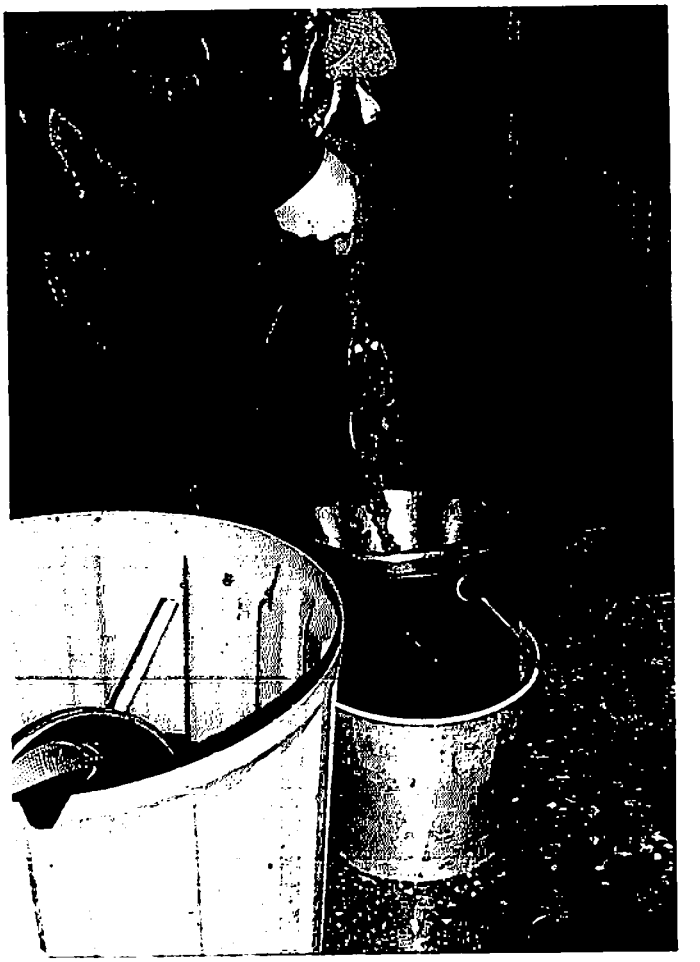
Temporary hiring of truck drivers Ira Fackenthall, Michael Heaton, Ernest Tuning and Steve Tuning to transport 1.5 million steelhead smolts to off-site locations in South Fork of Clearwater River.



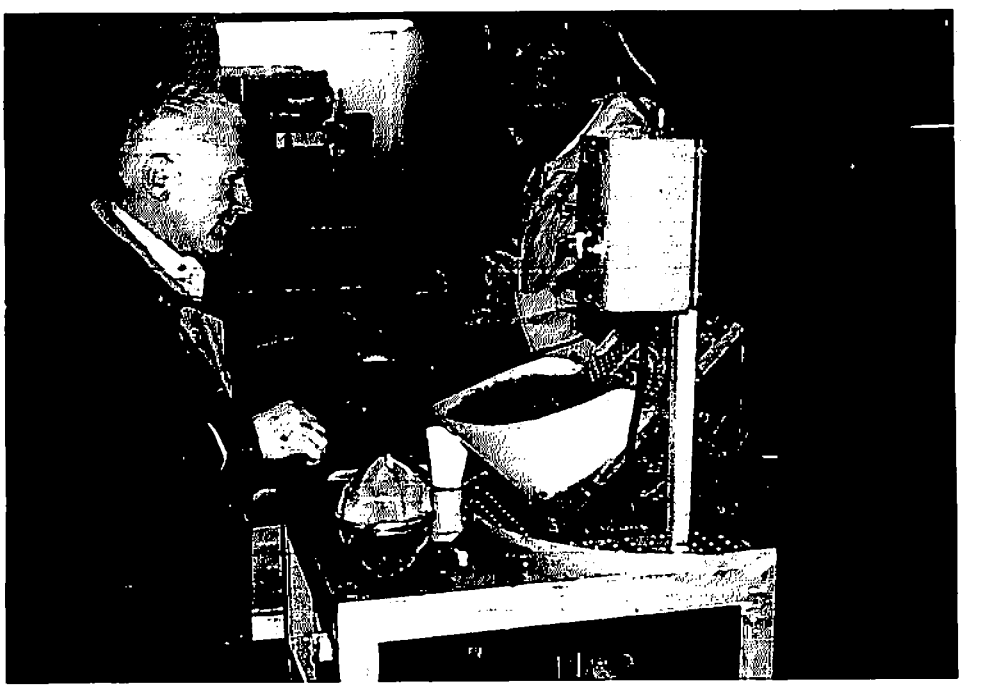
Fishery Biologist, Doug Lawson, feeding spring chinook production.



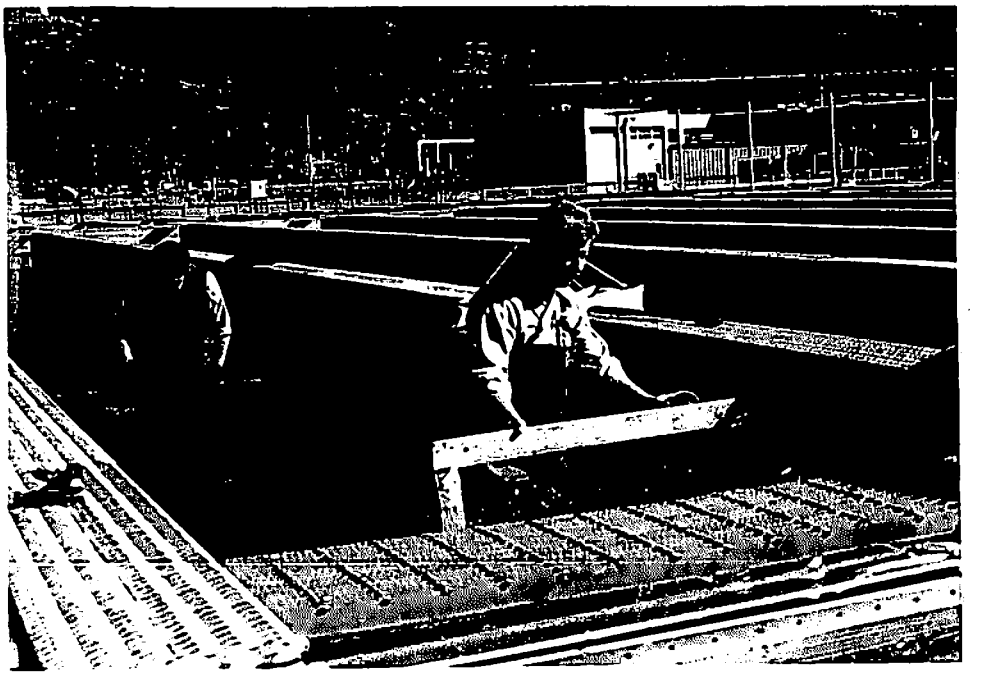
Releasing steelhead smolts directly from Burrows ponds to the main Clearwater River.



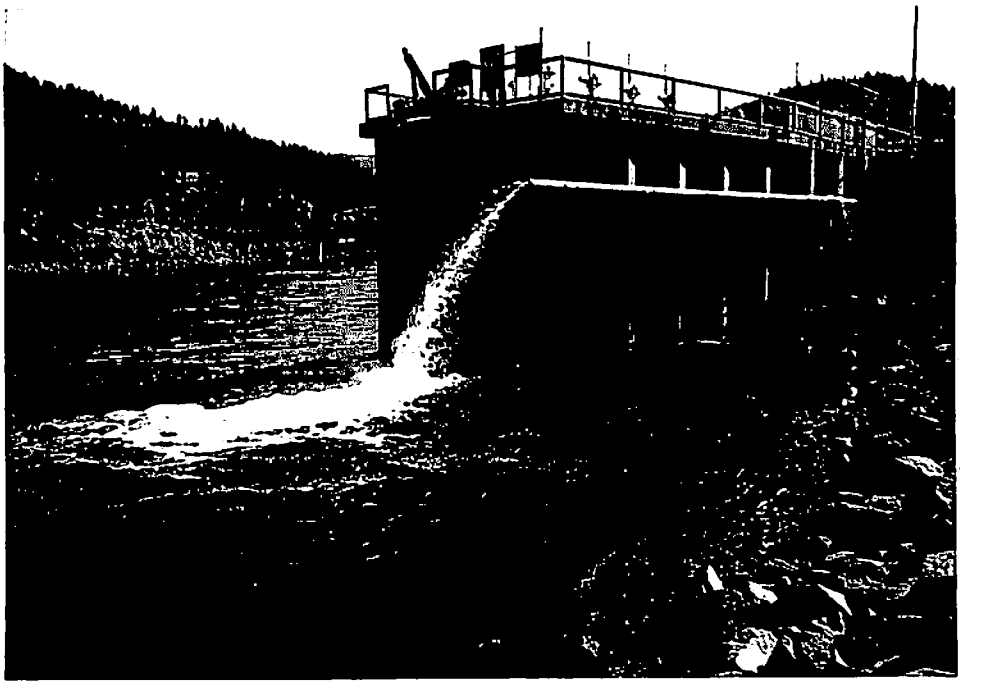
Spring chinook salmon egg collection.



Tom Taggart, Animal Caretaker Leader, and John Rueth, Fishery Biologist, picking and counting steelhead eggs.

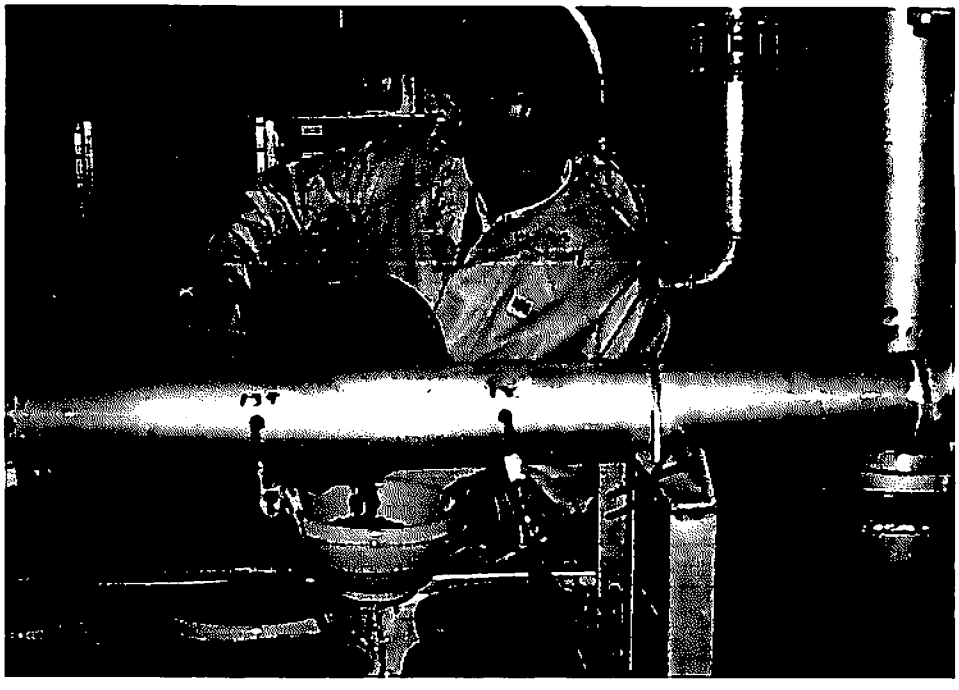


Fishery Biologist, Mark Maskill, and Laborer, Rocky Greenland crowding spring chinook smolts for loading distribution trucks.



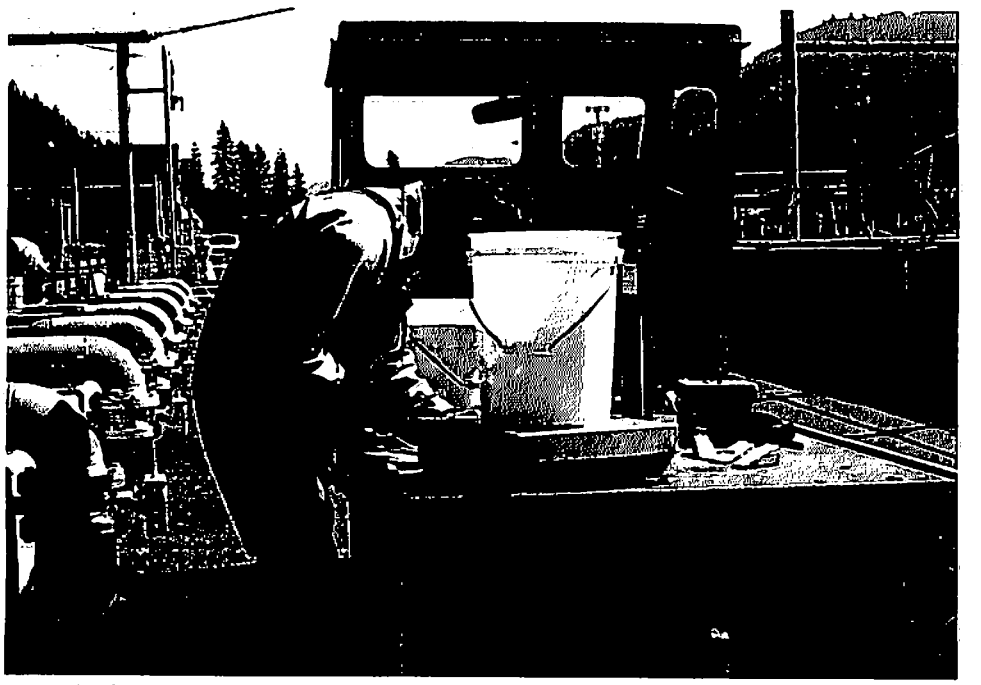
Direct release of spring chinook smolts from hatchery ponds.

Fishery Biologist, Mark Maskill, showing off a spring chinook returnee.

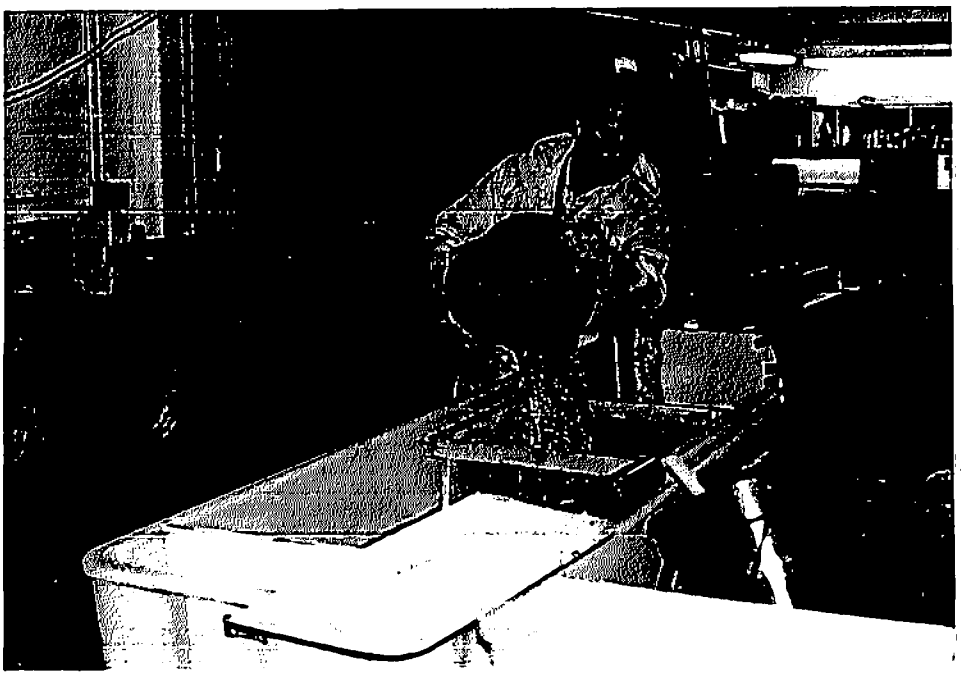


John Rueth, Fishery Biologist, transferring steelhead eggs to colanders for incubation and eye-up.

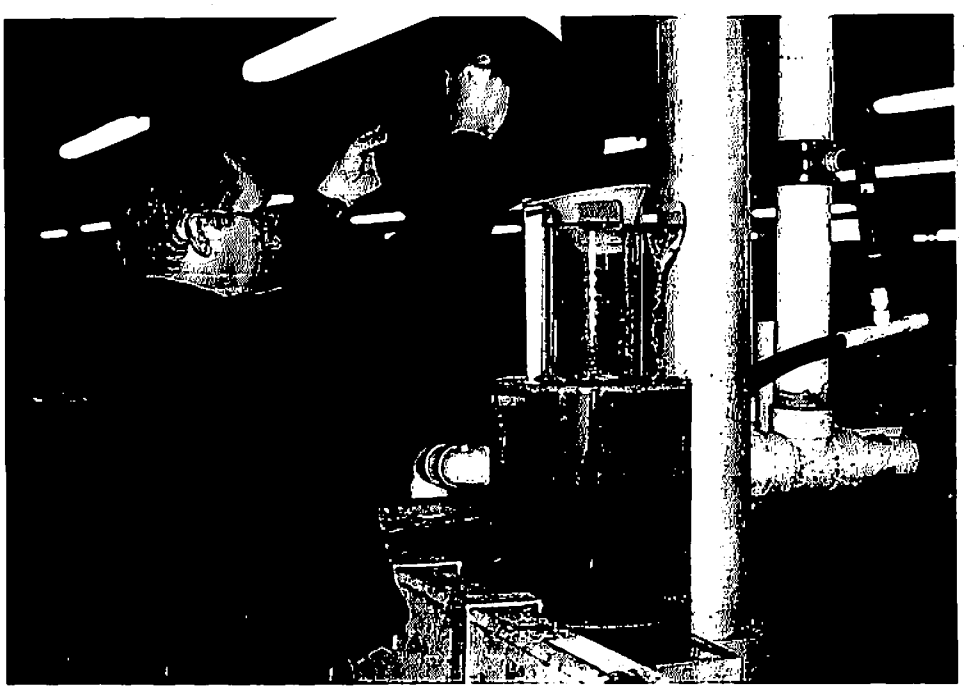
John Parks, Animal Caretaker, quarter net sampling spring chinook salmon production prior to shipment.



John Vargas, Animal Caretaker, recording weight samples of spring chinook production.

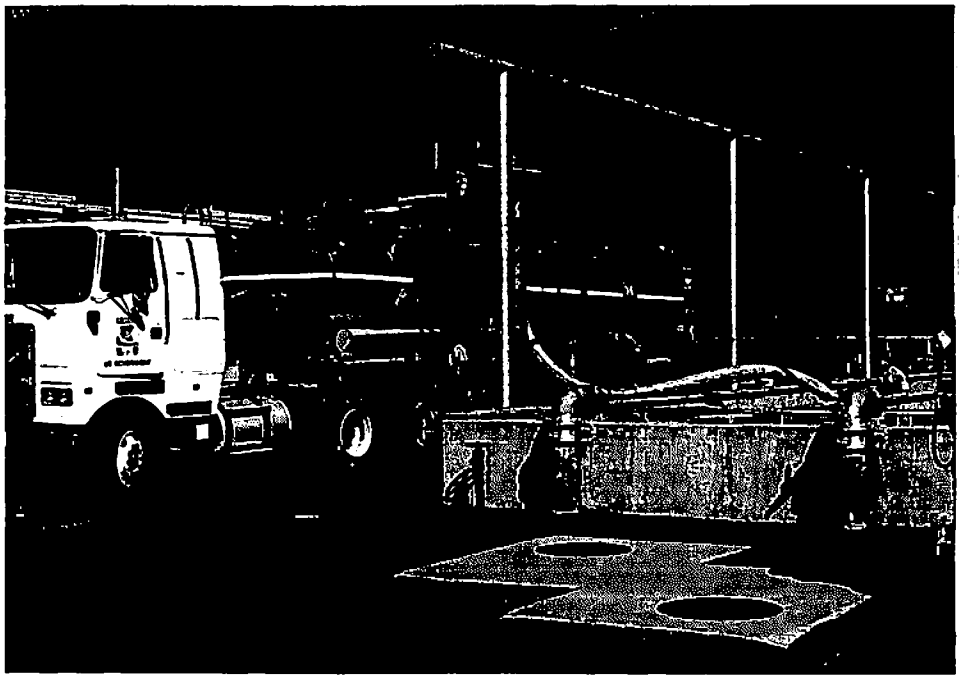


Fishery Biologist, John Rueth, shocking steelhead eggs prior to picking and transporting to other hatchery locations.



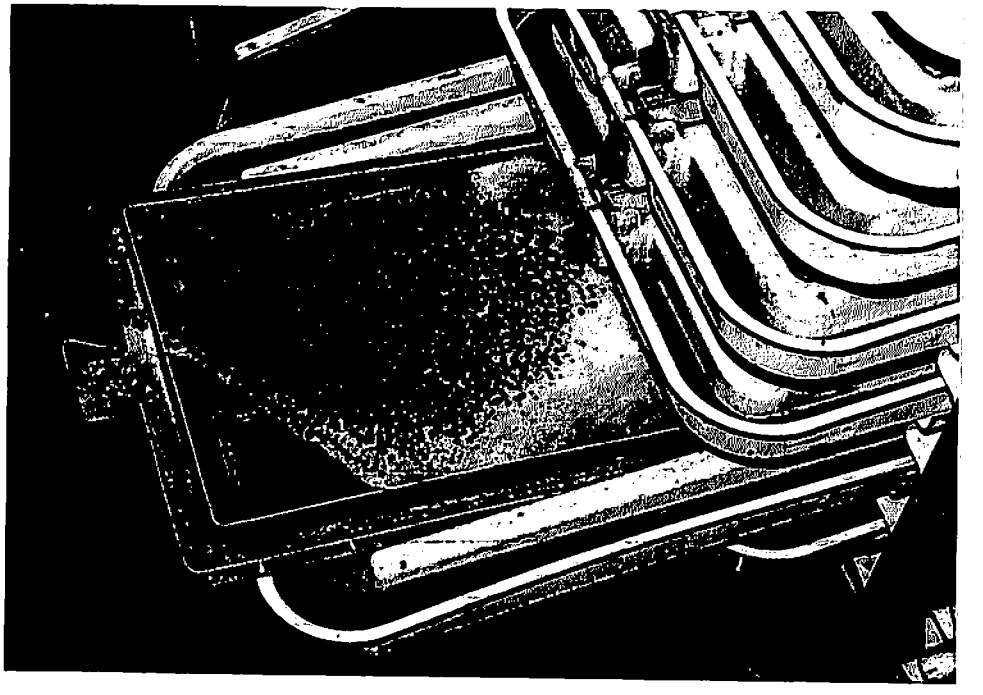
Assistant Manager, Jon Streufert, transferring eyed steelhead eggs to hatching jars.

Outplanting spring chinook salmon smolts with assistance from IDFG drivers and transport units.

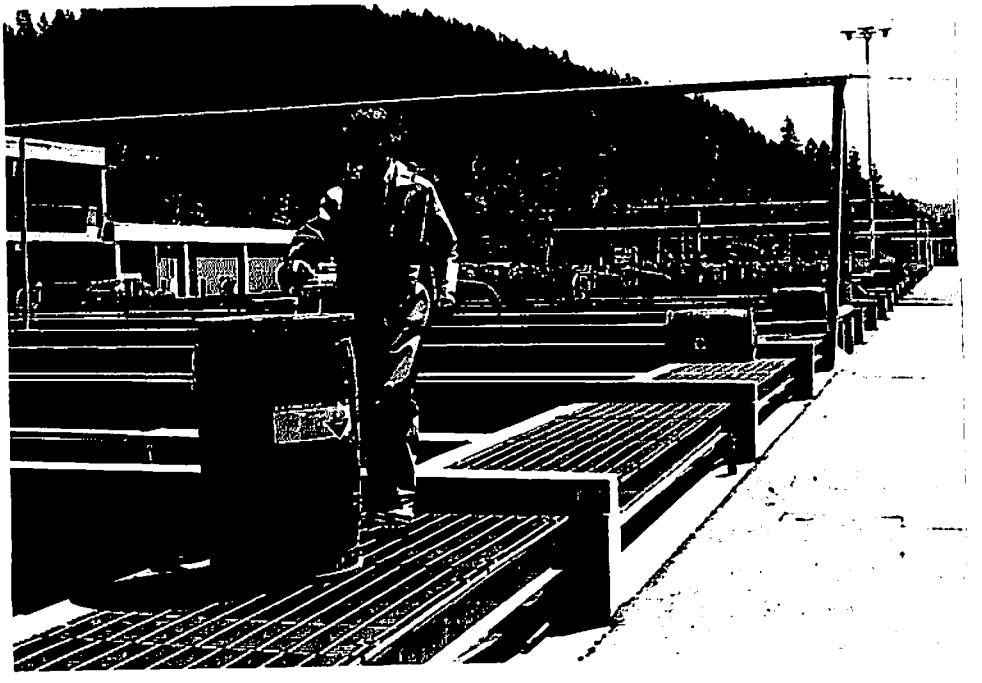


IDFG assistance in outplanting spring chinook salmon smolts in March 1990.

John Rueth, Fishery Biologist, transferring green chinook eggs to Heath incubators.

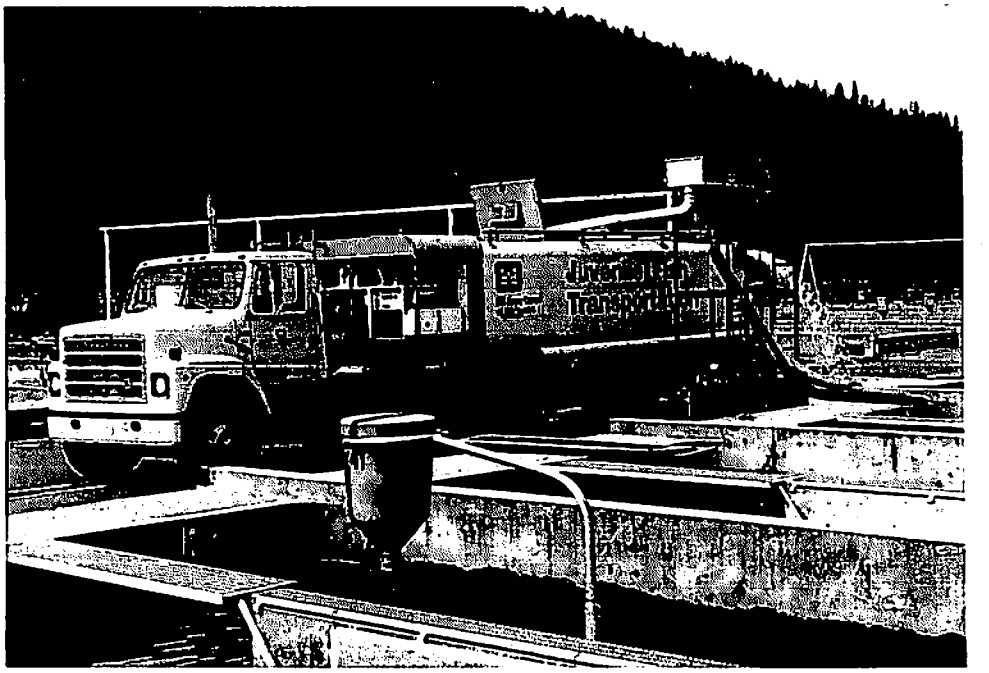


Placement of spring chinook eggs in tray incubators.

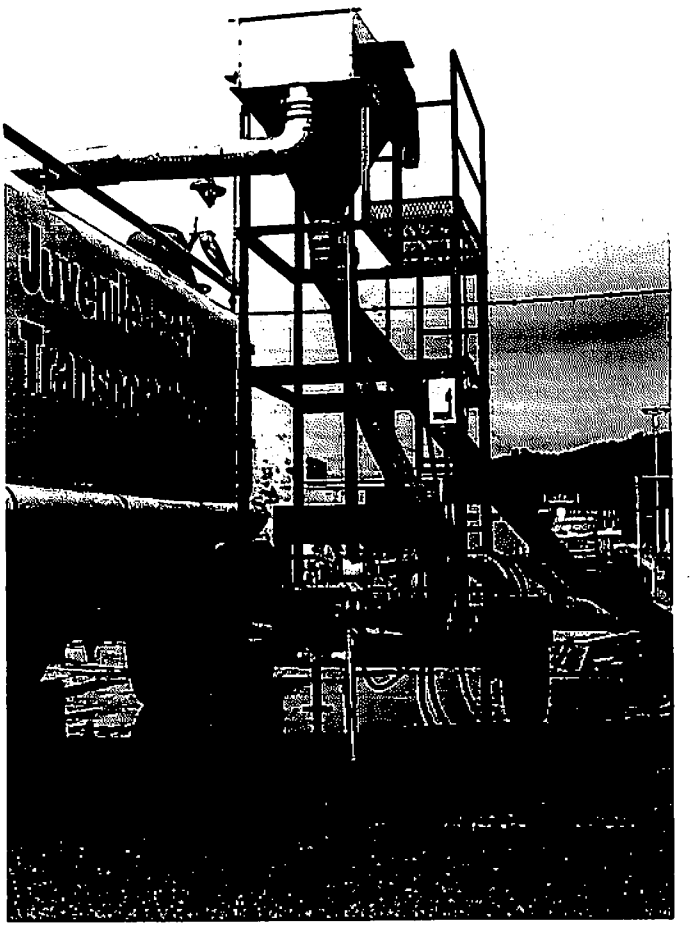


Fishery Biologist, Doug Lawson, applying chlorine disinfection to steelhead rearing ponds.

Animal Caretakers, John Vargas and John Parks applying iodophore treatment to shipping containers prior to transfer of steelhead eggs to Kooskia NFH.



Loading steelhead smolts on to Corps of Engineers tankers for off-site releases in the South Fork of Clearwater River.



Pumping steelhead smolts in to COE tankers for off-site release.

REPAIRS/IMPROVEMENTS/NEW EQUIPMENT

Several major maintenance projects were accomplished which added to the enhancement of station operations and improved existing facilities. The following describes some of those accomplishments.

Work was completed on the electrical installation and final connection of a new boiler in Mechanical I building. The boiler, purchased and delivered in FY 1988, replaced an oil fired unit.

A fencing project along the west perimeter of the hatchery neared completion with another 450 feet added. Work included excavation, concrete footing and retaining wall, and 6' chain-link material and posts.

A room addition was completed in the upstairs lobby area. The added work space, with new lighting, and cedar panelled walls, provides additional office storage and work area. The outside walls display new visitor exhibits.

New visitor exhibits and information signs were installed at various locations along a public tour route. A fish diorama was added to the lower lobby of the main hatchery building. A contract for $78,000 was awarded the previous year by the Corps of Engineers for the displays. In addition, cedar panelling of the downstairs lobby area was completed and improvements made to enhance the diorama exhibit.

Interior painting of hatchery residences No. 2 and No. 4 was completed at a cost of $625 for labor and materials.

Dworshak received two major pumps purchased in late FY 1989 at a cost of $71,000. The pumps replace main pumps No. 3 and 4 with installation scheduled in FY 1991.

Rehab of System II biofilters at a material cost of approximately $25,000 was completed by station personnel. Of this total, $19,800 was spent the previous fiscal year for drive chain and other related materials.

Two emergency purchases were required in August. A food service compressor was rebuilt at a cost of $3100 and No. 5 pump (major pump in Dworshak's main water supply) burned up at a cost of $4400 to repair.

Manual backwashing of Dworshak's incubator water supply became necessary in August on a weekly basis to remove siltation from the systems. This practice will continue as needed. Water furnishing the incubators has become increasingly dirty with silt and other debris from the river over recent years of operation.

A plan of study (POS) was completed by the Corps of Engineers (COE) addressing the hatchery's need for an ozone treatment system and additional water from Dworshak Reservoir. The reservoir supply was approved in late August to furnish 6400 gpm for egg incubation and early nursery rearing. The new pipeline is expected to be completed in September 1991 along with construction of the new Clearwater hatchery. The request for an expanded

ozone water treatment system is dependent upon the results of a new water supply will have on reducing diseases, especially IHN virus.

Work was nearing completion by the COE on implementing a major rehabilitation plan for the hatchery. This plan incorporates updating the electrical systems, improving water treatment, expanding water pumping capability, redesigning the production ponds and correcting several major building problems. Funding is anticipated to begin in Fiscal Year 1993 following a priority listing of the work required.

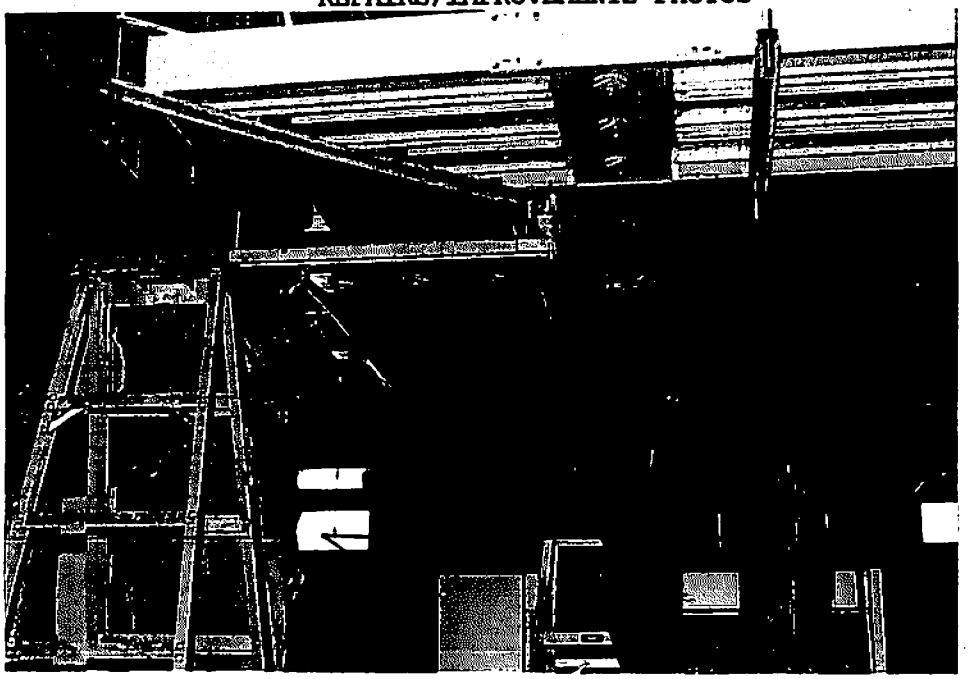
Project Costs:

Fencing of hatchery perimeter (450 ft)	$11,500
Construction of storage/office work area-upstairs lobby	4,100
System II filter beds - replace drive chain and related hardware - materials purchased FY 89 @ $19,800 - additional costs	4,500
Electric boiler installation Mechanical Building No. 1	4,600
Steelhead and spring chinook fish mounts for display	2,600
Pavement restriping	1,050
Rebuild channel fish crowder	1,300
Ozone transformer (replacement)	2,700

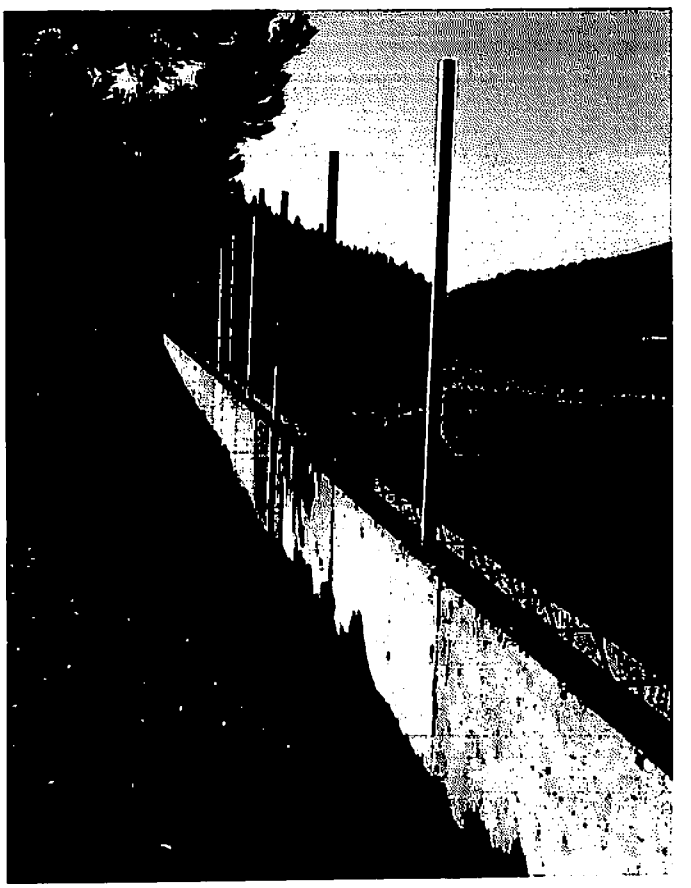
Equipment:

Truck cab and chassis (fish distribution)	58,500
Heath egg incubators (32 - 8-tray vertical units)	18,500
Electric 4-wheel cart	5,500

REPAIRS/IMPROVEMENTS PHOTOS

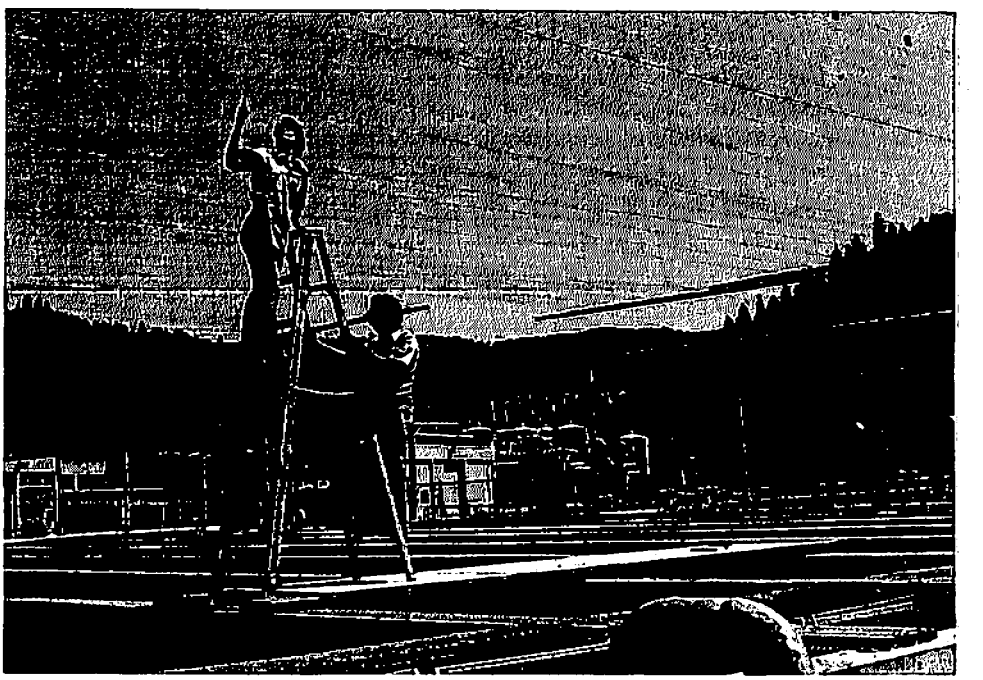


Installation of buss work and connections to new electrical boiler in Mechanical No. 1.



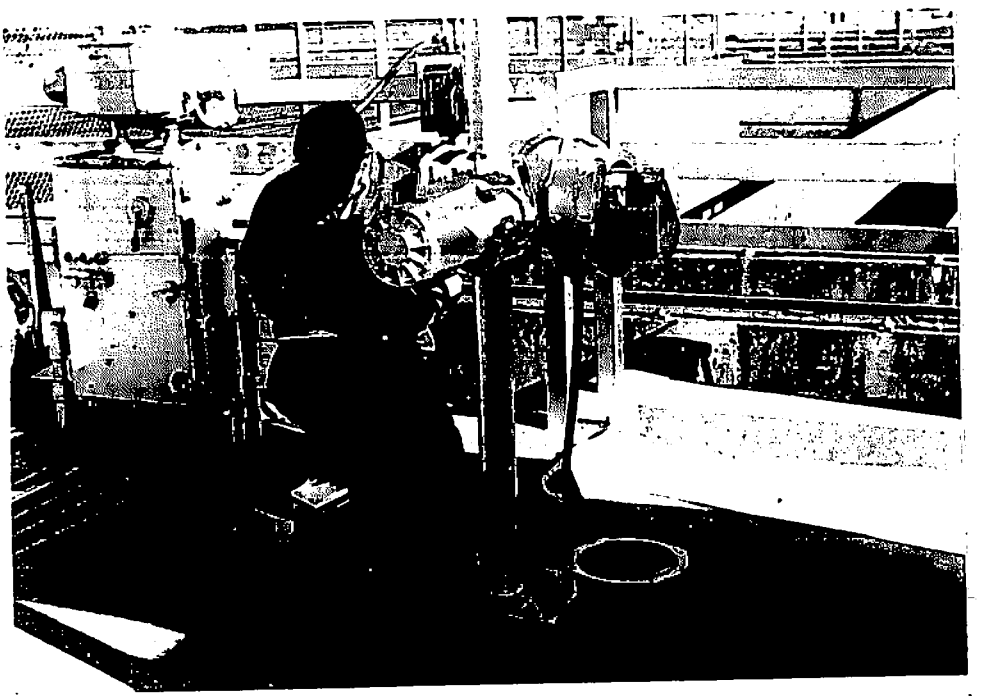
Construction of hatchery perimeter fencing.

Enclosed new work area located in upstairs of hatchery building adjacent to administrative offices.

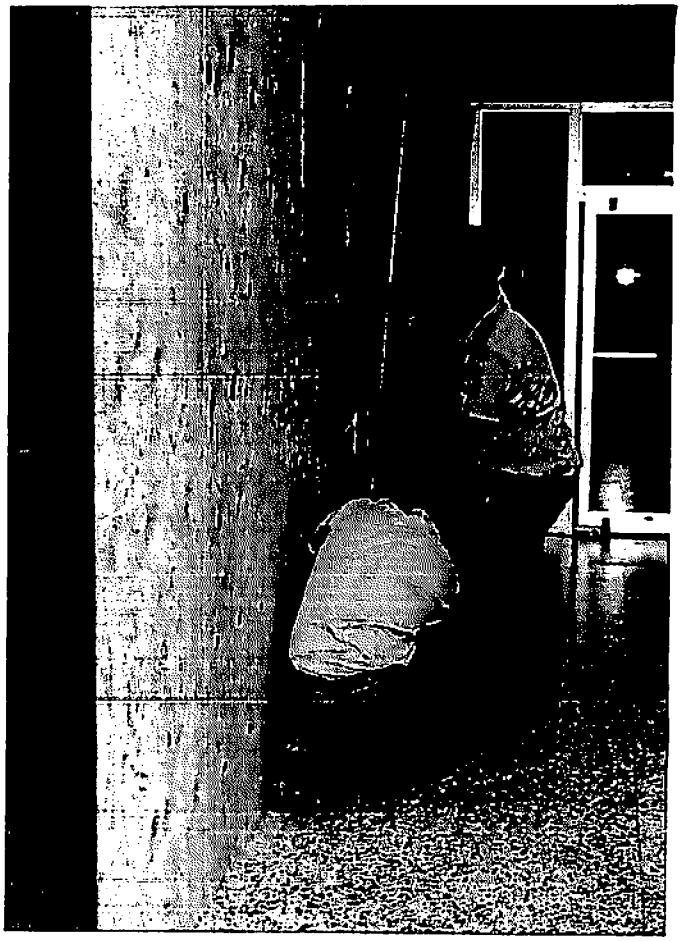


Bird netting repairs over spring chinook raceways.

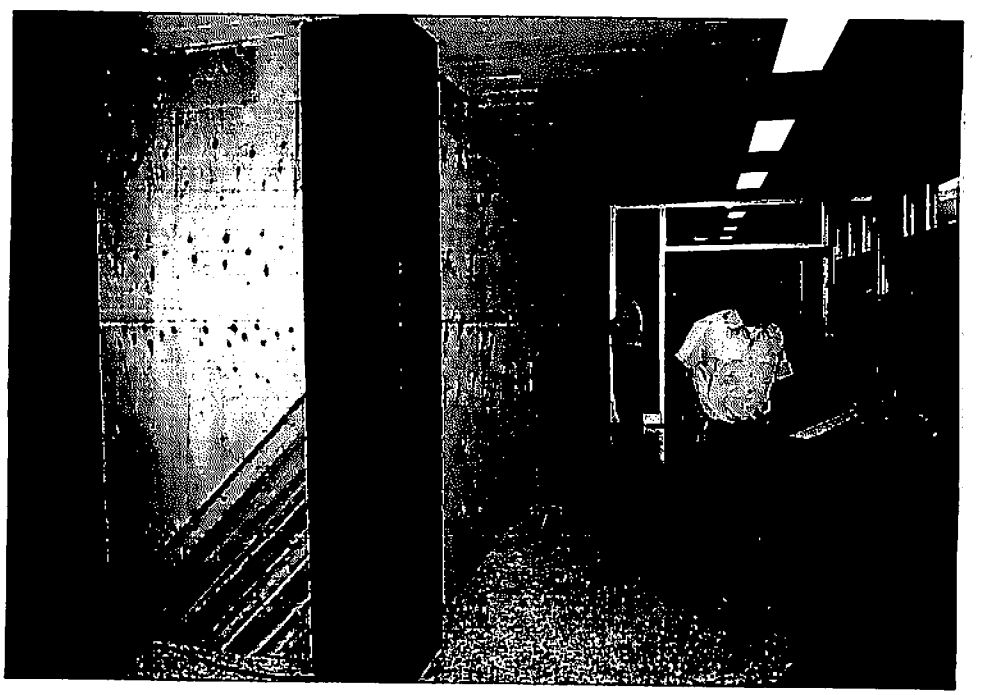
Youth Conservation Corps (YCC) enrollees landscaping station grounds--one of several projects completed to improve hatchery appearance.



Hatchery electrician Ben Greene installing electrical gate operator.



Constructing exterior wall of new office work area.



Construction of office storage and added work area-upstairs hatchery building.

MEETINGS/TRAVEL/TRAINING

Several meetings were held with the Corps of Engineers in both Walla Walla and at the hatchery to review and implement a Plan of Study (POS) addressing a pathogen-free water supply for Dworshak.

Dave Owsley and Jon Streufert instructed at a Coldwater Fish Culture Course (Leetown Academy) held in Syracuse, New York for state hatchery employees. The two instructors were in New York during the week of October 23 with Dave holding a session on "water quality" and Jon on "information retrieval."

A semi-annual coordination meeting was held at Dworshak on November 14 with 33 participants representing Fish and Wildlife Service, Idaho Department of Fish and Game, Corps of Engineers, National Marine Fisheries Service, Fish Passage Center, University of Idaho (CFRU), an Idaho Steelhead and Salmon Unlimited (ISSU) attending.

A Spring Chinook Salmon Workshop, sponsored by NMFS and held in Pasco, Washington, November 8-9, was attended by Olson, Streufert, and Hanson.

A budget review meeting in Walla Walla with the COE on November 27 was attended by Manager Olson.

Olson travelled to Portland on November 29 to meet briefly with Regional Office staff and attend a Fish Health Workshop on November 30.

Kerry Grande participated in a fishery "vision" team meeting held in Portland during the week of December 11.

Olson, Owsley, Streufert, and Hanson attended the Northwest Fish Culture Conference held at Salishan Lodge, Gleneden Beach, Oregon during the week of December 4. Papers were presented by Owsley, "A Simple Economical Static Mixer for Chemical Treatment of Eggs," and Streufert, "Iodine and Ozone Effects on Steelhead Trout Susceptibility to IHN VIrus at Dworshak."

Dave Owsley travelled at the expense of Alaska Fish and Game to assist in several engineering projects at various hatchery locations in Alaska. Dave provided his services from 1/19 to 1/23. Mr. Owsley was also a keynote speaker at the Annual Hatchery Managers meeting at Big Lake on January 23.

Owsley travelled to Leetown, West Virginia on January 24 to instruct at the Fisheries Academy on 1/25 and 1/26. Mr. Owsley covered the subject of water treatments of hatchery water supplies. Jon Streufert instructed at Leetown on January 31; an 8-hour session on information tracking of hatchery production records. Both Mr. Owsley and Mr. Streufert were part of the academy's "Fish Culture and Fisheries Management - General" training course for new Service employees in hatcheries and fishery management.

Manager Olson attended a public information review of the Nez Perce Tribal proposed hatchery facility in Lewiston the evening of January 11. Olson continued travel to Boise on January 12 to meet with tribal fisheries

representatives, IDFG, FWS, BPA, and NWPPC for a further technical review of the proposed facilities.

On February 12, Olson travelled to Boise to attend a review meeting with IDFG, NPPC, BPA and Nez Perce Tribe regarding design of a tribal hatchery and satellite rearing facilities. The Nez Perce Tribe is proposing the new facilities be located within the Clearwater River Basin.

An outplanting committee meeting in McCall, Idaho on February 8 with FWS, IDFG and Nez Perce Tribe identified number of anadromous fish for release and proposed spring planting sites. Olson represented the "Complex" hatcheries.

Olson travelled to the Abernathy Development Center in Washington on February 14 to attend a semi-annual review meeting of the Center's activities. Due to a 14-inch snowfall in the area, the meeting was cancelled. However, a "mini" meeting was held and found to be most beneficial.

Olson attended a Regional Office fisheries staff retreat in Portland on February 27.

Dave Owsley travelled to Denver Engineering Center on March 20 to assist in a preliminary review of the proposed Mora NFH (New Mexico).

Owsley travelled to Baton Rouge, Louisiana on March 22 to attend an American Fisheries Society (AFS) "EXCOM" meeting.

A meeting was held on March 7 with Corps and other agency representatives to view and discuss the proposed river crossing of the new Clearwater Hatchery pipeline. Dave Owsley represented the hatchery in regards to Dworshak's river water intake and the effects any high turbidity may have on fish production.

Olson and Streufert attended a Dworshak coordination meeting held in Boise on March 22 to review hatchery production programs and other fishery activities in the Clearwater River Basin.

Manager Olson represented the Service at an Executive Leadership of Political and Social Services in Natural Resources group training visit to Orofino on April 12. Attendees were from many different resource agencies throughout the northwest in a 1-week training session at the University of Idaho.

Olson and Owsley travelled to Little White NFH on April 30 enroute to Seattle National Fisheries Research Center to meet with Jim Winton on May 1. Purpose of the visit was to review recent steelhead losses at Kooskia with regard to a possible iodine toxicity problem.

Mary Lou Galloway was in the Regional Office on a detail assignment in fisheries from April 9-14.

Owsley attended a seminar (Biological Fluidized Beds for Water and Wastewater Treatment) in Ann Arbor, Michigan on May 24-25. Dave presented a paper "Operating Experiences in Applying the Fluidized Bed to Treatment of Fish Hatchery Waters."

The annual fisheries Project Leaders meeting was held in Portland June 19-21. Olson, Streufert, and Rueth attended.

A meeting in Walla Walla, on June 18 with Corps of Engineers, to discuss a reservoir water supply for Dworshak was attended by Olson and Owsley. Both District and Division engineers were briefed over a 5-hour period on the necessity for a 6400 gpm supply.

Owsley travelled to Bismarck, North Dakota to meet with Bureau of Reclamation representatives on June 14 to review the Garrison water diversion project. Arrangements for this trip were made through Region 6.

Owsley instructed a session on water quality at the Pacific Salmon Leetown course held in Olympia, Washington on July 18.

Olson was on detail in the Regional Office July 23-27.

Dave Owsley travelled to Pittsburgh, Pennsylvania on August 24 to attend a weeks session of the American Fisheries Society (AFS) annual meeting. Dave completed a one-year presidency of the Bioengineering Section of AFS.

Olson attended Hagerman's coordination meeting on September 11.

A Spring Chinook Salmon Hatchery tour was made during the week of September 24 with Olson and Streufert participating. Eleven hatchery facilities in a three-state area of Oregon, Idaho and Washington were visited including the Dworshak-Kooskia Complex.

A number of employees participated in formal training sessions:

Hank Jenks - Concrete and Grouting Techniques, LCSC - 12/05/89.

Christine Hanson - Technical Communications, Dworshak - 12/14-15/89.

Dave Owsley - Technical Communications, Dworshak - 12/14-15/89.

Mary Lou Galloway - Temporary Duty Travel, Clarkston, WA - 1/14-15/90.

Ben Greene - National Electrical Code, Lewiston - 3/17/90.

Dawna Newman - Secretaries Day Conference, LCSC - 4/25/90.

Mary Lou Galloway - Pre-Printed Forms System, Portland - 5/01-03/90.

Mark Maskill - Practical Statistics, correspondence - 5/27/90.

Wayne Olson - In Search of Excellence, Portland - 6/20/90.

Jon Streufert - In Search of Excellence, Portland - 6/20/90.

John Rueth - In Search of Excellence, Portland - 6/20/90.

Christine Hanson - Module II, Leetown Academy - 8/06-24/90.

John Rueth - Module II, Leetown Academy - 8/06-24/90.

John Vargas - Basic Fish Health Disease, Gresham, OR - 9/10-14/90.

PUBLIC INFORMATION/VISITORS

Fifteen (15) 3'x4' outdoor exhibit ponds were designed and installed along a self-guided tour of the hatchery. The downstairs lobby of the visitor center features a life-sized diorama of steelhead and chinook salmon in various stages of life. Super sized, wall mounted, colored murals, depicting the life cycle stages of anadromous fish in the natural environment of the river, lead the visitor from the downstairs lobby, upstairs to several spawning room exhibit panels. The attractive interpretive panels provide the public an understanding of Clearwater River anadromous fish, their management and the operation of the hatchery. Contract cost for the completed work was $78,000 awarded by the Corps of Engineers to Promotion Products, Inc., Portland, Oregon.

An information report is now available on radio 1610 AM noting various activities and events of the Corps of Engineers (COE), U.S. Forest Service and Dworshak NFH. The COE installed the equipment on the hatchery for transmitting information to vehicle traffic within a 4 mile transmission range along U.S. highway 12.

Numerous visitors were at the station to view the steelhead spawning operation in March and April. Assisting with questions and providing information about the process were two senior volunteers Jesse Lyda and Clay McGill. These two gentlemen did a great job of sharing their fishing stories besides providing an educational experience for the visitor. Nearly 70 hours of volunteer time were donated.

Olson presented an update on hatchery activities at a regular program meeting of the Orofino Rotary club on March 23.

Stefan Dobert of Dobert Productions, Inc., Washington D.C., was at Dworshak March 26-28 to film hatchery operations. Mr. Dobert was on contract with LSRCP to video a fishery story of the Compensation Plan field operations.

Gordon Eastman, nationally known outdoor wildlife film producer, from Cody, Wyoming, was at Dworshak and immediate area to film fishery activities, especially river scenes of steelhead being caught and also of hatchery operations. Filming will highlight this area and its famous steelhead fishery in a 30-minute video for commercial distribution.

A group of 15 law enforcement officers, representing state and federal within the Columbia River Basin, toured Dworshak on April 26. Several other visiting groups including Nez Perce Tribal Fisheries, NMFS, IDFG, and universities were on station at various times during the year.

A Rotary group study exchange team of seven people from the Netherlands was given a tour on May 7. On May 28, a group of 25 Rotary exchange high school students, representing many different foreign countries, visited the hatchery. On May 17, students attending the Leetown Academy electrofishing course in Orofino, were given a Dworshak tour.

School groups at Dworshak represented Lewis-Clark State College, Prairie Middle School, Kendrick High, Bovill Elementary, Nezperce Jr. High, Endicott Elementary, West Park Elementary, Kamiah Head Start, Centennial Elementary, Nezperce Elementary, Kellogg Elementary, Bowdish High, Orofino Jr. High, Weippe Middle School, St. Stanislaus Elementary, Moscow High, Kamiah Elementary, McCall-Donnelly High, and Kooskia Elementary. Number of students totaled nearly 750.

Colonel Collmeyer, Deputy Division Engineer, Portland and Colonel Walter, District Engineer, Walla Walla (Corps of Engineers) were given a tour of the Dworshak facilities on May 17 and presented a 45 minute briefing on hatchery operations by Manager Olson.

Harry Senn and John Mack, engineers representing Fish Management Consultants, Olympia, Washington, were at Dworshak on May 9 to meet with Olson and Owsley regarding hatchery design and fish culture technology.

A Columbia River Water Management group of 15 people, headed by Steve Spaulding, COE, Walla Walla, was given a tour of Dworshak along with an operation's briefing on June 15.

Public visitors increased with the beginning of summer. Several groups were provided formal tours during the month. A group of fish culture technicians from the Leavenworth Complex and Washington Department of Fisheries visited on June 26.

A television set with VCR was purchased to be installed in the upstairs visitors' lobby. A 7-minute video of hatchery operations is available for public viewing. The video, professionally prepared, has received excellent reviews.

Mike Prager, outdoor life reporter for the Spokane Spokesman Review and Bart Rayniak, photographer, visited Dworshak on August 8. A story with front page photos on spring chinook salmon appeared in the August 20 newspaper.

The Lewiston Tribune carried a news story on August 16 regarding Dworshak's low incidence of IHN virus in this year's steelhead production.

A group of 17 volunteers representing the Smithsonian Institution, Washington D.C. were in the Orofino area for 1 week on assignment to cover the local area. Dworshak hatchery was toured for 2 hours and questions answered. Their hatchery visit will become a part of the Smithsonian archives.

Among visitors from the Portland regional office were Marv Plenert, Bill Shake, John Miller, Dan Diggs, Tom Sheldrake and Chuck Eggleston.

An estimated 32,000 public visitors toured the station during the year ending September 30, 1990. Idaho's centennial year appeared to increase the number of visitors to the many public facilities in the state.

One of 14 new interpretive signs along a self-guided tour of the hatchery grounds.

Visitor area with new exhibits and cedar paneling.

New exhibit murals in lobby of visitor center.

STAFFING

The station continued to participate in employee development training with the following fishery biologists (trainees) in the programs: Kerry Grande, John Rueth and Mark Maskill. John Rueth, Lahontan NFH, was selected (12/31/89) to fill a previous vacancy that had remained unfilled since June 16, 1989 when Dick Mueller retired on a medical disability. This position was advertised several times with no selection due to lack of qualified candidates. Recruitment again was initiated in September expecting that it could be filled by December 1990. Kerry Grande transferred to Saratoga NFH on December 31 with promotion to Assistant Hatchery Manager.

Christine Hanson, Fishery Biologist (Production Assistant), was selected as Assistant Manager at Leadville NFH with a transfer date of November 1990. Recruitment action was initiated for the forthcoming vacancy.

Personnel actions resulted in promotions to the following employees:

Jon Streufert, Fishery Biologist, GS-11 to GS-12, effective 12/17/89.
Alfred Jenks, Animal Caretaker, WG-4 to WG-5, effective 3/11/90.
John Vargas, Animal Caretaker, WG-4 to WG-5, effective 3/11/90.
Mark Maskill, Fishery Biologist, GS-5 to GS-7, effective 4/08/90.
Mary Lou Galloway, Program Assistant, GS-6 to GS-7, effective 4/22/90.
David Owsley, Environmental Engineer, GS-12 to GS-13, effective 6/03/90.

Several applicants were interviewed for four temporary truck driver positions to transport steelhead smolts from Dworshak beginning in mid-April. Responsibility for the drivers was shifted to the hatchery when the COE was restricted by a hiring freeze. Hiring was for a period ending April 28, 1990.

Ira Fackenthall, Motor Vehicle Operator, WG-7.
Michael Heaton, Motor Vehicle Operator, WG-7.
Ernest Tuning, Motor Vehicle Operator, WG-7.
Steve Tuning, Motor Vehicle Operator, WG-7.

The hatchery again participated in a summer 8-week YCC program in which six enrolles and one crew leader were hired. The program began on 6/11, ending 3/03/90.

Other personnel actions included:

Dawna Newman, Clerk-Typist, GS-4, career conditional appointment, effective 10/08/89.

Donovan Kangas, Student Aide (temporary), appointed 11/10/89, terminated 4/09/90.

Travis Schultz, Student Aide (temporary), appointed 5/19/90.

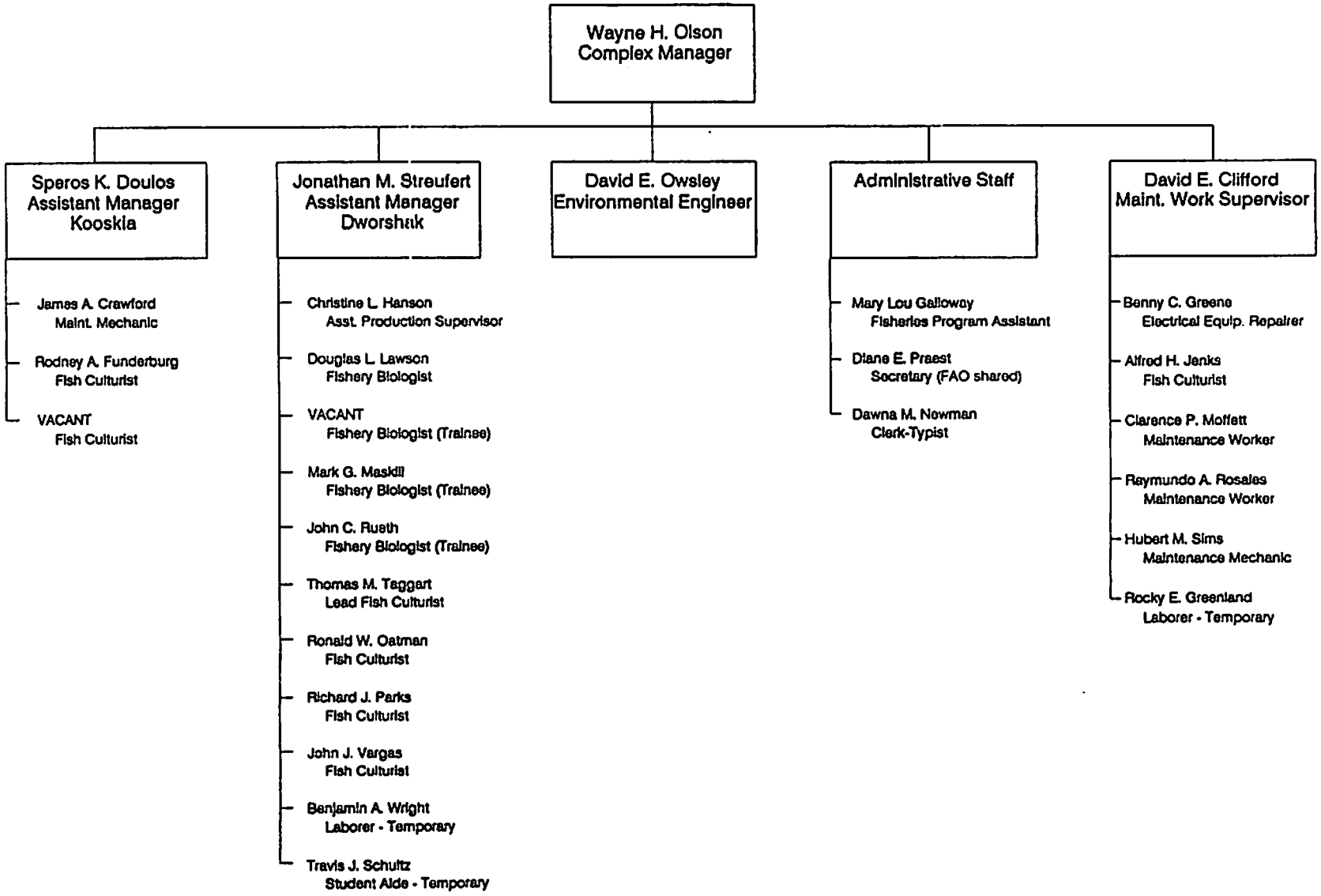
Dworshak Employees
- FY 90 -

Name	Position Title	Period of Employment		Status
Bosse, Brent W.	YCC Enrollee	6/11/90 8/03/90	-	YCC Program
Brown, Roger E.	YCC Enrollee	6/11/90 8/03/90	-	YCC Program
Clifford, David E.	Work Supervisor (Maint.)	10/01/89 9/30/90	-	Permanent
Coley, Amy N.	YCC Enrollee	6/11/90 8/03/90	-	YCC Program
Collins, Sheila K.	Clerk-Typist	7/01/90 9/30/90	-	Temporary
Eckman, Lester L.	YCC Enrollee	6/11/90 8/03/90	-	YCC Program
Fackenthall, Ira J.	Motor Vehicle Operator	4/11/90 4/28/90	-	Temporary
Galloway, Mary Lou	Fisheries Program Asst.	10/01/89 9/30/90	-	Permanent
Grande, Kerry W.	Fishery Biologist	10/01/89 12/31/89	-	Permanent
Greene, Benny C.	Electrical Equipment Repairer	10/01/89 9/30/90	-	Permanent
Greenland, Rocky E.	Laborer	10/01/89 9/30/90	-	Temporary
Hanson, Christine L.	Fishery Biologist	10/01/89 9/30/90	-	Permanent
Harvey, Kristi A.	Student Aide	10/01/89 8/04/90	-	Temporary
Heathco, Merle S.	Motor Vehicle Operator	4/11/90 4/12/90	-	Temporary
Heaton, Michael O.	Motor Vehicle Operator	4/11/90 4/28/90	-	Temporary
Jenks, Alfred H.	Animal Caretaker	10/01/89 9/30/90	-	Permanent
Kangas, Donovan	Student Aide	11/10/89 4/09/90	-	Temporary
Lawson, Douglas L.	Fishery Biologist	10/01/89 9/30/90	-	Permanent
Maskill, Mark G.	Fishery Biologist	10/01/89 9/30/90	-	Permanent
McTevia, Laura T.	YCC Enrollee	6/11/90 8/03/90	-	YCC Program
Miller, Blandyna E.	YCC Enrollee	6/11/90 8/03/90	-	YCC Program
Moffett, Clarence P.	Maintenance Worker	10/01/89 9/30/90	-	Permanent
Newman, Dawna M.	Clerk-Typist	10/01/89 9/30/90	-	Permanent
Oatman, Ronald W.	Animal Caretaker	10/01/89 9/30/90	-	Permanent
Olson, Wayne H.	Hatchery Manager	10/01/89 9/30/90	-	Permanent

Name	Position Title	Period of Employment		Status
Owsley, David E.	Environmental Engineer	10/01/89 9/30/90	-	Permanent
Parks, Richard J.	Animal Caretaker	10/01/89 9/30/90	-	Permanent
Praest, Diane E.	Secretary (Typing)	10/01/89 9/30/90	-	Permanent
Rosales, Raymundo A.	Maintenance Worker	10/01/89 9/30/90	-	Permanent
Rueth, John C.	Fishery Biologist	12/31/89 9/30/90	-	Permanent
Schultz, Travis J.	Summer Aide	5/19/90 9/30/90	-	Temporary
Sims, Hubert M.	Maintenance Worker	10/01/89 9/30/90	-	Permanent
Streufert, Jonathan M.	Assistant Manager	4/24/89 9/30/90	-	Permanent
Taggart, Thomas M.	Animal Caretaker Leader	10/01/89 9/30/90	-	Permanent
Tuning Ernest A.	Motor Vehicle Operator	4/11/90 4/28/90	-	Temporary
Tuning Steven R.	Motor Vehicle Operator	4/16/90 4/28/90	-	Temporary
Vargas, John J.	Animal Caretaker	10/01/89 9/30/90	-	Permanent
Wilson, Wade W.	Social Services Asst.	6/11/90 8/03/90	-	Temporary YCC Program
Wright, Benjamin A.	Laborer	10/01/89 9/30/90	-	Temporary

DWORSHAK-KOOSKIA NFH COMPLEX

September 30, 1990



COOPERATIVE PROGRAMS

The hatchery continued to work closely with the following agencies and groups in the accomplishment of various activities.

- -Idaho Department of Fish and Game:
  - Boise Office
  - Lewiston Office
- -Seattle National Fishery Research Center (SNFRC)
- -Corps of Engineers
  - Walla Walla District
  - Dworshak Dam and Reservoir Project
- -Cooperative Fishery Research Unit (CFRU) - University of Idaho
- -Nez Perce Tribal Fisheries
- -National Marine Fisheries Service (NMFS)
- -University of Idaho
- -Washington State University
- -Clearwater National Forest
- -Clearwater County Sheriff Office

Dworshak Fish Health Center and Dworshak Fisheries Assistance Office shared facilities on the hatchery. The three Service groups are cooperatively involved in FWS activities on the Clearwater River.

Steelhead carcasses were, as in recent years, received by a local processor on spawning days to be processed, frozen, and made available to several commodity programs administered through the Idaho Department of Education. The hatchery provided cold storage space for the processed fish until distribution was made.

Eggs and small fish were again furnished other agencies and university groups for study purposes, i.e., environmental testing genetic experiments, and on-going bacterial kidney disease monitoring.

Provided instructors for Leetown Academy courses:

- -Dave Owsley, "Water Quality" - Syracuse, New York - 10/89
- -Jon Streufert, "Information Retrieval" - Syracuse, New York - 10/89
- -Dave Owsley, "Water Treatment" - Leetown, West Virginia - 1/90
- -Dave Owsley, "Water Quality" - Olympia, Washington - 7/90
- -Jon Streufert - "Data Collection and Usage" - Leetown, W.V. - 1/90

Nez Perce Tribal fishery program was provided two circular nursery tanks, column degassers and several test groups of fish to examine a well water source for a possible future hatchery facility.

Sixteen hours of community service was provided by an Orofino high school student to satisfy a work requirement.

The hatchery assisted in collecting and transferring excess adult steelhead to IDFG transportation units for release in the Boise area.

Assistance in distribution of Dworshak's smolt production was provided by IDFG and COE with trucks and drivers as requested.

Two semi-annual coordination meetings were held with Idaho Department of Fish and Game to review hatchery production programs and to discuss Clearwater

River fishery activities. A meeting in November 1989 was held at Dworshak followed by a second session at Boise in March 1990.

Dave Owsley, Engineer, provided on-site consulting assistance to the following:

Alaska Fish and Game - 1/90
Denver Engineering Center - 3/90
Bureau of Reclamation, Bismarck, North Dakota - 6/90

Numerous visitors to Dworshak met with Mr. Owsley for information on water treatment, hatchery design and other related facility operations. Dave, also, as a renowned bioengineer in hatchery operations, continued to offer his service's through information mailings and telephone calls.