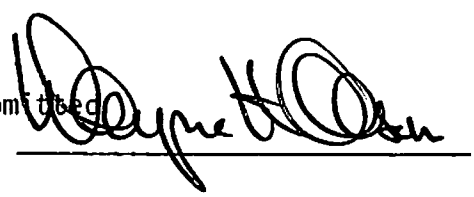
ANNUAL REPORT
FISCAL YEAR 1983
DWORSHAK NATIONAL FISH HATCHERY
AHSAHKA, IDAHO

Submitted
By:  Title: Hatchery Manager Date: 12-12-83

Date Received
Regional Office: _____ Reviewed
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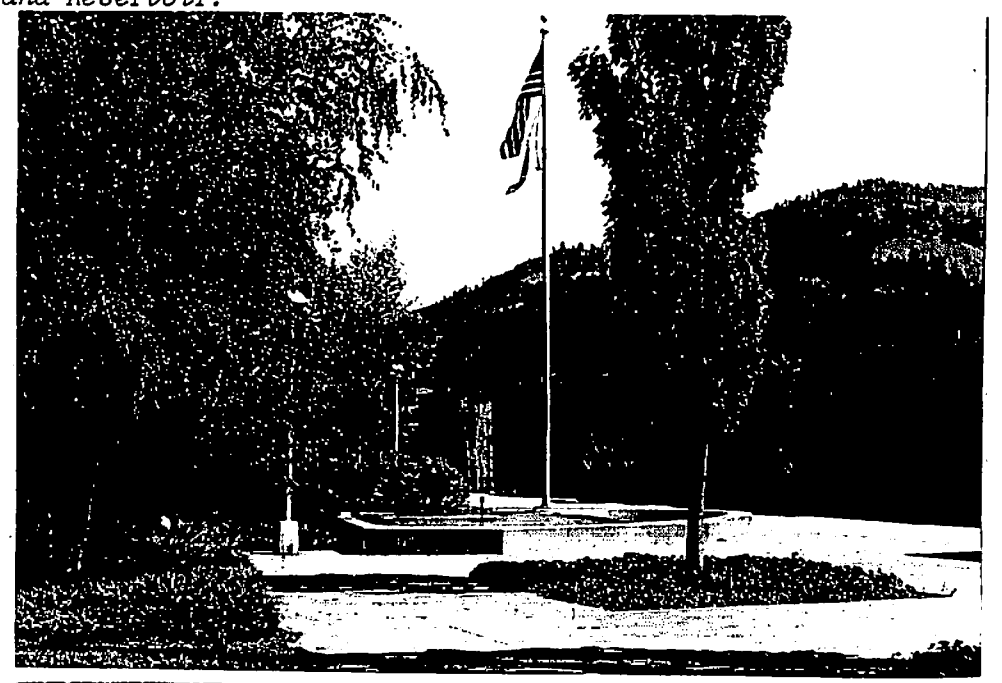
INTRODUCTION

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 three miles west of Orofino (population 3,800) on the north bank of the Clearwater River, one mile downstream from Dworshak Dam.

The site was purchased by the U. S. Army Corps of Engineers in 1967 from several landowners. Title remains with the Corps.

Funds for developing the hatchery were allocated from construction funds for Dworshak Dam under Public Law 10 U.S.C. 2304(a), Appropriation 96 x 3122, Construction, General, Corps of Engineers, Civil, Dworshak Dam and Reservoir.



The hatchery was designed and constructed by the U. S. Army Corps of Engineers. It is administered and operated by the U. S. Fish and Wildlife Service. Rearing facilities consist of 84 recirculating-type ponds (17 feet by 75 feet) for steelhead production, 128 inside nursery tanks (3 feet by 16 feet), and 128 vertical stack egg incubators. In addition, there are nine adult holding ponds (17 feet by 75 feet) of which six are modified into twelve 8-foot by 75-foot raceways to hold rainbow production and thirty 8-foot by 80-foot concrete raceways for production of spring chinook salmon.

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. Subsequent construction over the years has modified some of the existing features, and new design concepts have been incorporated into the hatchery.

Steelhead and rainbow trout are mitigation production assigned to the hatchery with construction of Dworshak Dam. Steelhead are released into the Clearwater River drainage; rainbow to Dworshak Reservoir.

Further construction was completed in June 1982 to expand facilities for spring chinook salmon. Authorized and funded under the U. S. Fish and Wildlife's Lower Snake River Compensation Plan, site selection was approved in 1981 and construction began in September.

Kooskia National Fish Hatchery, located 35 miles upriver, operates as a complex with Dworshak producing spring chinook smolts and steelhead fingerling.

This report covers the period of hatchery activities from October 1, 1982 to September 30, 1983.

STATION OPERATIONS

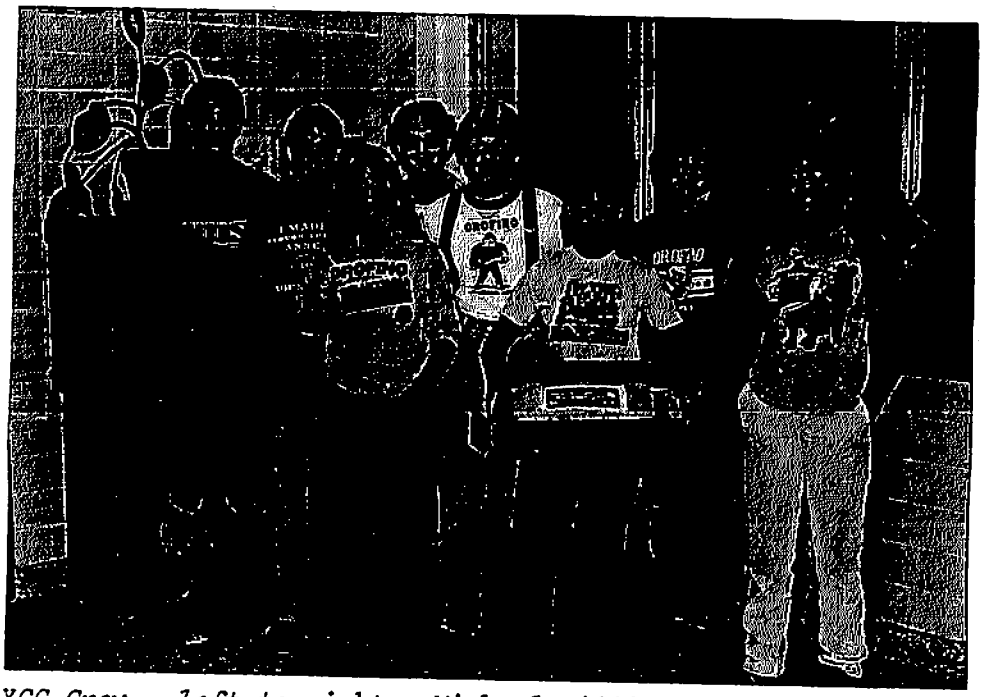
O&M funding from the Corps of Engineers (COE) included $918,700 (Subactivity 1930) and $13,365 (Subactivity 1994) quarters reimbursement. In addition, $30,000 was annual work planned to the Dworshak Fish Health Center (FHC). Bureau of Indian Affairs (BIA) reimbursed the hatchery $2,115 for rainbow trout production costs; $16,920 was moved from station activity 14330 (Subactivity 1300) for pay back in FY 1984; and $1,000 was received from activity 81230 (Cooperative Fishery Research Unit (CFRU) - Subactivity 1150) for material cost on a research study. Funds totalling $131,000 were provided by the Lower Snake River Compensation Plan (LSRCP) for production of spring chinook salmon. Funding sources totalled $1,083,000, exclusive of FHC.

Cost per pound of all fish produced was $2.06, based upon a production gain of 525,077 pounds. This cost reflects equipment repair and maintenance, facility upkeep, rehabilitation, travel and training, and direct production expenses. Direct production costs (labor, fish food, mineral addition, and drugs) were $464,200 or $.88 per pound.

A total of 20.5 staff years was used during the year for a 26,100 pounds of production gain per staff year employed. Production each staff year increases to 40,075 pounds, when based upon direct production responsibilities.

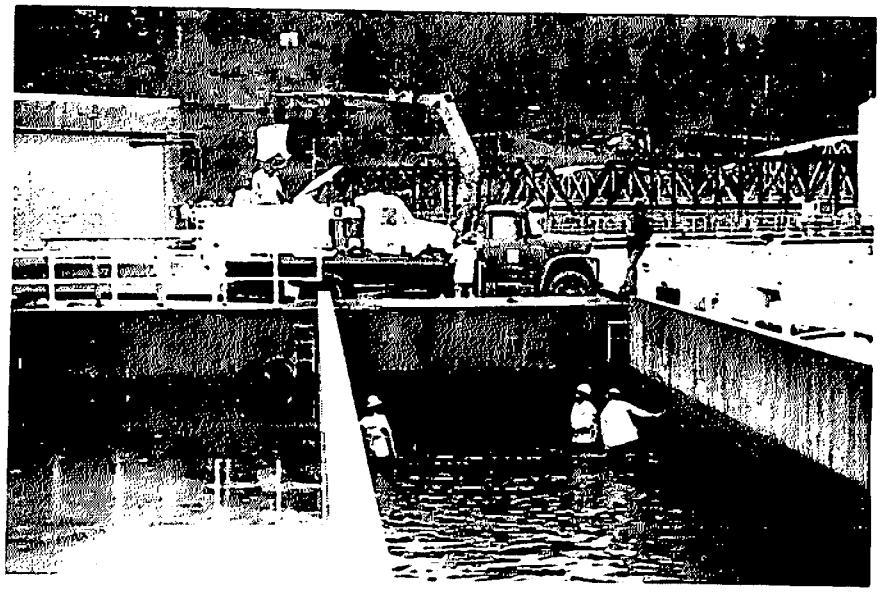
Food conversion (pounds of food to produce one pound of fish) was the best in the station's 14-year history; a very respectable 1.45. This figure is calculated from 760,000 pounds of fish food used to produce a gain of 525,000 pounds.

A Youth Conservation Corps (YCC) program of eight enrollees with a group leader was activated for an eight-week period, from June 20 to August 12, without cost to the station. In addition, employment of four enrollees was extended two weeks to complete unfinished projects. Transfer funds totalling $10,800 were made available to pay enrollee salaries and purchase minor supplies and materials. Several projects resulted from the YCC program including; station landscaping, patios and covers for residences, a fishing path, painting, and pond cleaning.



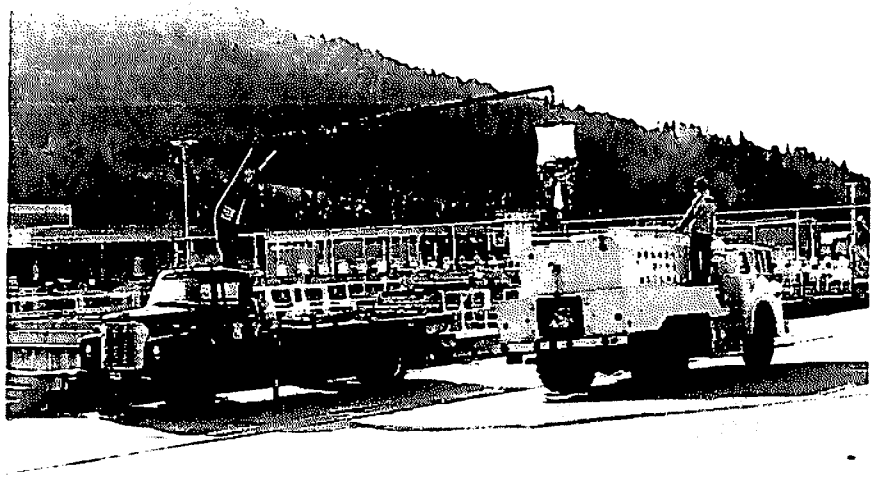
YCC Crew - left to right: Michael Williams, Jess Spencer, Colleen Curry, Duane Tribe, Mark Shamion, Bridgette Zierlein, Marla Kuykendall, Serra Scannell, and Mark McMurray (Crew Leader)

Two major accomplishments were highlighted in the production program. Changes in collection and spawning procedures of steelhead broodstock resulted in distribution of 6,829 fish. Recipients were Idaho Department of Fish and Game (1,444), Nez Perce Tribe (1,200), and Valley Food Bank (4,185). In past years, none of the larger steelhead could be used for outplanting or as a food commodity if they were exposed to the anesthetic MS-222 and were cut to collect eggs. This year's program, using CO_2 and air spawning, allowed immediate disposition of the fish after having gone through the spawning process only one time. Contracts with BIA and U. S. Department of Agriculture (USDA) made possible distribution of fish to the Tribe and to the Food Bank program. Another major change involved individual sampling of each female steelhead for *Infectious Hematopoietic Necrosis* (IHN) virus, resulting from the 48 percent loss of Dworshak's fingerling production in 1982.

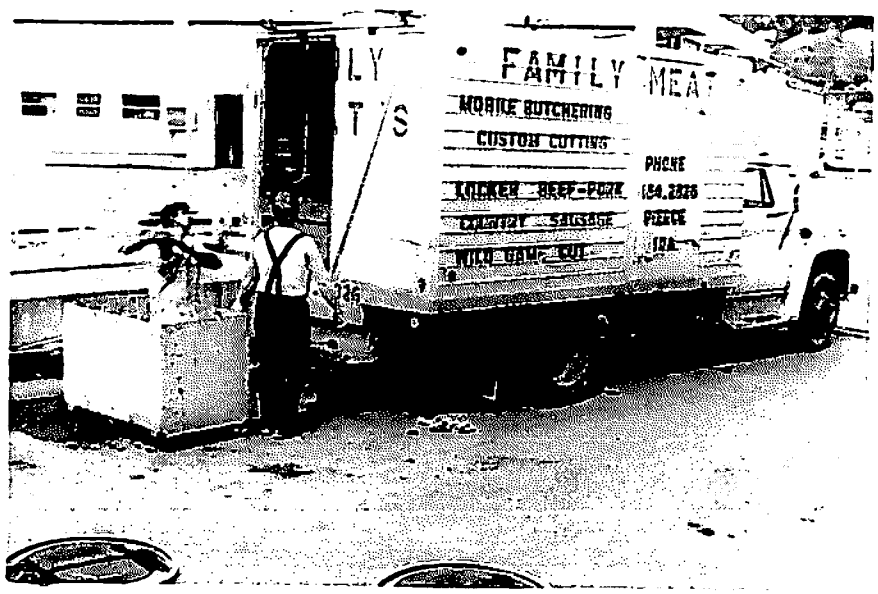


Transferring adult steelhead from holding pond to distribution truck.

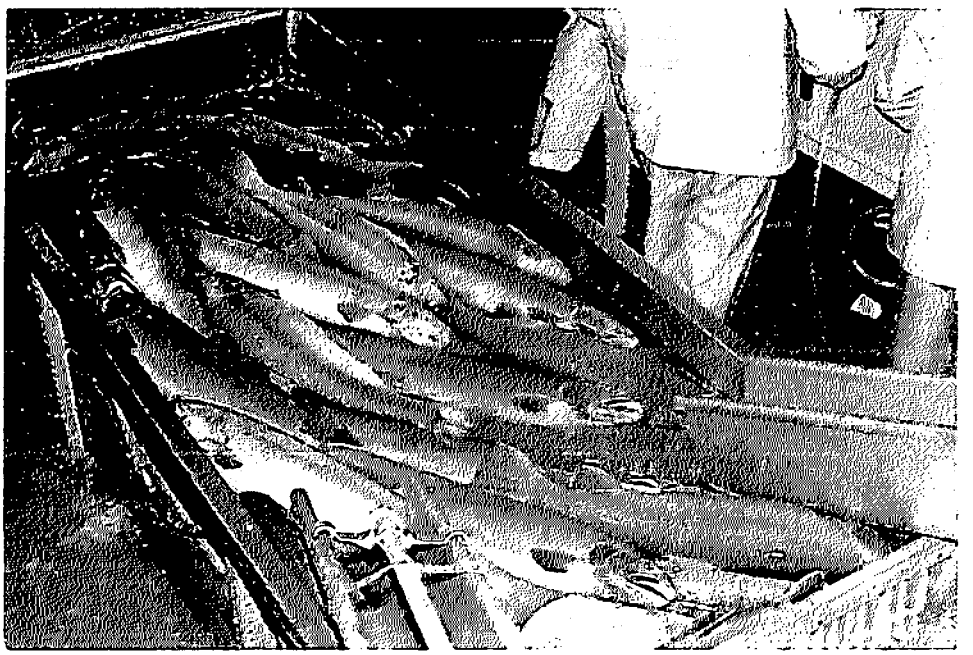
Loading adult steelhead into basket net for transfer to truck.



Excess steelhead broodstock being loaded for release into lower Clearwater River.



Providing fish to processor for later transfer to Valley Food Bank.



Sorting steelhead for spawning and disposal.

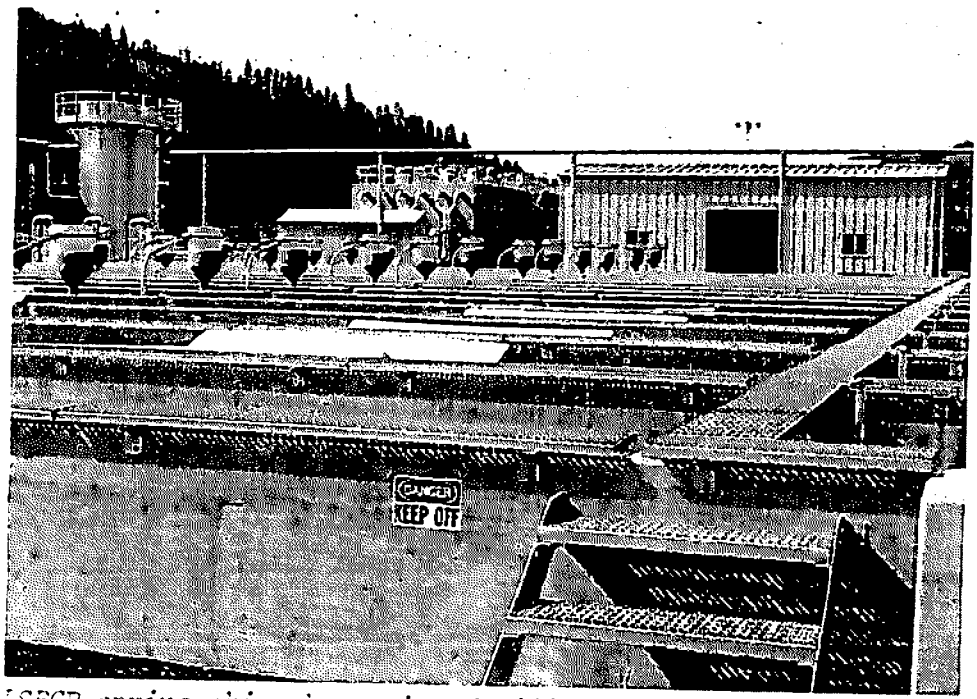
Broodstock culling of returning steelhead began as a means to manage around a potential IHN problem. Greater use of Kooskia's facilities allowed 2.5 million eggs to be hatched, released, and later returned to Dworshak as fingerling at 250-300 per pound. This move was made in view of Kooskia's success in avoiding IHN during the 1982 season. Foresight in this program paid dividends as 2.2 million fish were returned to Dworshak's program after it had experienced a 95 percent loss in production. Kooskia's production will provide the release into the Clearwater River in spring 1984.

Increased efforts were made during the year, with assistance from other "researchers", to study the seriousness of IHN at Dworshak and to design new techniques for future rearing programs. However, devastating losses seen in this year's production appear formidable in programs to follow.

Final release of Dworshak's steelhead smolts was made during the week of May 23. A total of 2,144,947 fish, weighing 317,685 pounds, was planted beginning in mid-April.

The number of returning steelhead to Dworsnak was 7,662. Ladder operation began on November 3 and continued to operate until May 10, with exception of a brief shutdown period in early winter. The sizable run in the Clearwater allowed for a catch and keep fishery from October 15 to April 30.

A first full season of operation was completed on the new LSRCP spring chinook facilities. Despite some rearing problems with bacterial kidney disease (BKD), early nursery drop-outs, and larger-than-projected sizes, success of the program could be measured by a production gain of 103,520 pounds and release of 520,903 smolts. Again, as in recent years, the Dworshak and Kooskia programs were shifted between stations to utilize available rearing space.

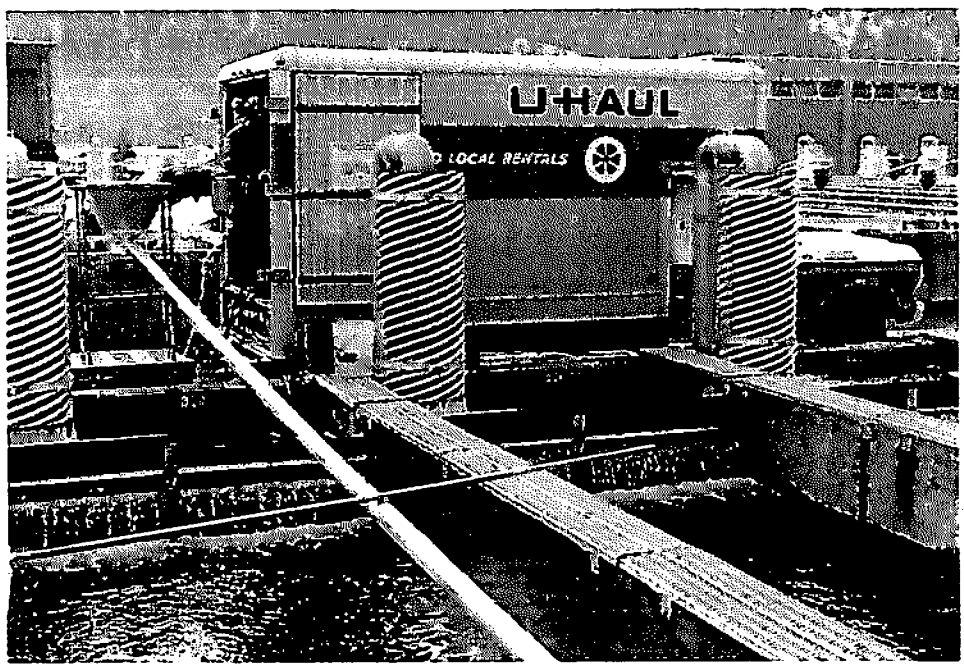


LSRCP spring chinook rearing facilities with demand feeders in operation.

Rainbow production proceeded on schedule with a large distribution of catchables in the spring and early summer. A change in egg requirements was made during the year which emphasized early receipt of eggs (fall shipment in lieu of receiving fall and late winter eggs). A total loss of 150,000 early-feeding rainbow to IHN from a shipment of eggs received in February 1983 appears to indicate that early susceptability to the virus may be detrimental to the steelhead program which follows, especially, when both small rainbow and steelhead fingerling are in production at the same time.

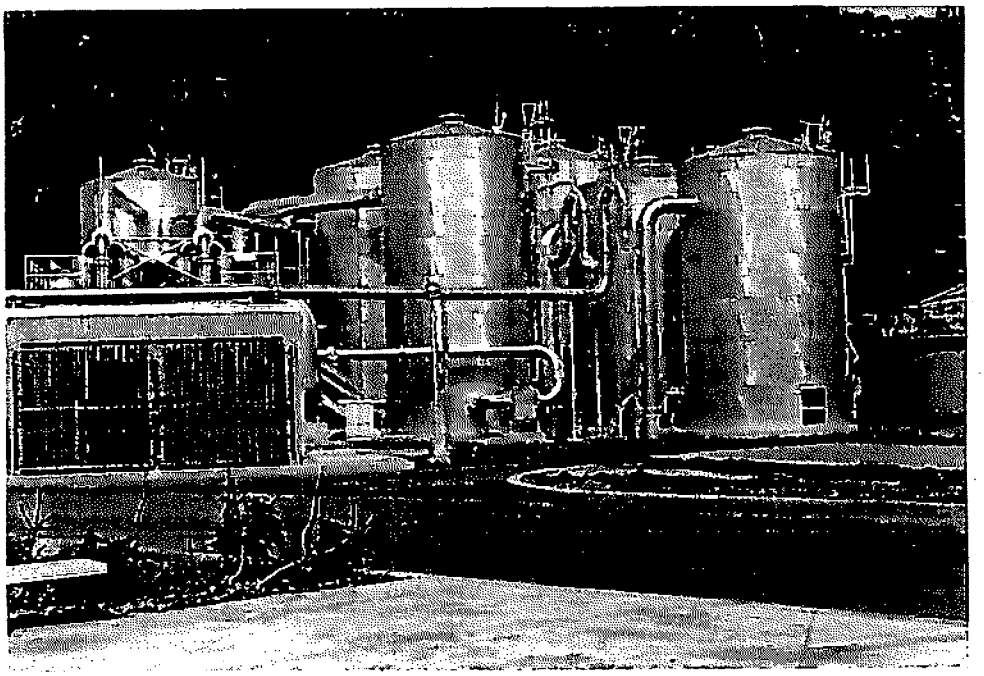
On December 20, 1982, when selected water temperature levels were no longer available for hatchery use, the selector gate at Dworshak Dam was pulled. The gate had been in place since May 17 to provide desired operating temperatures for fish production during a 5-month period. The gate was again installed on April 22, 1983 to increase rearing temperatures.

Tagging studies included freeze branding of 60,000 spring chinook which provided for a release of 30,000 in December 1982 and 30,000 in April 1983 as part of a BKD study coordinated with the University of Idaho CFRU. National Marine Fisheries Service (NMFS) coded-wire tagged 240,000 steelhead in January 1983 for a homing-migration study. Also, Idaho Department of Fish and Game (IDFG) in cooperation with CFRU, wire-tagged 120,000 steelhead in an age class study.

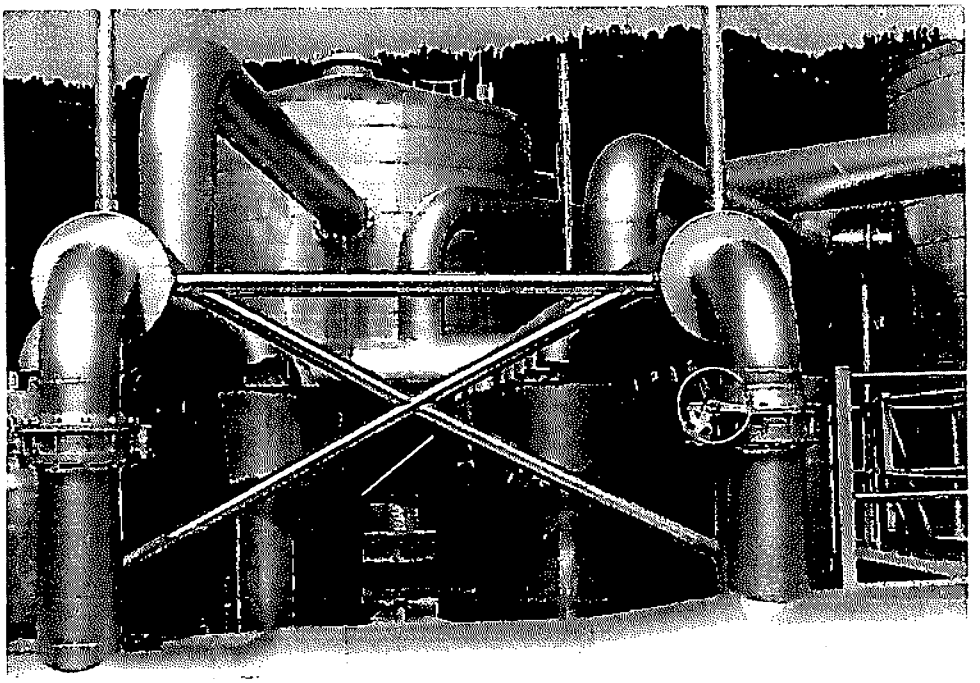


Temporary facility for freeze branding spring chinook salmon - Cooperative Fishery Research Unit.

An increase in suspended solids through the new System I biofilters was a major concern. To continue operating the present system, without change, only adds to further problems in rearing small fingerling chinook in the reuse facility. Additional study by COE towards improving the system is expected in FY 1984.



New System I biofilters.



System I piping and aeration.

A number of papers were presented by station personnel at the 33rd Annual Northwest Fish Cultural Conference, Gleneden Beach, Oregon, November 30 through December 2. Subject and author are as follows:

"Demand Feeders Replace Hand Feeding at Dworshak National Fish Hatchery" - Wayne Olson

"Telephone Alarm System at Kooskia National Fish Hatchery" - Bruce McLeod

"Aeration and Degassing of Hatchery Water Supplies" - David Owsley

"Using Seasonal Changes in Condition Factor (K) for Accurate Monitoring of Growth in Steelhead Trout" - Jerry McClain

"Total Disinfection of Production Facilities" - David Owsley

"Fish Handling at Dworshak National Fish Hatchery" - Jerry McClain

"Jar Incubation of Salmonid Eggs from Green to Swim-up" - Wayne Olson

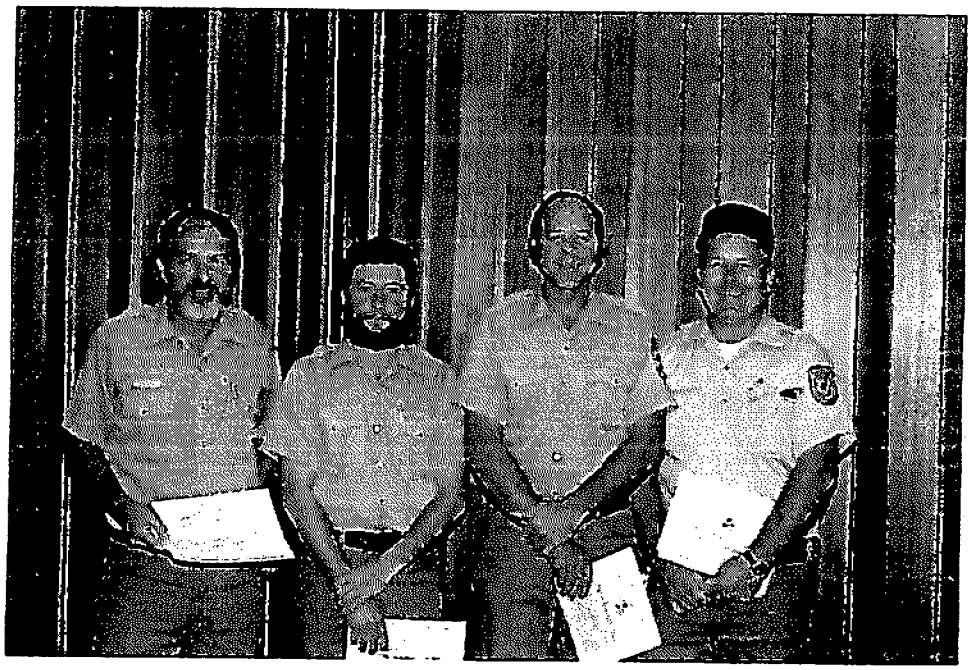
"Control of Bird Predation at Dworshak National Fish Hatchery" - David Owsley

Several poaching incidents were noted in the vicinity of the steelhead adult holding ponds. Federal and local enforcement officers were called in to monitor activity. Twenty-one steelhead were removed from a broodstock pond on March 18 and the violators were apprehended. This case remains pending as to final disposition.

Final production for Fiscal Year 1983 showed spring chinook (103,620 pounds), steelhead (357,737 pounds), and rainbow trout (61,851 pounds); a respectable production gain when considering that major disease problems were evident throughout the year which hampered programs. Dworshak's program reflects the largest production gain in the station's history. The added spring chinook program put it over the top.

A personnel management evaluation report was completed during the week of July 11 by Jim Sisson and Russ Miller, Regional Office, Personnel Operations. This was the first extensive review of personnel operations since 1977 when a similar report was filed.

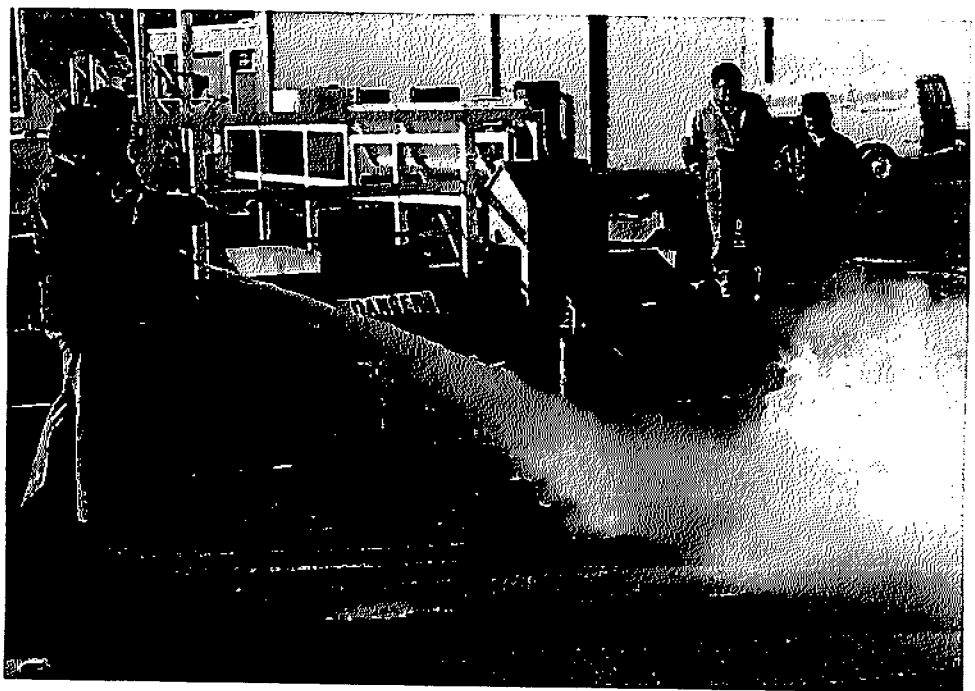
A Special Achievement Award was received by Hatchery Manager, Wayne Olson, for his efforts in the steelhead carcass disposal program. Also, a group award was made to Olson, and Kooskia's employees Bruce McLeod, Jim Crawford, and Rodney Funderburg for their successful planning and production of steelhead fingerling to replace Dworshak's losses caused by IHN.



Group Special Achievement Award to (left to right) Wayne Olson, Rodney Funderburg, Bruce McLeod, and James Crawford.

The station filed six accident reports including two lost-time reports. Total staff days at end of year since last lost time accident was 268. Monthly safety meetings were held with Bob Austin and Larry Strong serving terms as chairman of the safety committee.

Fire extinguisher demonstration at monthly safety meeting.



Demonstrating several different fire extinguishers in use at the hatchery.

FISH CULTURAL OPERATIONS

STEELHEAD PRODUCTION

Fiscal Year 1983 began with 2.6 million steelhead (24,659 lbs.) on station. Reuse Systems I, II, and III held 644,000, 850,000, and 1,143,000 fish respectively. All fish were showing residual effects of the IHN virus which had plagued the early rearing phase.

SYSTEM I was composed largely of fish reared early at Kooskia and returned to Dworshak as fingerlings. Overall health of the System's fish was very good through November. The newly-completed reuse system was activated on November 18. Addition of NaCl was required in late November when nitrite levels began increasing.

Quality deteriorated significantly in System I fish in December. An increase in *Ichthyopthirius ("Ich")* was observed in mid-December accompanied by an increase in mortality. System temperature was reduced on December 17 in an attempt to break the *"Ich"* cycle. Mortality continued to increase, however, for most of the month. Improvement (in regard to mortality) was observed late in December, but feeding activity remained low and quality continued to deteriorate. It did not appear that the parasite load was solely responsible for the increased mortality as some physiological changes were noted as well. A combination of parasite load, physiological changes, and residual effects of the IHN problem probably all contributed to poor performance.

The biofiltration system, itself, appeared to function efficiently. Chloride addition protected the fish during an increase in nitrites. Nitrite levels decreased, but because of the physiological changes which took place in the System I fish, the addition of the sodium chloride was continued. On December 15, potassium was added for further protection.

Continued poor performance resulted in increased mortality in January. During the first two weeks of January, no improvement in feeding activity was observed; and fish health continued to deteriorate. *"Ich"* load remained relatively constant and was primarily affecting the small fish which had been earlier reared at Kooskia. In an attempt to stimulate feeding activity, System I temperature was increased to 53°F on January 13. *"Ich"* and *Costia* appeared to increase slightly over the next ten days.

On January 24, IDFG personnel began marking operations in Pond 47 (larger fish from an earlier take). Although these fish had been showing signs of physiological changes and had light-to-moderate loads of *"Ich"*, overall condition was good. Comments from Rodney Duke (IDFG marking crew leader) indicated that the fish were not handling well. Examination showed a dramatic increase in *Costia* and associated gill damage. As a result, marking was discontinued on January 25.

It was believed that the small fish (Ponds 3-25), which were in such poor condition, were acting as a "breeding ground" for *"Ich"*, *Costia*, and bacteria. This, coupled with the fact that they would not reach "smolt" size by release time (even under optimal conditions), prompted preparations for moving them from System I to the LSRCP raceways. Water temperature was reduced, and formalin treatments began on January 25. All 22 ponds had been treated at least once prior to January 31. Formalin treatment seemed to be very effective in removing the *Costia;* and by month's end, it appeared that the *"Ich"* was decreasing. Six ponds of the poorest fish were removed from System I in late January. Continued improvement was observed in February and March; and as a result, the marking operation was completed in late March.

SYSTEM II fish recovered in October and November from earlier problems in the nursery stage and performed very well the remainder of the rearing cycle. National Marine Fisheries Service began marking operations January 17. A total of 254,000 fish were coded-wire tagged and freeze branded as a repeat of the 1982 project.

SYSTEM III was switched to reuse on October 15. The parasite *"Ich"* began increasing shortly thereafter and reached the point to where a decision was made to change over to raw water on October 28. *"Ich"* was observed in the gills of the weaker fish, and mortality increased slightly. It was felt that switching back to raw water would aid in breaking the cycle and hopefully, in averting heavy losses. No increase in the parasite load was observed after the change. It was apparent that the fish were more susceptible to the parasite due to their weakened condition. By the second week of November, the parasite load had decreased and the System was returned to reuse. Improvement continued for the remainder of the rearing cycle.

Physiological stress changes observed in December, were alleviated by a mineral package of 10mg/ℓ Na+ (sodium) and 4mg/ℓ K+ (potassium). Some gill swelling was noticed in February resulting in an increase of the mineral package to 20mg/ℓ Na+ and 8mg/ℓ K+. Within

one week, gill swelling was reduced and blood parameters returned to normal levels.

STEELHEAD RELEASES

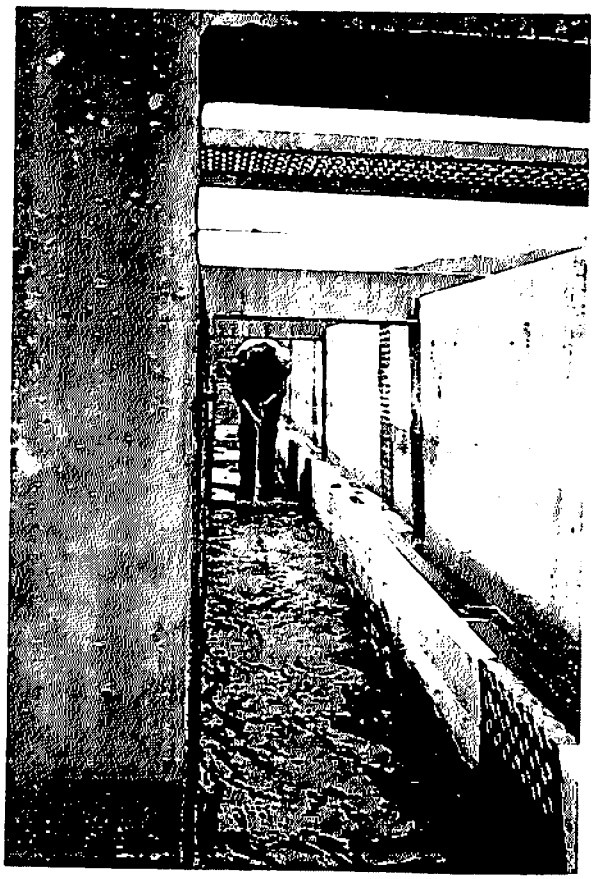
Smolt releases were completed in May. Quality was excellent in all groups, and smolt size was larger than past years. Communication with personnel involved in the downstream collection/transportation operation indicated quality and outmigration was excellent.

A summary of this year's smolt releases is as follows:

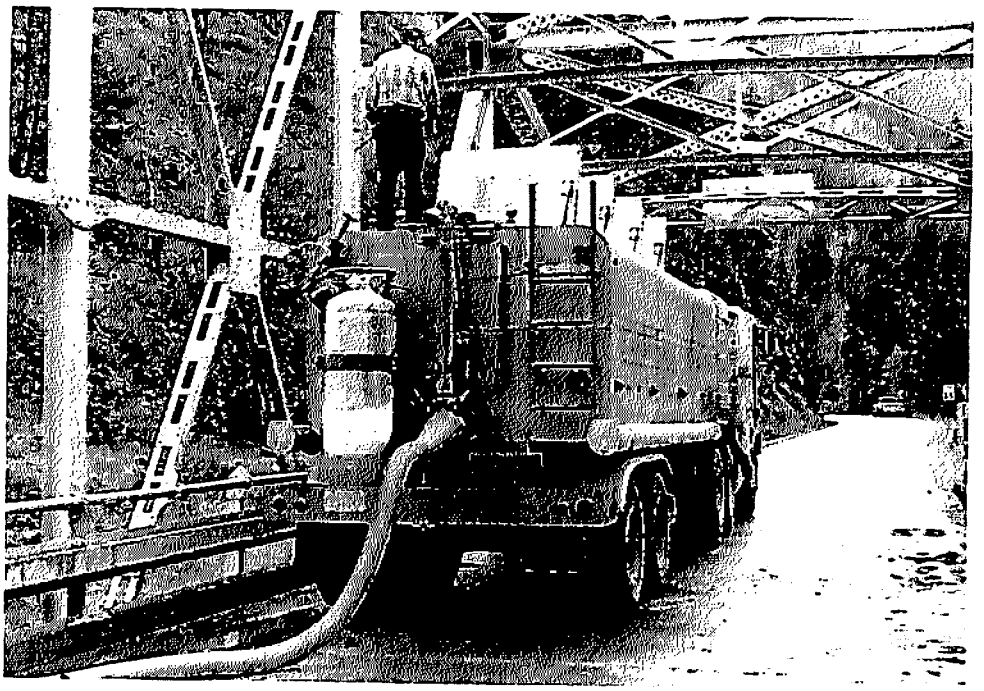
SYSTEM I (2-DS-I-13)	365,728 @ 7.22/lb. =	50,673 lbs.
$\bar{X}$ T.L. 185mm		
SYSTEM II (2-DS-II-11)	830,019 @ 6.49/lb. =	127,946 lbs.
$\bar{X}$ T.L. 194mm		
SYSTEM III (2-DS-III-12)	949,200 @ 6.83/lb. =	139,066 lbs.
$\bar{X}$ T.L. 188mm		
TOTAL	2,144,947	317,685 lbs.

Distribution of the smolt releases was as follows:

Main stem Clearwater River	1,225,935	=	173,947 lbs.
North Fork Clearwater River	35,177	=	5,701 lbs.
South Fork Clearwater River	496,471	=	76,835 lbs.
Clear Creek	250,488	=	37,952 lbs.
Truck-Barge (NMFS)	136,876	=	23,250 lbs.
	2,144,947		317,685 lbs.

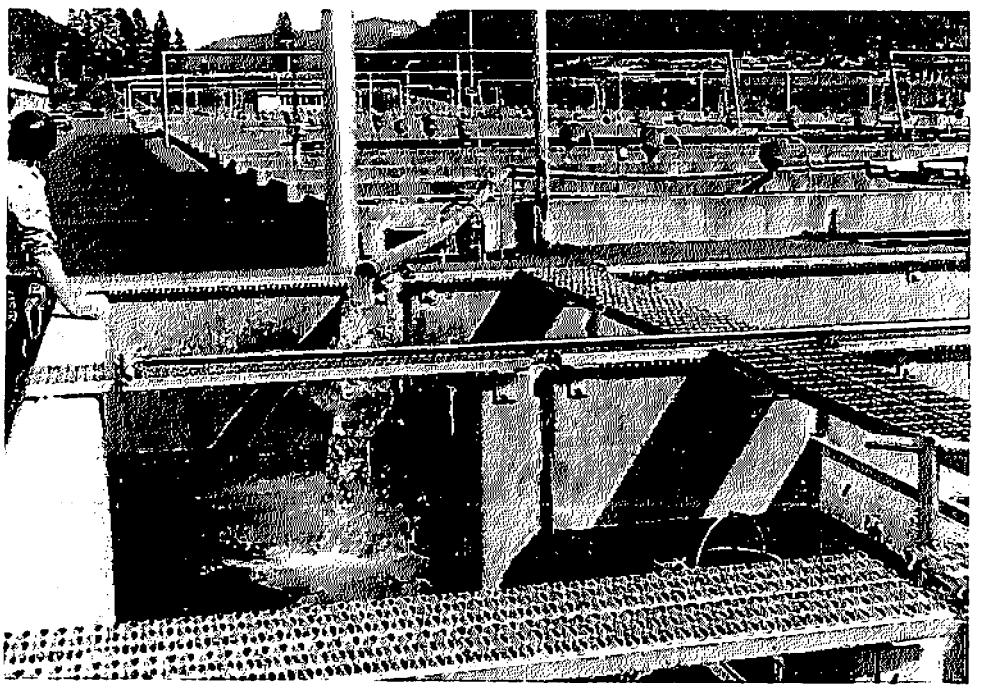


Releasing steelhead smolts from system ponds via common trough to river outlet.



Planting steelhead smolts at Mt. Idaho Bridge on the South Fork of the Clearwater River.

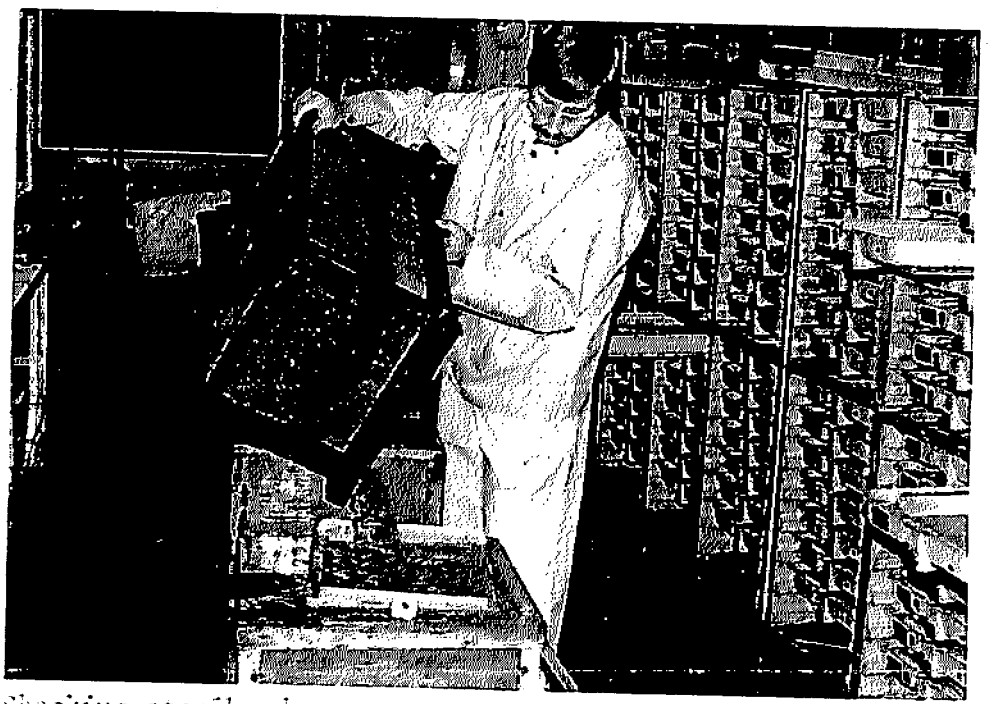
Releasing steelhead in the South Fork.



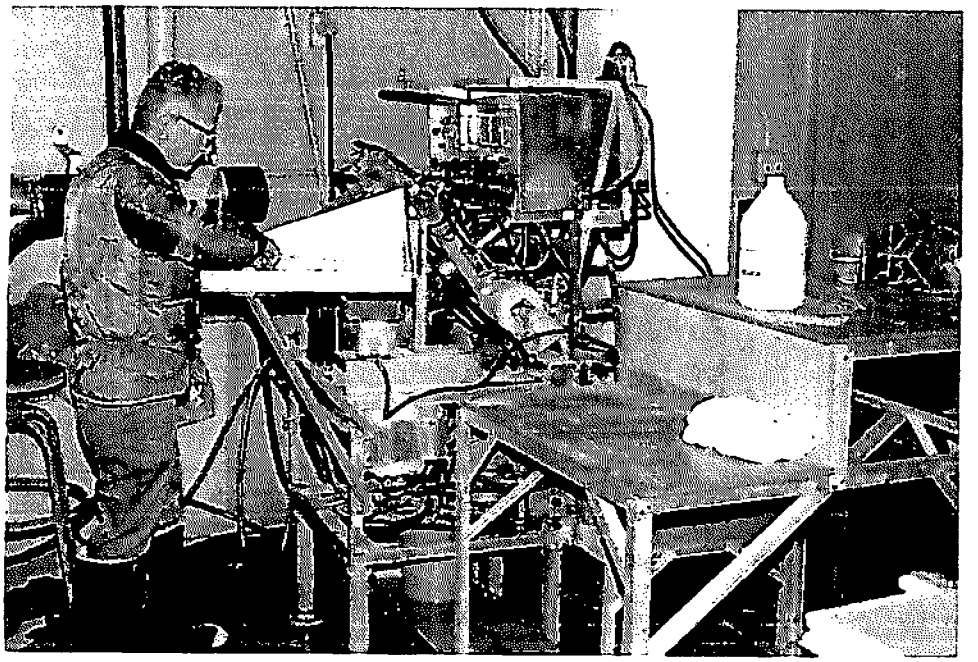
Dumping steelhead smolts from system test ponds to North Fork.

- 1983 Steelhead Spawning Summary -

Ladder Opened	November 4, 1982* - February 8, 1983
Ladder Closed	December 6, 1982* - May 11, 1983
	*Early spawning group
Spawning Began	January 26, 1983
Spawning Ended	May 10, 1983
TOTAL FISH IN RUN	7662
Females spawned	1736
Total Green Eggs	10,449,821
Total Eyed Eggs	8,783,388 (84.0%)



Shocking steelhead eggs.



Cleaning and picking steelhead eggs prior to hatching.

- Disposition of Eyed Eggs -

Kooskia NFH	2,539,750
Dworshak NFH	3,469,750
University of Rhode Island	20,000
Idano Dept. of Fish & Game	2,056,250
Idaho Dept. of Fish & Game (as feeding fry)	330,000
Destroyed (IHN positive)	367,638
	8,783,388

Approximately 150 adults were captured through operation of the ladder November 4 to December 6. These early-arriving fish were held and spawned separately as a test group. Approximately 100,000 progeny from these fish were reared separately and will be coded-wire tagged and released in the spring of 1984. The purpose of the study is to determine whether early arrival of these fish is genetically controlled. Spawning of the fall-arriving steelhead was concluded on February 8. Viral inspection revealed 100 percent positive for IHN virus. Because of the high

infection rate in fish held for several weeks and the promise of a strong run, a decision was made to take eggs from only newly-arriving fish as extended holding time appeared to increase the infection rate.

Sorting steelhead broodstock.

Carbon dioxide was employed as the anesthetizing agent for the 1983 spawning operation to allow distribution of spawned and unspawned fish for human consumption. Distribution of returning adults was as follows:

Valley Food Bank	4,185
Nez Perce Tribe	1,200
IDFG (outplants)	1,444

Use of carbon dioxide resulted in 10 to 15 percent mortality in fish returned to holding ponds. However, this mortality was eliminated as fish were immediately disposed of on spawning day.

Spawned females were sampled to determine the overall infection rate of IHN. As much as possible, all eggs from IHN-infected females were destroyed or reared separately from "clean" eggs. Egg Takes 1-7, and portions of 13 and 14, were transferred to

Kooskia NFH for initial rearing in well water. IHN was not diagnosed in any of the fish reared at Kooskia, and excellent performance resulted.

Air spawning to collect eggs and to sample ovarian fluid for IHN virus.

In mid-May, IHN began showing in Take 10 fish at Dworshak with two tanks experiencing heavy losses. These tanks, on reuse, were quickly moved to raw water tanks in an effort to prevent spread of the virus to other reuse fish. Mortality did not decrease in those two tanks; and by month's end, 80-90 percent mortality had been suffered. Meanwhile, the virus spread throughout other reuse tanks. By the end of May, heavy losses were experienced in all tanks of Takes 10 and 11; and the virus was beginning to show in Take 12. All tanks on reuse were set up with fry from IHN negative females. Losses continued; and by early July, all tanks (reuse and single-pass raw water) had been affected.

An inventory of tanks was completed in mid-July with the following results:

Egg Take	Number Eyed Eggs Started	Number of Fingerling Surviving to 07-12-83	Percent Survival
10	512,500	31,484	6.14
11	1,225,500	115,614	9.43
12	460,000	9,786	2.13
13	423,000	4,167	0.98
14	460,000	7,100	1.54
15	298,750	8,962	3.00
16	90,000	2,700	3.00
TOTALS	3,469,750	179,813	5.18

The nursery building was emptied on July 26 by moving the surviving fish to Pond 53 in System III.

System I pond loading was completed June 14. A total of 926,510 steelhead from egg Takes 1, 6, and 7 were transferred from Kooskia NFH. These fish were received in excellent condition.

IHN was not reported in the early rearing of steelhead at Kooskia. However, on June 24, approximately two weeks after transfer, mortality began increasing in two ponds at Dworshak. By month's end, losses had approached 1,000 fish a day in each pond. IHN was diagnosed and confirmed through tissue culture by Division Biologist, Joseph Lientz.

Except for two ponds of steelhead in System I, all had "broken" with IHN by the end of August. Final "breaks" were being experienced by fish in the 45/lb. range (much larger than expected). Mortality patterns were consistent with a sudden increase in mortality followed by an immediate decline to a chronic level.

The remaining 1.3 million steelhead (Takes 4, 5, 13, and 14) were moved from Kooskia to ponds in System III in June and July. Because of the variation in age of the fish, considerable "shuffling" between Systems was required. A few ponds in Systems II and III "broke" with IHN late in the year, but losses were minimal. By the end of the fiscal year, all steelhead were showing general improvement in health and performance.

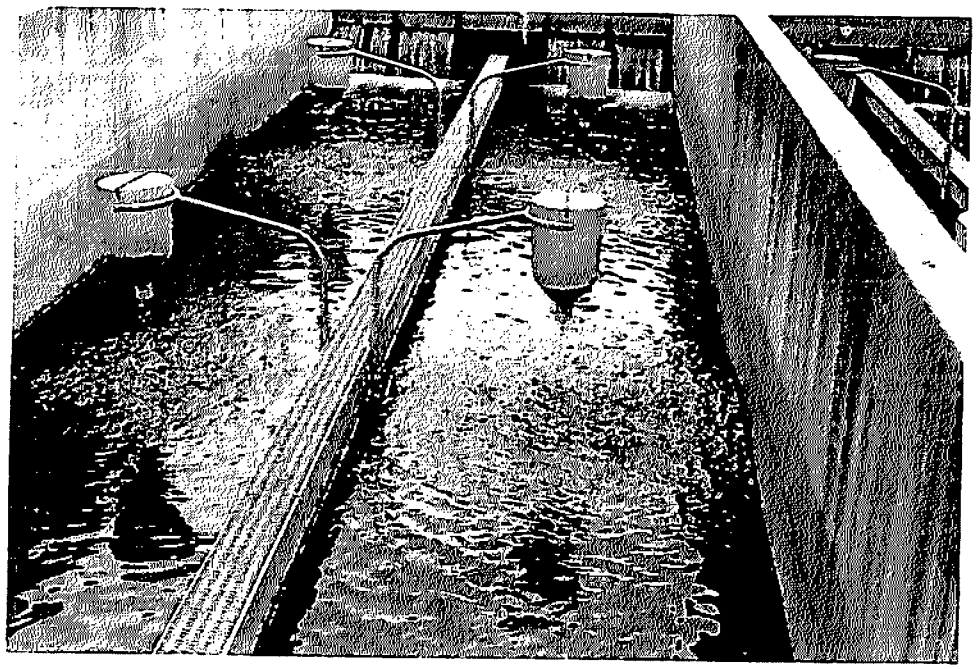
Total steelhead on station September 30, 1983:

SYSTEM I (3-DS-I-14)	508,944 @ 25.1/lb.	=	20,278 lbs.
SYSTEM II (3-DS-II-16)	797,020 @ 68.5/lb.	=	11,642 lbs.
SYSTEM III (3-DS-III-15)	843,634 @ 20.2/lb.	=	41,768 lbs.
TOTAL	2,149,598		73,688 lbs.

All systems will be switched to reuse in late November when raw water temperatures begin to decrease. Mineral addition will be initiated at that time.

RAINBOW TROUT PRODUCTION

Excellent performance was again demonstrated using demand feeders. Because of the excellent growth, thinning of catchables was required in January. Remaining catchables were planted in the Reservoir from March through June. IHN was diagnosed in the catchables in April. Though losses were minimal, they were of a chronic nature.



Adult holding ponds modified into rainbow trout rearing facilities - demand feeders in operation.

A total of 1.2 million eyed eggs were received from White Sulphur Springs NFH in October. Once again, eggs were from 2-year-old broodstock and survival to feeding fry was poor. As a result, an additional 350,000 eggs were received in November to supplement losses.

Poor environmental conditions, resulting from inadequate design of the new nursery reuse system, produced a number of parasite problems during the second quarter of FY 1983. Chemical treatments were required for control. A change was made to raw water in March when it was apparent that no improvement could be made in water quality. Fingerling plants into the Reservoir were made in March and April.

In April, IHN was diagnosed in White Sulphur fingerling and in a small group of Ennis fingerling (received in February). Losses were 20-30 percent in the White Sulphur group and 100 percent in the Ennis fish.

A total of 300,000 White Sulphur fingerling were retained for catchable plants in FY 1984.

Final distribution figures show a total of 51,561 pounds of fingerling and catchable trout to the Reservoir in FY 1983 as follows:

January 1983	43,755	@ 4,23/lb. =	10,333 lbs.	catchables
March 1983	17,749	@ 3.30/lb. =	5,378 lbs.	catchables
	279,919	@ 116.50/lb. =	2,402 lbs.	fingerling
April 1983	116,407	@ 123.80/lb. =	941 lbs.	fingerling
	32,844	@ 3.02/lb. =	10,878 lbs.	catchables
May 1983	37,048	@ 2.71/lb. =	13,673 lbs.	catchables
June 1983	22,326	@ 2.81/lb. =	7,956 lbs.	catchables
	550,048		51,561 lbs.	

CHINOOK SALMON PRODUCTION

Fall Chinook Spawning

A total of 122 adults and 31 jacks were transported to Dworshak from Ice Harbor Dam. Quality of the fish was poorer than the preceding year; and as a result, prespawning mortality was 15.7 percent.

Spawning began on October 19 and concluded on December 2. A total of 192,747 green eggs were taken from 45 females. Again, quality of the adults was reflected in a poor (68.1 percent) eye-up. A total of 131,218 eyed eggs were shipped to Hagerman NFH in late December.

Spring Chinook

Fiscal Year 1983 began with 624,000 Little White Salmon and 73,000 Rapid River stocks on station for LSRCP. BKD was quite prevalent in both groups, and mortality was holding at 4 percent per month. Twelve raceways of the Little White stock were involved in the testing of pond covers and diet supplementation for reduction of BKD infection. In addition, two Burrows ponds (one each in Systems I and II) contained Little White stock for testing of performance in heated water.

Incidence of BKD-related mortality remained constant throughout January. Despite disease problems, growth continued at a rate above projection, resulting in the need for further thinning in January. BKD began increasing in February and continued until release in late March. Mortality and infection of BKD primarily affected the larger fish in the population. The first release of spring chinook under the LSRCP was completed on April 1. Final release figures were as follows:

12/15/82	Little White Salmon	*28,100 @12.2/lb. =	2,303 lbs.
04/01/83	Little White Salmon	**459,799 @ 6.8/lb. =	67,671 lbs.
04/01/83	Rapid River	61,124 @ 8.4/lb. =	7,287 lbs.
	TOTAL	549,023	77,261 lbs.

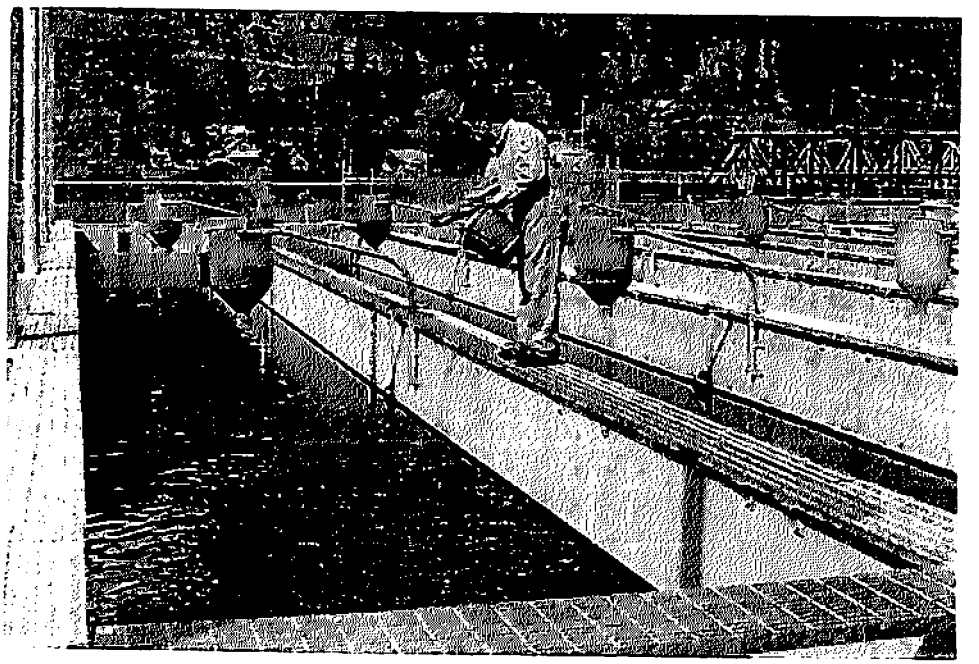
* Freeze branded and released to test fall release.
** Includes 30,000 freeze branded to test spring release.

An attempt should be made in future years to receive eggs at a late date as excessive growth rate resulting from Dworshak's rearing temperatures appears to be conducive to BKD infection. Health of the mid-sized fish was quite good and should contribute to adult returns.

The second year of the LSRCP at Dworshak began with the receipt of Brood Year 1982 eggs. On October 7, a total of 450,000 eyed eggs were received for the Looking Glass State Hatchery in Oregon. These eggs were of Rapid River origin, but found to be from IHN-infected adults and thus rejected by Oregon Fish Commission. Eggs were received in poor condition as they had not been cleaned up and were heavily fungused. Considerable loss was experienced in this group. On the 15th of October, 1,375,000 eyed eggs were received from Leavenworth NFH. Some 400,000 of these eggs were tranferred to Kooskia NFH for a 0-age program. On October 27, some 400,000 eyed eggs were received from Rapid River State Hatchery. Once again, eggs were received earlier than desired and will result in fish larger than desired at release time.

Early rearing in the newly-completed nursery reuse system resulted in a number of problems. Environmental condition began deteriorating in January and continued through February. Inefficiency of the clarifiers resulted in high turbidity in the reuse water. Poor quality of the water was conducive to a buildup of ectoparasites. A sharp increase in loads of *Costia* required formalin treatment for control. *"Ich"* began increasing in February to compound the problem. A switch was made to raw water in March after several attempts to rectify the situation failed. Combination of the above factors resulted in poor performances, pinheading, and significant losses.

Fingerling chinook were moved to raceways in April and rapid improvement observed with increasing water temperature. An additional 194,000 Leavenworth fish were transferred to Kooskia to supplement their program. Some 125,000 of the Leavenworth fish, scheduled for 0-age release at Kooskia, were returned to Dworshak in April when that program was cancelled. Available space at Dworshak will allow a size evaluation study for fall release.



Combination of hand feeding and demand feeding prior to placing spring chinook entirely on feeders.

Health and performance remained quite good throughout the remainder of FY 1983 except for the group of large Leavenworth fish. Severe BKD in these fish will result in their release early in FY 1984. BKD was increasing in all groups late in the year and the required reshuffling of programs between Dworshak and Kooskia will undoubtedly add to the problem.

Spring chinook salmon on station September 30, 1983:

2-LE-1a	32,178	@ 5.22/lb. =	6,164 lbs.
2-LE-1b	153,116	@ 8.02/lb. =	19,092 lbs.
2-RR-2a	88,001	@ 9.89/lb. =	8,898 lbs.
2-RR-2b	216,475	@ 8.34/lb. =	25,956 lbs.
2-KK-1	180,154	@20.94/lb. =	8,689 lbs.
TOTAL	669,924		68,799 lbs.

Spring Chinook Spawning

A total of 358 adults were collected at Kooskia NFH in June-July 1983 and transferred to Dworshak for holding and spawning. Spawning, which began on August 23, was completed on September 6. An estimated 750,000 green eggs were taken from 185 females. Once again, pond cover and daily malachite

treatments resulted in minimal mortality. Total pre-spawning mortality was 13.7 percent.

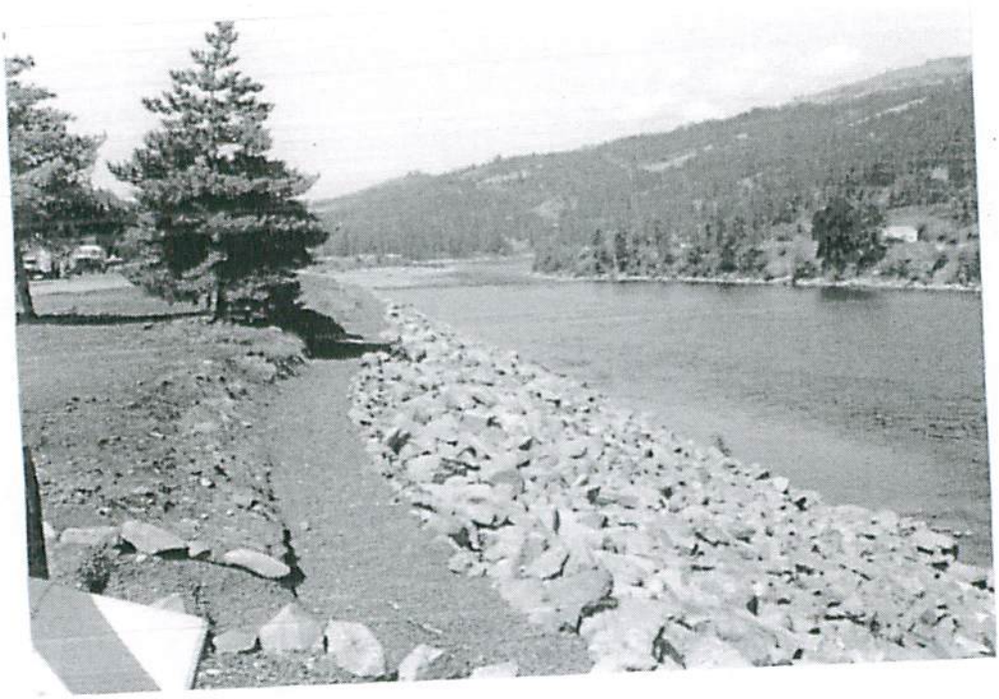
Again this year, an attempt was made to separate eggs from BKD-infected and non-infected adults. Cooperation between Dworshak FAO, Dworshak Fish Health Center, University of Idaho CFRU, and Dworshak production crew has been important in carrying out this complex operation.

IMPROVEMENTS

A number of projects were initiated and completed during the summer by the YCC. Some of these projects included a fishing path, patios and roofs for the station residences, landscaping, installation of a sprinkler system, painting, and general grounds maintenance.

YCC fishing path construction.

YCC patio and roof construction on station residences.



YCC fish path.

A loft for storage of production equipment and supplies was completed in the metal building adjacent to the new LSRCP facilities. Also, in the same building, a small room was added for use by production in repair of nets, etc.

A pipeline was installed in the nursery building to make possible a water-to-water transfer of small fingerling direct from starting tanks to the outside rearing units. Special tanks were constructed to hold fish and water prior to pumping to the outside.

An electrically-operated hoist was installed at the fish ladder entrance to allow easy operation of a slide gate. This installation makes possible the lowering and raising of a gate, if needed, to control the number of adult steelhead entering the hatchery.

A microprocessor was installed by the Corps, replacing the obsolete IBM 1800 computer. Station alarms enter the equipment and are recorded by a printer.

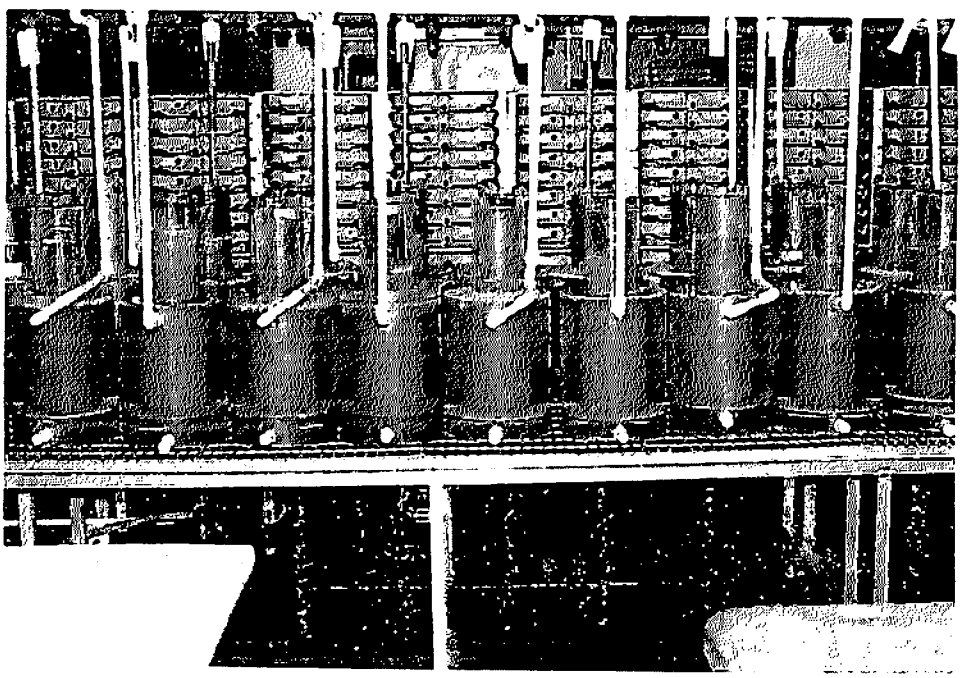
Aluminum walkways and screens were installed for 12 new raceways resulting from modification of six adult holding ponds. The new facilities were in operation, beginning in November, to hold rainbow trout production.

An abandoned transfer pipe used to move fish from the spawning table to outside holding ponds was modified for use in the carcass disposal program. Some 6,800 adult steelhead were transferred in this manner to Idaho Department of Fish and Game, Nez Perce Tribe, and Valley Food Bank.

Modifying fish transfer pipe to assist in disposing of excess steelhead.

Additional demand fish feeders, including support brackets and hangers, were purchased at a cost of $7,700. All rearing facilities now have available, if needed, response feeders for feeding 1/8-inch pellet size dry diet.

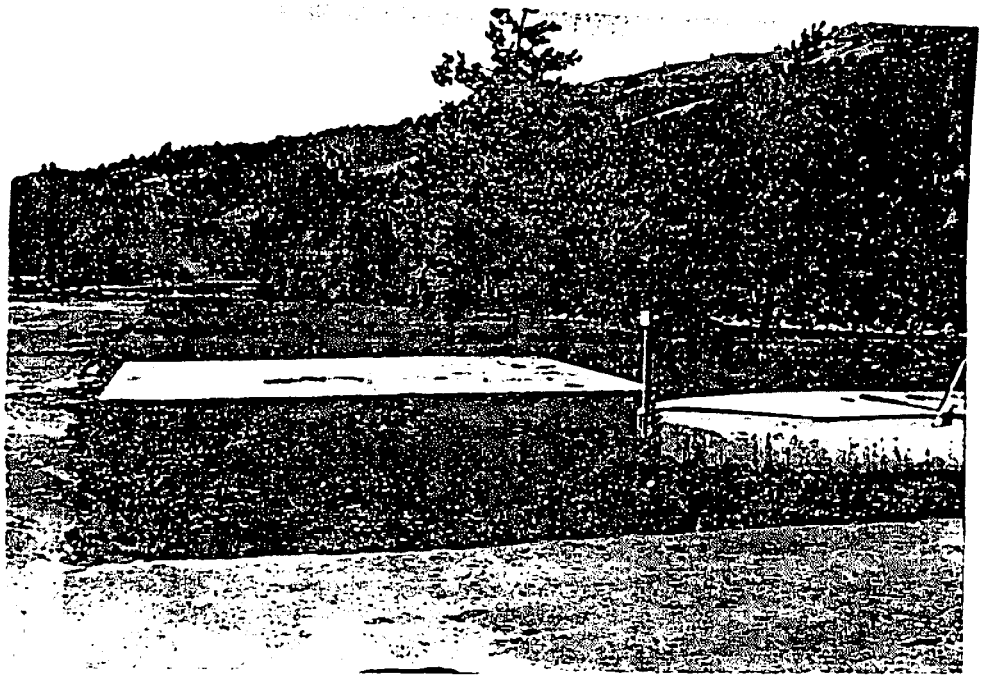
Increased use of jar incubation was evident during the steelhead program. Jars were used for both green and eyed eggs with a number of the units installed on the nursery tanks to receive swim-up fry.



Jar incubation of steelhead eggs.

Six nursery tanks (3 feet by 16 feet), purchased in FY 1982, were installed in the incubation room. Tanks were set up in several study designs for use in steelhead and chinook rearing programs.

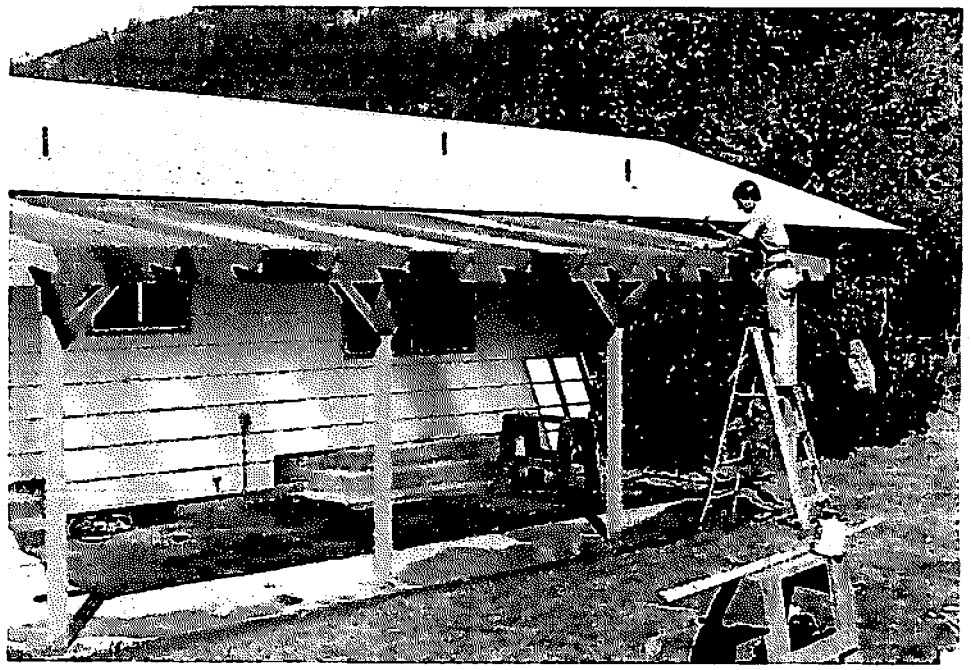
Landscaping and installation of a sprinkler system in the west area of the facility was completed. Material costs, including removal of fill dirt, were $7,500. Station personnel, with YCC enrollee assistance, completed the project.



Newly-landscaped area west of [illegible] residence.

Thirty-two fiberglass (3 feet by 16 feet) rectangular tanks were purchased at a cost of $48,000 for use in Kooskia's expanded nursery program. Additional rearing capacity is needed to assist Dworshak in managing around IHN.

Patios and covers for three residences, together with patio doors, improved the quarters at a cost of $3,200. Force account, labor with YCC assistance, completed the job. In addition, window shades and awnings were installed on the residences for $2,700.

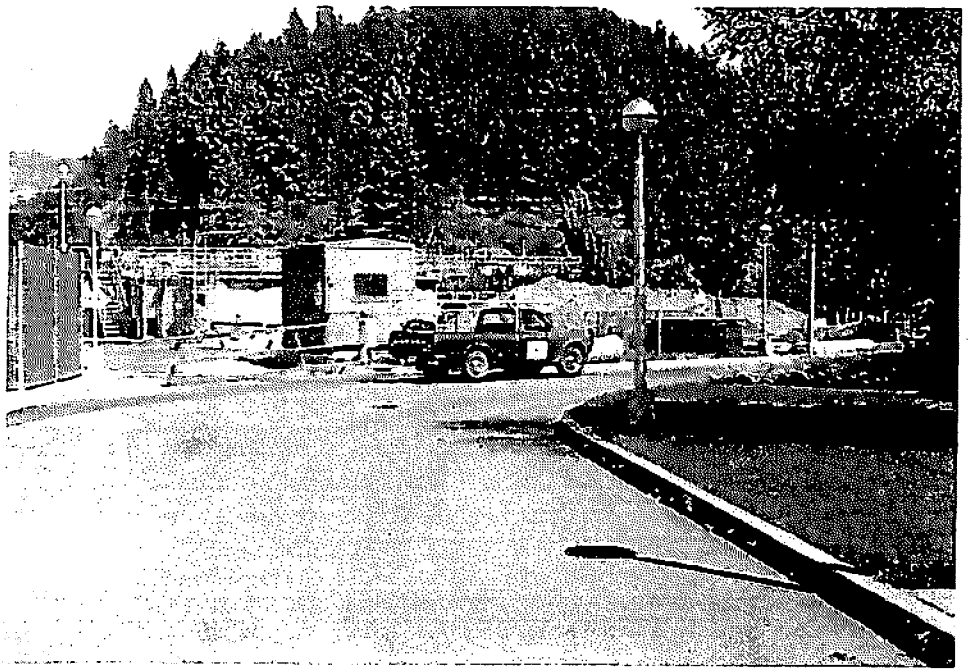


New patios and awnings on staff residences.

Other station purchases included: A portable fish transport tank for $2,500, two refrigeration compressors and modification for $16,000, and new pumps, pump modification, and electrical parts totalling $13,000.

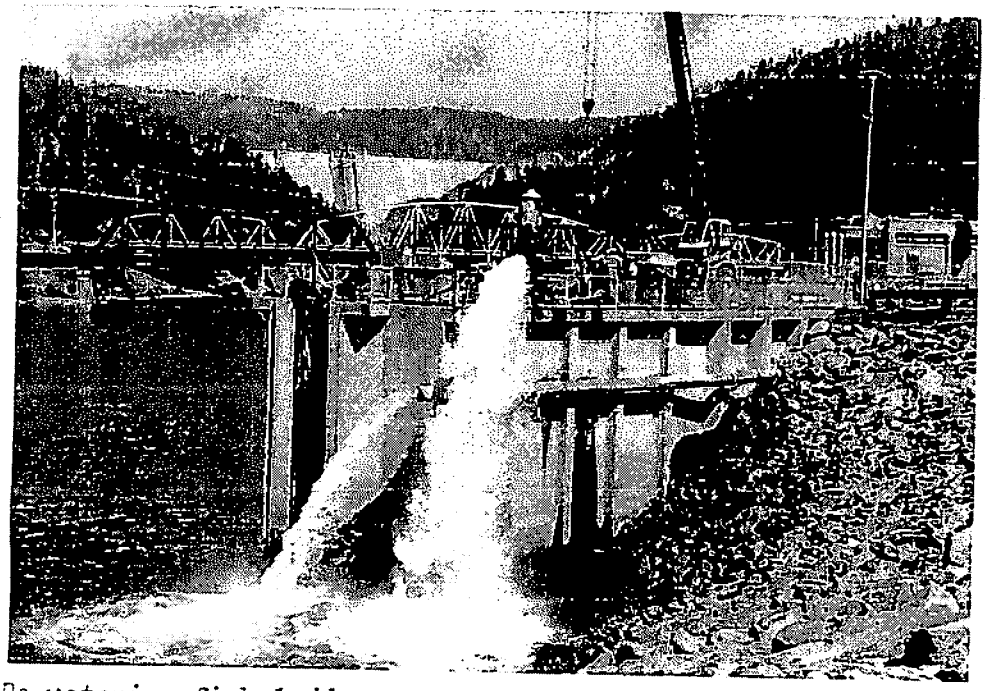
CONSTRUCTION

Award of System I mineralization facility was made by COE to Contractors Northwest, of Coeur d'Alene, at a cost of $180,769. Additional work will include a storage shelter for the electric carts and station paving. The project was begun in July.



Construction site for System I mineral addition.

Repair of the fish ladder was completed through a Corps contract. Floor grating was replaced to prevent fish from being trapped in the lower sections of the ladder.



De-watering fish ladder for repair of floor grating.

Design work was completed by the Corps to construct a screen barrier in front of the main river intake. Work is expected to be completed in FY 1984.

MEETINGS/TRAVEL/TRAINING

Meetings attended were as follows:

R.O. Fisheries meeting in Leavenworth, Washington, October 14-15 to present briefing programs to new staff members - Wayne Olson.

33rd Northwest Fish Cultural Workshop, Gleneden Beach, Oregon, on November 30-December 2, 1982 - Wayne Olson, David Owsley, Jerry McClain, and Bruce McLeod.

EPA discharge monitoring session in Boise on February 8 - David Owsley.

Meeting with IDFG hatchery trainees to present a session on "Hatchery Monitoring Procedures", February 23 - David Owsley.

Water reuse meeting at Eagle Creek NFH and visit to Regional Office, February 15-16 - Wayne Olson and David Owsley.

Ontario Trout Farmers Association Annual Convention, Toronto, Canada, March 25-26, to present paper, "Water Reuse - Good to the Last Drop" - David Owsley.

Fisheries Project Leaders meeting, Medford, Oregon, April 6-7 - Wayne Olson.

Discussion of spring chinook rearing problems, IDFG, Boise, May 5 - Wayne Olson, Jerry McClain, and Bruce McLeod.

Spring chinook workshop, Pendleton, Oregon, June 1-2 - Wayne Olson, Jerry McClain, David Statler, and Bruce McLeod.

Review of System I modification design deficiencies, COE, Walla Walla, June 21 - Wayne Olson, George Williams, and David Owsley.

COE meeting, Walla Walla District Office, to discuss IHN virus and siting of new Clearwater hatchery, July 20 - Wayne Olson and David Owsley.

Discussion with Bob Smith, Hagerman Research Laboratory, McCall, Idaho, July 26 - Jerry McClain and Bruce McLeod.

Hagerman NFH/IDFG Coordination meeting, Boise, Idaho, August 23 - Wayne Olson.

EPA's NPDS permitting activities associated with Idaho's trout culturing facilities, Boise, Idaho, August 10 - David Owsley.

Coordination meetings were held during the year with IDFG, on November 9 and March 23. In attendance were IDFG personnel, COE, Tribal, and FWS officials. Fishery programs were reviewed including adult steelhead disposition, security problems, chinook and steelhead production, spring chinook egg bank, and project studies.

In anticipation of having excess steelhead onhand, meetings were held with Marie Ahlstrom (Valley Food Bank, Lewiston), and Melvin Joye and Bill Allman (Nez Perce Tribal Executive Committee) to discuss disposal procedures. USDA and BIA handled the agreements, with their respective representatives, to enable distribution of the fish. Arrangements were also made with IDFG to return some fish to the Clearwater River.

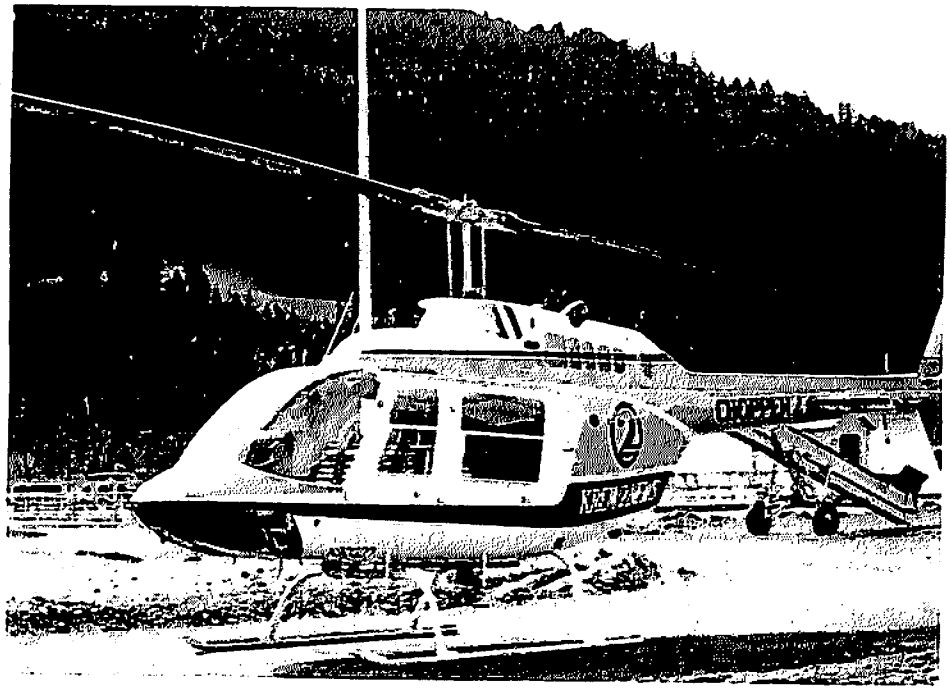
Jerry McClain, Production Supervisor, accompanied Division Biologist, Joe Lientz, on an inspection of Lahontan NFH during the week of February 21.

Dave Owsley assisted Regional Office engineers with an on-site review of Coleman NFH's development program and provided assistance with design of their water reuse facility, March 30-31. Several trips were also made to Portland Regional Office regarding the Coleman program. Mr. Owsley was also involved in travel to Cowlitz State Hatchery, Washington, to review several disinfection options being considered for their water supply and to Corvalis, Oregon, to inspect a water treatment facility.

Training was provided to Dave Statler, 2-week session, Newport, Oregon, on "Pacific Fish Culture"; Sharon Russell and Mary Lou Galloway, Regional Office Clerical Workshop, Portland, Oregon, May 10-11; Dave Clifford, 1-week session on refrigeration maintenance, Los Angeles, June 13-17; and Mary Lou Galloway, 1-day on travel vouchers, U. S. Forest Service, Orofino.

PROGRAM INFORMATION

The large steelhead returns to the Clearwater River resulted in an increase in public relations. Local news media reported daily and weekly on the steelhead run, collection and spawning activities, carcass disposal, IHN virus, and spring chinook operations. Coverage was extensive, especially during the adult steelhead disposal program. On March 15, the first day in which the Valley Food Bank received fish, four television stations and two newspapers were represented at the hatchery to report on the event. News of this program reached across the country with stories appearing in USA Today, U.S. News and World Report, and the New York Times, to name a few.



Spokane KREM-2 News TV on station for story of steelhead "give away".

Conducting interviews on March 15, 1988 for television broadcasting of the Valley Food Bank receiving fish.

Showing some of the newspaper clippings of major events happening at Dworshak.

Again, as in the previous year, the hatchery did not employ tour guides in the summer program. Self-guided signs directed the public to particular interest points. Formal group tours were provided by the staff if advance notice was received. Forty-five special group tours were given during the steelhead spawning season to 925 people from various schools in the immediate area.

A number of state and federal officials were at the station at different times throughout the year. Dan Mulcahy made two visits to review IHN problems and to discuss procedures for broodstock culling. Grant Christensen and Evan Parrish made several trips to the hatchery to discuss siting and operation of the newly-proposed LSRCP Clearwater hatchery. Regional Office personnel (Steucke, Vincent, Iverson, and Weathers) were at the hatchery in June to discuss future development of Kooskia NFH relating to Dworshak's steelhead program.

Listed are several of the groups given special attention in their visit to the hatchery facilities:

A 6-member Rotary Group Study Exchange (GSE) team from England came in April. Dave Pearson, a member of the GSE team, later spent one day on a vocational learning experience.

Seventeen directors representing major hydroelectric dams in Norway.

Sixteen students from Aloha High School, Beaverton, Oregon - arrangements for tour made through the Columbia River Inter-Tribes.

Eight engineers from mainland China representing the Ministry of Water Resources and Electric Power, in May.

On June 23, Mr. and Mrs. Raaf'at Fauzi Exkander, from Cairo, Egypt, were guests for the day. A tour of Dworshak hatchery and Dam was made along with discussion of anadromous fish production techniques. Mr. Eskander represented a large government fish farming facility under construction in Egypt for production of Tillapia and mullet.

A forestry tour of the Orofino area included a stopover at the hatchery for 135 sixth grade students and leaders in July.

The hatchery was honored by hosting IDFG Director Jerry Conley, State Commissioners and several Fish and Game staff members from Lewiston and Boise for their regularly scheduled commissioner's meeting on April 15. A tour of the hatchery facilities and spawning activities

was made in the morning prior to the business meeting. A public meeting was held in the conference room in the afternoon.

Number of public visitors was estimated at 32,000.

IHN disease

Virus returns to claim heavy losses of young steelhead at Dworshak National Fish Hatchery

More steelhead bring problems

Bigger run on the Clearwater has made for management hassles

Steelhead

This year's run ranks among the best and some predict things will get better

Residents Hope Steelhead Season Closes Soon

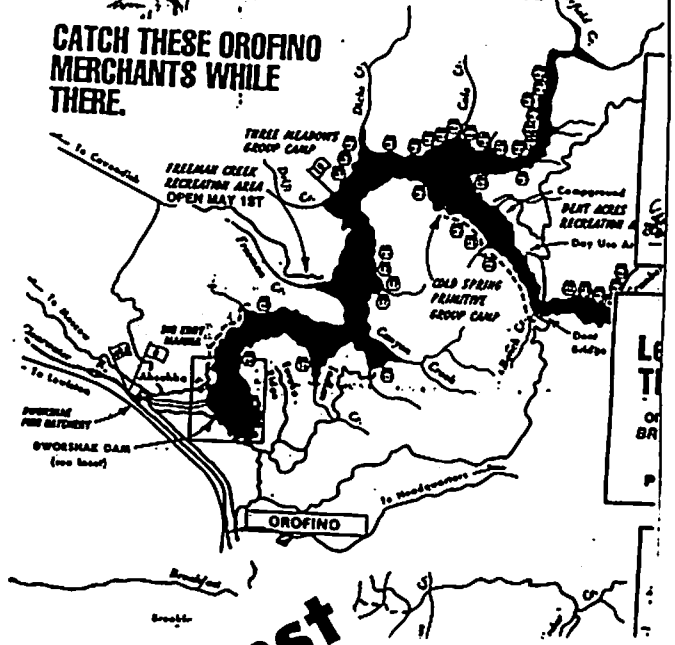
Steelhead run on the Clearwater has anlgers drooling

Counties Pick 17-Man Board To Manage Steelhead Crisis

OROFINO, IDAHO
Steelhead Capital of The World . . .

PLUS.GATEWAY TO DWORSHAK RESERVOIR, OVER 60 MILES OF EXCELLENT FISHING AND CAMPING

CATCH THESE OROFINO MERCHANTS WHILE THERE.



White House clears way for steelhead distribution

Dying fish

Virus wiping out millions of steelhead at hatchery

The future of Orofino and the sea-run trout

Some hope steelhead will provide base for new prosperity

Area needy to feast on steelhead

Hatcheries Wage War Against Crippling Viral Infection

Network TV Coverage Focuses On Hatchery

COOPERATIVE PROGRAMS

Hatchery Manager, Wayne Olson, attended several meetings throughout the year with Clearwater County and State of Idaho officials concerning the impact of the steelhead fishery on the Clearwater River. Several subcommittees were formed to deal largely with public use facilities and waterway control.

The hatchery entered into a memorandum of agreement with Department of Commerce for inspection of frozen steelhead prior to distribution by Valley Food Bank. Assistance was also provided by Dworshak FHC.

An agreement was made with BIA to furnish rainbow trout (4,000) to three lakes on the Nez Perce and Coeur d'Alene Indian Reservations on a cost reimbursable basis.

Agreements signed with BIA and USDA made possible the transfer of excess adult steelhead to the Nez Perce Tribe and Valley Food Bank for distribution to needy families.

The YCC, an 8-week summer program, was successful in initiating and completing a number of work projects.

Another employment source was explored when an agreement was initiated with Clearwater County to furnish a work site for participants of the Comprehensive Welfare Employment Program.

Continuing assistance was provided by programs of Washington State University, University of Idaho, Potlatch Corporation, and others in supplying test fish for various on-going studies.

Involvement continued with University of Idaho CFRU and Dworshak FAO in examining the spring chinook program as part of a bacterial kidney disease study.

The hatchery worked closely with IDFG, NMFS, COE, and Nez Perce Tribe on programs of interest.

Administrative assistance was provided for Dworshak FHC and Dworshak FAO.

The hatchery maintained holding facilities for fall chinook salmon broodstock collected at Ice Harbor Dam. Spawning and incubation were completed at Dworshak, and eyed eggs tranferred to Hagerman NFH.

The hatchery complex of Dworshak and Kooskia share facilities to assure accomplishments of program objectives.

STAFFING

A total of 20.5 staff years were employed during the year. This total included 16.2 permanent employees and 4.3 temporaries. Two permanent positions remained unfilled at the year's end; a maintenance worker and an animal caretaker.

Employee promotions included:

Mary Lou Galloway, Clerk-Typist, GS-4, effective December 26, 1982.

David Owsley, Environmental Engineer, GS-12, effective July 24, 1983.

Employee reassignments included:

Greg Kindschi, Fishery Biologist, to Lahontan NFH, December 12, 1982.

Larry Strong, Fishery Biologist, from Winthrup NFH, December 12, 1982.

David Clifford, Maintenance Mechanic, from Tehama-Colusa Fish Facility, April 3, 1983.

Ralph Roseberg, Fishery Biologist, from Multi-Outlet Reservoir Study Office, Arkadelphia, Arkansas, April 1, 1983.

Other personnel actions:

Richard Wurth, Maintenance Mechanic, transfer to COE, Dworshak Dam, January 15, 1983.

Doug Lawson, Fishery Biologist, conversion to permanent full-time (PFT), effective April 17, 1983.

Raymundo Rosales, Maintenance Worker, conversion to PFT, effective April 17, 1983.

Mary Lou Galloway, Clerk-Typist, conversion to PFT, effective May 1, 1983.

David Statler, Fishery Biologist, resignation, effective July 30, 1983.

Hamilton McCleary, Animal Caretaker, WG-2, appointment, effective September 18, 1983.

Sharon Russell, reclassification, from Secretary to Budget Assistant, effective September 18, 1983.

Several temporary employees were hired on an emergency basis during the peak steelhead run. Additional hiring during the year provided temporary assistance to both production and maintenance programs.

A total of 76 personnel actions were initiated and processed,

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

HATCHERY PRODUCTION SUMMARY

Dworshak National Fish Hatchery

Period Covered
October 1, 1982 through September 30, 1983

Density Index 0.124 | Flow Index 0.513 | Total Flow 59,950

Species and Lot	Fish on hand End of Month			Fish shipped this F.Y.	Gain this F.Y.	Fish Feed Expended		Conversion	Unit Feed Cost Per lb.	Unit Feed Cost Per 1000	T.U Per Inch	T.U. to Date	Length increase 30 day month
	Number	Weight	Length	Number	Weight	Pounds	Cost						Inches
1	2	3	4	5	6	7	8	9	10	11	12	13	14
SCS 1-LW-1	0	0	7.413	488.6	24,462	51,580	11,964.12	2.11	0.49	36.29	24.66	150.59	0.000
SCS 1-RR-1	0	0	7.002	61.1	2,698	7,460	1,752.10	2.77	0.64	36.01	22.70	126.99	0.000
RBT 1-WS-11	0	0	9.992	190.8	40,263	67,904	16,050.72	1.69	0.40	112.29	15.0	137.10	0.000
STT 2-DS-II-11	0	0	7.499	830.0	114,825	170,172	57,461.36	1.48	0.50	69.27	21.51	138.60	0.000
STT 2-DS-III-12	0	0	7.214	949.2	131,326	174,688	43,361.04	1.33	0.33	46.14	21.79	134.20	0.000
STT 2-DS-I-13	0	0	6.996	511.3	49,706	80,843	20,352.81	1.63	0.41	54.32	21.38	127.00	0.000
TOTALS													
AVERAGES													

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

HATCHERY PRODUCTION SUMMARY

Dworshak National Fish Hatchery

Period Covered
October 1, 1982 through September 30, 1983

Species and Lot	Density Index: Fish on hand End of Month			Flow Index: Fish shipped this F.Y.	Flow Index: Gain this F.Y.	Fish Feed Expended		Total Flow: Conversion	Unit Feed Cost		T.U Per Inch	T.U. to Date	Length increase 30 day month
	Number	Weight	Length	Number	Weight	Pounds	Cost		Per lb.	Per 1000			Inches
1	2	3	4	5	6	7	8	9	10	11	12	13	14
STT 2-DS-X-5	0	0	4.418	125.0	1,338	1,735	407.02	1.30	0.30	4.23	20.26	11.50	0.000
SCS 2-LE-1A	95.6	11,707	6.995	0	9,307	9,096	2,121.68	0.98	0.23	23.52	17.89	58.5	0.626
SCS 2-LE-1B	153,8	14,605	6.426	326.5	24,851	26,850	10,137.61.	1.08	0.41	38.36	20.07	102.70	0.796
SCS 2-RR-2A	89.7	7,583	6.183	30.0	9,835	12,383	4,820.71	1.26	0.49	41.03	21.86	106.60	0.451
SCS 2-RR-2B	219.7	18,196	6.141	99.5	25,176	24,693	7,585.73	0.98	0.30	24.70	18.94	91.50	0.872
SCS 2-KK-1	185.3	7,358	4.806	0	7,191	10,328	3,104.25	1.44	0.43	16.79	25.93	91.10	0.536
TOTALS													
AVERAGES													

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

HATCHERY PRODUCTION SUMMARY

Station: Dworshak National Fish Hatchery

Period Covered: October 1, 1982 through September 30, 1983

Species and Lot	Density Index: Fish on hand End of Month			Flow Index: Fish shipped this F.Y.	Flow Index: Gain this F.Y.	Flow Index: Fish Feed Expended		Total Flow: Conversion	Total Flow: Unit Feed Cost Per lb.	Total Flow: Unit Feed Cost Per 1000	Total Flow: T.U Per Inch	Total Flow: T.U. to Date	Total Flow: Length increase 30 day month Inches
	Number	Weight	Length	Number	Weight	Pounds	Cost						
1	2	3	4	5	6	7	8	9	10	11	12	13	14
RBT													
2-WS-12	124.6	18,479	7.179	396.3	21,588	28,135	7,675.23	1.30	0.36	52.66	17.44	110.30	0.549
STT													
3-DS-II-16	797.0	11,642	3.467	0	6,612	18,779	6,365.29	2.84	0.96	13.68	19.57	47.20	0.596
STT													
3-DS-I-14	508.9	20,278	4.780	263.5	22,408	34,098	11,235.70	1.52	0.50	17.79	17.47	42.60	0.750
STT													
3-DS-III-15	843.6	41,768	5.156	661.5	33,491	42,186	12,701.83	1.26	0.38	16.84	11.90	32.00	0.929
TOTALS	3,018.5	151,616		4,933.4	525,077	760,930	216,970.26						
AVERAGES			4.934					1.45	0.41	27.29	19.90	94.27	0.678