ANNUAL REPORT

FISCAL YEAR 1988

DWORSHAK NATIONAL FISH HATCHERY

AHSAHKA, IDAHO

14220

Project Leader — Date 12/22/88

for Assistant Regional Director — Date 1/5/89

Regional Director — Date

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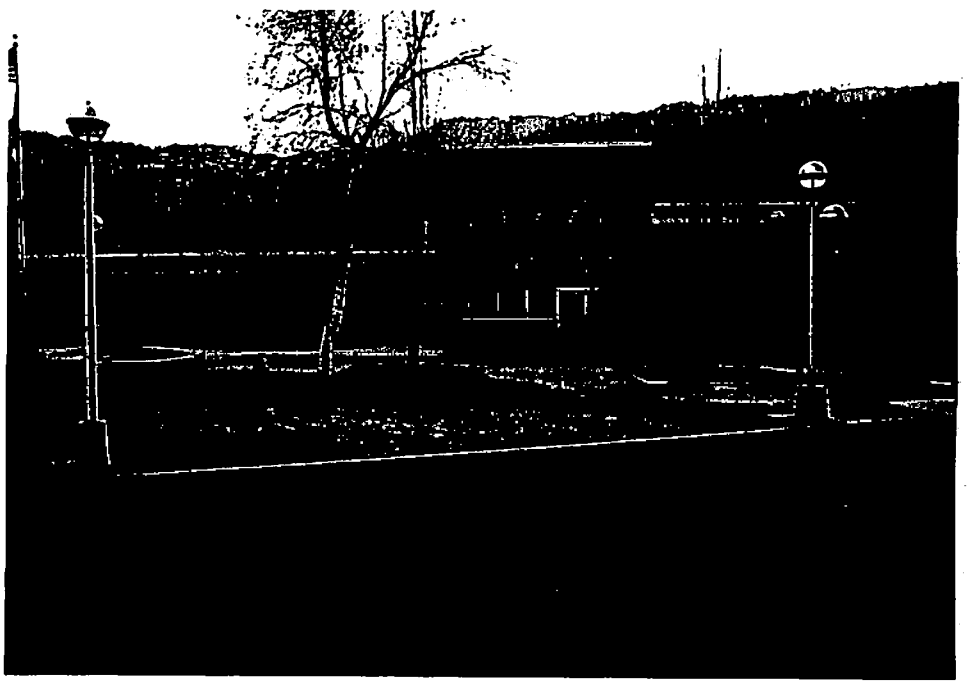
INTRODUCTION

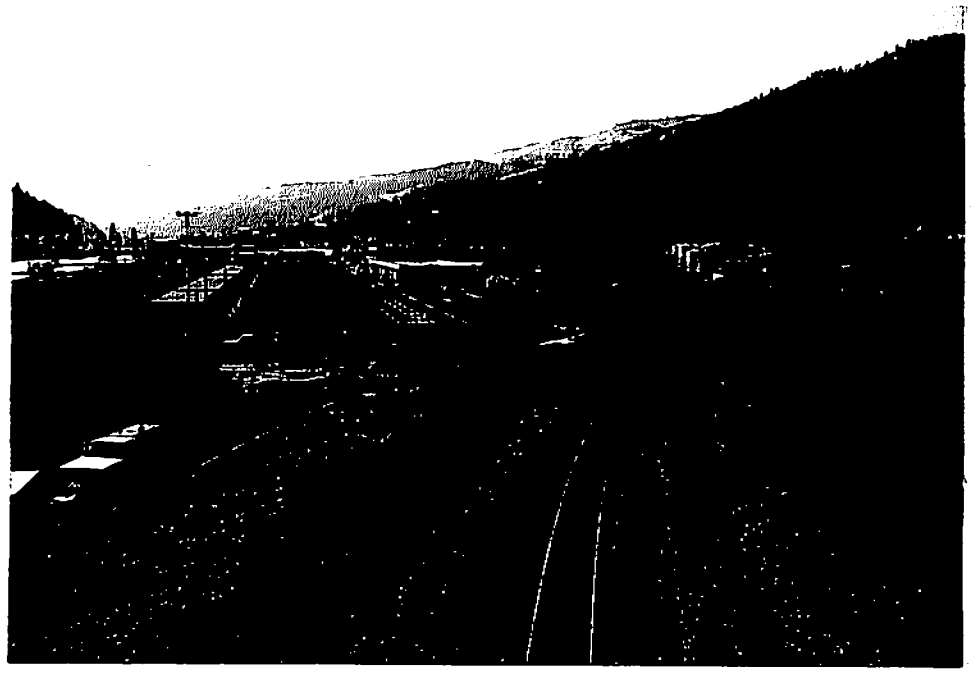
Dworshak National Fish Hatchery is located at the confluence of the North Fork of the Clearwater River and the main stem Clearwater River near the unincorporated town of Ahsahka, in north central Idaho. The site is 3 miles west of Orofino (population 3,800) on the north bank of the Clearwater River, 1 mile downstream from Dworshak Dam.

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

Construction of Dworshak National Fish Hatchery was included in the authorization for Dworshak Dam and Reservoir, Public Law 87-874, dated 23 October 1962. The purpose of the hatchery is to mitigate for steelhead losses caused by Dworshak Dam and Reservoir.



Visitor entrance to main hatchery building.



View of hatchery looking west from bridge overpass.

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' x 75') for steelhead production, 128 inside nursery tanks (3' x 16') and 30 vertical stack egg incubators. In addition, there are nine adult holding ponds (17' x 75') of which six are modified into twelve 8' x 75' raceways to hold rainbow production. Thirty 8' x 80' concrete raceways rear 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. 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 Rive Compensation Plan (LSRCP), expanded facilities to rear spring chinook salmon.

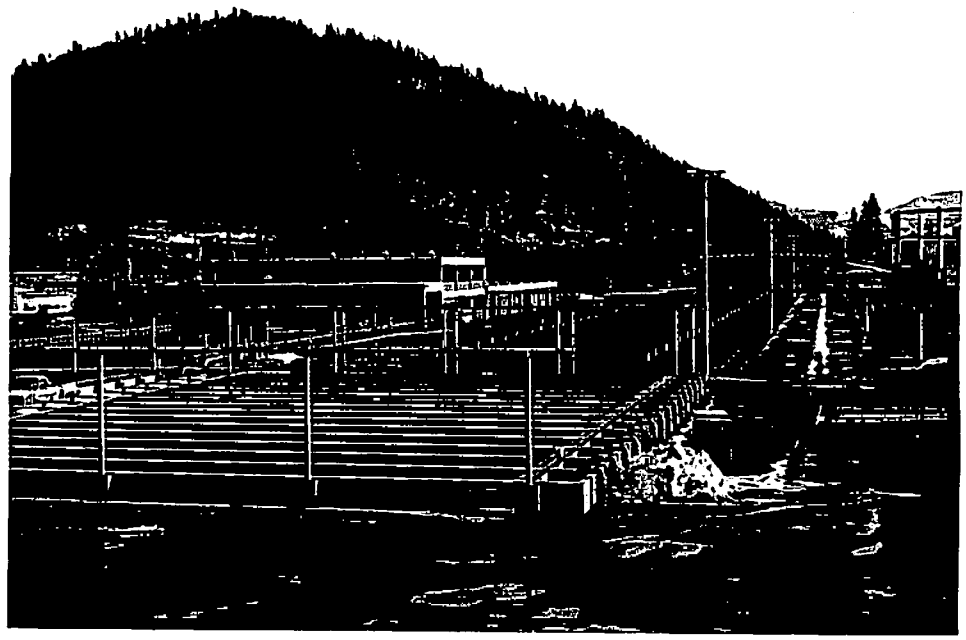
Steelhead and rainbow trout are mitigation production assigned to the hatchery with construction of Dworshak Dam. Steelhead and spring chinook are released into the Clearwater River drainage; rainbow into Dworshak Reservoir. As the result of Dworshak's Infectious Hematopoietic Necrosis Virus (IHNV) disease status, rainbow trout production, since 1983, has been assigned to Hagerman NFH for stocking Dworshak Reservoir. Costs for this program remains with the Dworshak hatchery. Spring chinook are 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 appears as follows:

Steelhead	2.3 million	450,000 pounds
Spring Chinook	1.6 million	90,000 pounds

Kooskia National Fish Hatchery, located 35 miles upriver, has operated as a complex with Dworshak since 1978 to produce spring chinook smolts. Steelhead fingerling 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, 1987 to September 30, 1988.



View of station looking east with LSRCP raceways in foreground.

STATION HIGHLITES

Fiscal Year 1988

Operational funds provided by the Corps of Engineers (COE) totaled $945,700; primarily for production of steelhead trout. In addition, $45,000 was annual work planned to the Dworshak Fish Health Center (FHC) and $30,000 for a broodstock evaluation study conducted by Dworshak Fisheries Assistance Office (FAO). Included in the hatchery's total funding was a transfer of $21,900 to Hagerman National Fish Hatchery for the production and distribution of rainbow trout for stocking Dworshak Reservoir. The above figures reflect a 9 percent reduction in funding administered by the COE District five months into the fiscal year. Dworshak's share was $132,000 which deleted the purchase of a new fish distribution unit.

The Lower Snake River Compensation Plan (LSRCP) furnished $198,400 for production of spring chinook salmon. The Youth Conservation Corps (YCC), funded by LSRCP, provided 10 enrollees and 1 crew leader for an 8-week summer work program. Total operation and maintenance funding, exclusive of FHC, FAO and YCC, was $1,144,100. Salaries accounted for $644,000 or 56.3 percent.

Cost per pound of all fish produced was $2.14, based upon a production gain of 534,863 pounds. This cost reflects equipment repair and maintenance, facility care, rehabilitation, travel and training, and direct production expenses. Production costs alone (labor, fish feed, mineral addition, drugs and chemicals) were $578,000 or $1.08 per pound.

A total of 21.7 staff-years was used during the year for a 24,648 pound production gain per staff-year employed. This increased to 427,890 pounds when based upon direct production responsibilities of 12.5 staff years.

Feed conversion (pounds of feed to produce one pound of fish) was 1.57 for the spring chinook and 1.60 for the steelhead, with an overall average of 1.59 for the year. Feed costs per pound of fish produced were $0.71 for chinook program and $0.43 for steelhead.

Dworshak had 3 million spring chinook (newly hatched) fry on station ending in October; a record number for the program. Also, nearly 3 million steelhead were in production. This number was 500,000 over requirement for this time of year, however, losses to IHN virus were much lower than had been expected which resulted in the excess.

Idaho Department of Fish and Game (IDFG) completed adipose clipping of fingerling steelhead at Dworshak beginning December 7 and ending December 21. Two 8-hour shifts, employing nearly 130 workers, were required to fin clip 3 million fish.

The fish ladder operated from January 4 until May 10, 1988 for the collection of 3,774 steelhead adults. However, spawning did not begin until March 1; one month later than usual because of the late arrival of fish. Speculative causes for this lateness of the return were (1) low water flows, (2) high

temperatures in the river system to delay migration, and (3) genetic differences in run timing.

February saw warm weather with temperatures reaching into the 60's. Snowpack at the higher elevations was well below normal (60 to 70 percent) causing concern in later months with smolt releases.

Low steelhead returns into Dworshak necessitated a closure of the Clearwater River to sport fishing. This closure was effective at midnight March 24; three weeks earlier than scheduled. The hatchery would have to collect 2500 adult steelhead to meet their anticipated egg requirement of 7 million. As of March 29, only 840 fish had returned through Dworshak's ladder.

Numerous news articles pertaining to the low steelhead run appeared in the Lewiston Tribune followed later by a decision from IDFG to close the season early. News media continued to follow the story knowing the interest and concerns generated by the closure.

A total of 3500 adult steelhead had returned to Dworshak as of April 26 and over 7.3 million eggs were collected. It was expected that numbers would approach 4000 fish at time of ladder shut down on May 10. A decision was made by Idaho Fish and Game to reopen the sport fishery on April 9 with closure on April 30 when it appeared that the hatchery would meet their broodstock requirements. Close coordination was maintained with IDFG and Nez Perce Tribe in providing information on broodstock collection, requirements and egg numbers.

Last spawning day at Dworshak was on May 10. Some 3900 steelhead returned to the hatchery and 9.4 million eggs collected. The ladder was shut down for maintenance and reopened on May 17 for spring chinook. By the end of May, five fish had returned.

A release of 1.33 million spring chinook was made in early April of which 200,000 were outplanted in the Lochsa River; the first of an off-site release from Dworshak since production began in 1982.

Trucking of steelhead smolts from Dworshak started on April 18 and ended April 28. The Corps of Engineers (COE) and IDFG distribution units, with drivers, transported nearly 1.3 million smolts weighing 200,000 pounds. It took 51 trips logging 6000 miles to make the releases. The station held over 1.4 million smolts for a direct release during the week of May 2 for a total of 2.7 million Brood Year 1987 production.

Water flow from Dworshak Dam increased from 1000 cfs to 25,000 cfs beginning May 4 and continued for six days. This additional flow assisted in moving chinook and steelhead downriver.

In addition to outplanting steelhead smolts, Dworshak provided assistance in the collection and loading of a number of broodstock for outplanting. These fish, considered excess to station needs, were released in the South Fork drainage of the Clearwater River.

Steelhead carcasses were again made available to the Idaho Department of Education, through an agreement with USDA, for distribution to various in-state food programs, a program which has been in effect since 1983. Over 3000 carcasses, weighing nearly 37,000 pounds, were distributed. Of this total, the Nez Perce Indian Tribe received 258 fish.

Steelhead production in Dworshak's nursery tanks experienced extremely high losses to IHN virus. Some 2.2 million young fingerling or 61 percent of initial numbers had been lost to the virus through June since first appearing in early May.

News media covered the IHN problem on nearly a daily basis for an update on fish losses. KRLC and KOZE radio stations reported on the disease since its early beginning. The Lewiston Tribune, with reporter Mike Stewart, gave done a very thorough coverage. KHQ-TV (Channel 6) Spokane sent a news team to the hatchery on July 13. KLEW-TV (Channel 3) Lewiston was at a station July 8. Manager Olson was also interviewed July 13 on live broadcast by KRLC radio, Lewiston, for 20 minutes followed by call-in questions from listeners. The Spokane Spokesman Review (Rich Landers) carried several stories.

The steelhead production program was drastically affected by the severe IHNV epidemic, occurring in early May in Dworshak's nursery fingerlings and extending through late summer in the fingerlings brought back in July from Kooskia. As of October 1, 1988, 75 percent of the fingerlings started and reared at Dworshak had died from IHN.

In years past, the majority of steelhead for Dworshak's program had been started at Kooskia, with fingerlings being returned to Dworshak in mid-June. This was done to avoid early exposure of the fish to IHN virus. In two previous years' Dworshak experienced less disease incidence in their nursery program and saw increased losses from Kooskia returnees. Thus, the decision this past year to start the majority of steelhead fry, 3.6 million, in Dworshak's nursery. Another factor, however, was the lateness of the egg take preventing additional numbers to be reared at Kooskia; spring chinook production impacted by a late steelhead program.

An additional 80,000 steelhead fingerlings are expected back in November from 1.2 million eggs shipped earlier to Hagerman NFH. Adding these fish to the 1.37 million fingerlings on station October 1, 1988, and anticipating a 10 percent overwinter loss, Dworshak should release near 1.3 million steelhead smolts in spring 1989. This anticipated release is down 1 million from a planned program of 2.3 million.

Spring chinook returned to the Clearwater River in good numbers. Although a return of only 1900 had been predicted, 2567 adults returned to the Dworshak/Kooskia NFH complex. These high adult returns must be considered a positive indicator for the future success of chinook salmon in the Clearwater. A total of 4.9 million eggs was collected. Accompanying eye-up of 96 percent assured the hatchery of meeting its egg requirement entirely from Clearwater River returnees for the second successive year.

Another successful Youth Conservation Corps (YCC) 8-week program, employing 10 enrollees and one crew leader, assisted in a variety of work projects during the summer. This program has been available to the hatchery since 1983. Prior to YCC and dating back to late 1977, the station had been actively involved in the Young Adult Conservation Corps (YACC) program. The YCC enrollees, alone, have contributed over 20,000 hours of work to the project.

Several special projects were initiated and accomplished during the year which contributed towards improved production methods, improvements to the water supply, beautification of the hatchery grounds, added security, upgrading and rehabilitating equipment, and adding additional storage space to the project.

John Miller, Portland Regional Office, performed station inspections on October 27-28.

From the Lewiston Tribune of January 6, 1968 (20 years ago), "The first concrete was poured today on the start of construction of the first steelhead fish hatchery at Ahsahka. It will be the largest hatchery in the world upon completion".

A highlight of January's safety program was instruction in CPR training in which 25 Service employees participated. Also, employees took part in a health screen which included blood pressure, blood cholesterol monitoring, and health assessments.

Station employees receiving CPR training.

A revised "Dworshak Operation Plan" was completed in January. This plan will continually be updated as required.

Dworshak's FTS phone system was cancelled on January 17. This service had been made available by the Corps of Engineers at Dworshak Dam. High costs appeared to have resulted in discontinuing the service.

Special Achievement monetary awards, for performance during Fiscal Year 1987, were presented in January to employees Dave Clifford, Mary Lou Galloway, Hamilton McCleary, Ron Oatman, Dave Owsley, Greg Pratschner, Diane Praest, Hubert Sims, and Tom Taggart.

Jim Rockowski, Fishery Biologist (Production Assistant), was presented a Special Achievement certificate and a monetary award of $1000. This award was in recognition of outstanding work performed in the absence of an Assistant Manager from February 1 to May 1.

Classifiers Joe Wood, Washington, D.C. (Central Office) and Jack Donahue, Portland (Regional Office) visited Dworshak on April 20 and 21. Purpose of their trip was to redefine and develop classification standards for the Fishery Biologist, 482 series.

Two coordination meetings were hosted by the hatchery in which fishery activities (production, management, etc.) within the Clearwater River basin are reviewed. These meetings, held on November 3 and March 17, were represented by IDFG, NMFS, Nez Perce Tribe, FWS and COE.

FISH CULTURE OPERATIONS

Steelhead Trout Production
- Brood Year 1987 -

Overall steelhead production for Brood Year 1987 was excellent, with exception of approximately 10 percent experiencing health problems (IHNV, "Ich", and Myxobacteria) at time of release. The total number of 2,699,618 smolts weighing 434,445 pounds and averaging 197 mm in length represents one of the largest releases in Dworshak's 20 year history. Relevant events during Fiscal Year 1988 are presented below.

System I

System I, originating from the early spectrum of the run, had two ponds restocked with fish reared in Dworshak's nursery because of earlier IHN losses (27 percent). Only two ponds (11 and 30) in the system tested positive.

Fish in the system were from earlier takes which negated conversion to reuse for any additional growth. Performance was excellent throughout the outside rearing period.

Adipose fin clipping by Idaho Fish and Game (IDFG) was conducted in December, followed by coded wire tagging (CWT) in January. Although fungal infections and eventual mortality resulted in many fish from deep ad-clipping, mortality was not significant. Inventories by IDFG crews were in close agreement with hatchery book values as summarized in Table 1 below.

Table 1. Brood Year 1987 steelhead tagging inventories summary.

System	Marked by IDFG	Dworshak Book Values	Difference (Number)	Difference (Percent)
I	712,434	721,175	-8,741	-1.21
II	989,014	993,789	-4,775	-0.48
III	1,276,907	1,242,606	+34,301	+2.76
Totals	2,978,355	2,957,570	+20,785	+0.70

At the time of release fish health and quality were excellent. Monthly parameters are summarized in Table 2.

Table 2. FY 1988 STT performance - System I.

Date	Number	No./Lb.	Growth (in.)	Mortality (%)	Temperature (°F)
10/01/87	743,714	21.0	-	-	-
11/01/87	735,559	13.0	0.67	0.96	52.9
12/01/87	726,793	10.0	0.69	1.19	48.6
1/01/88	704,982	9.0	0.13	2.05	42.8
2/01/88	710,118	9.2	0.17	1.68	39.5
3/01/88	694,857	8.0	0.27	2.15	38.9
4/01/88	686,872	7.4	0.27	1.15	40.4
Release	684,111	6.8	-	-	-

System II

Originating from late egg takes, System II steelhead were a combination of fish reared at Kooskia NFH with fish reared in Dworshak's nursery. Four empty LSRCP raceways were also used for rearing due to initial loading numbers exceeding the system's capacity.

IHNV related mortality reached significant numbers during February (3.4%) and March (8.0%), with additional gill damage from "Ich" and Myxobacteria. Pond 2 was transferred to single pass water in March to hopefully reduce the mortality it was experiencing. Unfortunately, no significant improvement was observed. These fish were eventually released March 30, 1988. IHNV was confirmed in a total of nine system ponds, six of which tested positive after February 12.

Conversion to reuse with mineral supplementation (20 mg/l Na+, 8 mg/l K+) occurred November 16. Reuse remained in operation through March 22 with no functional problems.

Adipose fin clipping and CWT were completed in December with inventory numbers in close agreement (Table 1). Mortality due to the stresses of marking was light with exception of approximately 1,000 fish lost in Pond 14 to secondary infection of wounds caused by ad-clipping and freeze branding.

At time of release, fish health was generally good with exceptions of the March 30 release and several Take 10 ponds still experiencing IHNV, "Ich" and Myxobacteria losses. A summary of monthly parameters is provided in Table 3.

Table 3. FY 1988 STT performance - System II.

Date	Number	No./Lb.	Growth (in.)	Mortality (%)	Temperature (°F)
10/01/87	1,019,643	45.0	-	-	-
11/01/87	1,010,091	29.0	0.50	1.07	53.1
12/01/87	996,953	18.0	0.80	1.19	48.6
1/01/88	979,442	15.0	0.30	1.28	54.5
2/01/88	964,856	10.7	0.70	1.73	54.4
3/01/88	932,299	8.7	0.60	3.37	54.6
4/01/88	832,044	6.8	0.20	7.95	50.8
Release	829,349	7.0	-	-	-

System III

This system consisted of fish that were reared initially at Kooskia NFH, and were mid-spectrum fish. Monthly mortality was low entering the fiscal year (0.8 percent) and peaked in December at 2.0 percent. Mortalities were primarily pinheads dropping out, although five ponds were confirmed as IHN positive.

Conversion to 54°F reuse water, accompanied by mineral supplementation, occurred December 7. Reuse temperatures remained constant until January 15 when significant gill swelling and light Myxobacteria infestations were observed in some ponds. This warranted a temporary reduction to 50°F. The 17,300 fingerlings in one pond were transferred to raw water in System I on January 12, again to try and alleviate health problems. Mortality in the group did not drop significantly. System III was converted back to single-pass water April 14.

The steelhead fingerlings were adipose fin clipped during December of 1987, and an additional 43,574 received CWTs. Inventories during the tagging operation are summarized above in Table 1.

At the time of release fish health and quality were excellent. Monthly system parameters are provided in Table 4.

Table 4. FY 1988 STT performance - System III.

Date	Number	No./Lb.	Growth (in.)	Mortality (%)	Temperature (°F)
10/01/87	1,274,444	29.0	-	-	-
11/01/87	1,264,014	19.0	0.62	0.8	53.0
12/01/87	1,250,990	13.0	0.51	1.0	48.6
1/01/88	1,248,296	10.0	0.56	2.0	51.7
2/01/88	1,206,499	10.5	0.10	1.9	51.6
3/01/88	1,183,988	7.5	0.80	1.9	51.6
4/01/88	1,165,362	6.2	0.50	1.6	49.9
Release	1,186,158	5.5	-	-	-

Table 5 contains a summary of the overall performance of the three steelhead systems.

Table 5. Brood Year 1987 STT performance summary.

System	Number Shipped	Weight Gained (Lb.)	Feed Fed (Lb.)	Feed Conversion
I	684,111	96,107	151,037	1.57
II	829,349	109,666	187,180	1.71
III	1,186,158	202,539	309,907	1.53

Distribution

Steelhead smolt release began on April 18 with upriver outplants and was completed May 4 with direct releases. The only exception was a group of 26,000 fingerlings released early because of health problems and the need to perform maintenance on the rearing units they were occupying. Outplanting to various Clearwater drainage sites was accomplished using distribution trucks and drivers provided by the USCE and IDFG. A total of 51 trips were required and no mortality was recorded. The outplants are summarized in Table 6.

Table 6. STT outplant summary (April 19 - 28, 1988).

Release Site	Number	Weight	No./Lb.	Length (mm)
S.Fork Clearwater River:				
American River	56,885	9,268	6.14	198
Crooked River	201,325	27,180	7.41	186
Mill Creek Bridge	165,055	24,969	6.61	193
Newsome Creek	190,708	27,016	7.06	189
Other:				
Clear Creek	254,898	44,511	5.73	203
Eldorado Creek	200,806	29,850	6.73	192
Lolo Creek	200,425	36,350	5.51	205
Totals/Averages	1,270,102	199,144	6.38	196

Table 7 presents a summary of Dworshak's direct releases to the Clearwater River from this brood year by system:

Table 7. STT Direct release summary (April 18 - May 4, 1988).

System	Number	Weight	No/Lb	Length (mm)
I	395,366	62,447	6.33	200
II	481,622	68,491	7.03	188
III	552,528	104,393	5.29	212
	1,429,516	235,331	6.07	202

A summary of the overall steelhead numbers released is presented in Table 8.

Table 8. STT Smolt release summary (April 18 - May 4, 1988).

Release Type	Number	Weight	No./Lb.	Length (mm)
Direct	1,429,516	235,331	6.07	202
Outplant	1,270,102	199,114	6.38	192
Total/Avg	2,699,618	434,445	6.21	197

K (metric condition factor) = 9.52 E-06

A summary of releases by egg takes is given below in Table 9.

Table 9. STT smolt releases by egg take.

Egg Take	Date Taken	Type of Release: Direct	Type of Release: Outplant
1	2/03/87	22,000	65,081
2	2/10/87	27,773	41,460
3	2/17/87	40,182	27,584
4	2/24/87	69,690	104,468
5	3/03/87	181,170	-
6	3/10/87	92,507	49,600
7	3/17/87	106,808	38,555
8	3/24/87	217,569	103,663
9	3/31/87	368,953	101,441
10	4/07/87	170,846	294,102
11	4/14/87	73,040	30,352
12	4/21/87	16,876	82,900
13	4/28/87	19,231	126,785
14	5/05/87	11,300	102,056
15	5/12/87	11,301	102,055
Totals		1,429,516	1,270,102

Table 10 gives a summary of outplants by egg take.

Table 10. STT outplants by egg take.

Egg Take	Eldorado Creek	Clear Creek	Lolo Creek	Crooked River	Newsome Creek	Mill Cr. Bridge	American River
1	0	0	0	58,572	0	6,509	0
2	0	0	0	34,951	0	6,509	0
3	0	0	0	21,075	0	6,509	0
4	0	91,384	0	6,575	0	6,509	0
5	0	0	0	0	0	0	0
6	37,200	12,400	0	0	0	0	0
7	0	0	38,555	0	0	0	0
8	0	0	70,169	30,000	3,494	0	0
9	34,440	0	38,555	28,446	0	0	0
10	31,296	130,835	0	0	23,017	84,936	24,018
11	0	0	15,016	0	0	15,336	0
12	0	0	0	21,706	28,327	0	32,867
13	0	20,279	0	0	106,506	0	0
14	48,935	0	19,065	0	29,364	19,374	0
15	48,935	0	19,065	0	0	19,379	0
Total	200,806	254,898	200,425	201,325	190,708	165,055	56,885

- Brood Year 1988 -

Adult Collection

Brood Year 1988 steelhead operations began with the opening of the fish ladder January 4 and continuing through May 10, 1988. A total of 3,774 adults was collected for spawning; 941 males and 2833 females. An additional 139 adults were transferred from Kooskia NFH and 49 from Lower Granite Dam as part of a study to observe the relationship between hormonal injection of LHRN on IHNV disposition in adults. The slow arrival of returning adults (141 through February 1) delayed spawning operations until March 1, one month later than originally planned.

Returning adult numbers and age ratios, determined from length measurements, consisted of 4.4 percent I-salts, 92.4 percent II-salts, and 3.2 percent III-salts.

A total of 1,451 females were spawned with 9.8 million green eggs collected (6,760 eggs per female) in 11 weekly egg takes. An eye-up of 88.7 percent (after adjusting for IHN positive eggs destroyed) produced 7.8 million eyed eggs. A summary of the spawning statistics is presented in Table 11.

Table 11. Brood Year 1988 spawning summary.

Take	Date	No. Spawned: Females	Males	Eggs per Female	Green Eggs	Eyed Eggs	Eye-Up(%)	IHN+ Destroyed
1	3/01	17	10	7,047	119,793	99,750	83.3	0
2	3/08	21	14	7,203	151,272	117,000	77.3	0
3	3/15	35	23	7,272	254,548	190,900	74.9	0
4	3/22	91	61	7,165	659,254	541,750	82.2	0
5	3/29	185	110	7,177	1,327,712	1,143,500	86.6	7,956
6	4/05	217	111	7,160	1,543,798	1,366,000	90.2	30,000
7	4/12	222	155	6,740	1,493,404	1,256,396	85.1	17,300
8	4/19	185	96	6,473	1,197,429	1,008,800	92.2	103,561
9	4/26	165	81	6,596	1,088,397	1,021,808	95.0	13,192
10	5/03	220	123	6,356	1,398,384	892,500	92.9	438,564
11	5/10	96	51	6,215	596,657	182,250	94.6	403,975
		1,454	835	6,761	9,830,648	7,820,654	88.7	1,014,548

Age Composition

A summary of the age and sex ratio for Brood Year 1988 is given in Table 12.

Table 12. Brood Year 1988 STT adults - age and sex ratio summaries.

	Males	Females	Totals (%)
I-ocean	143	25	168 (4.4)
II-ocean	726	2761	3487 (92.4)
III-ocean	72	47	119 (3.1)
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	941	2833	3774

Spawning Procedures

Spawning protocol was essentially identical with that of past years'. Egg lots were placed in individual colanders, water hardened in iodophore (100 mg/l) for one hour, and incubated until eyed. Fish health samples were taken throughout the entire run with IHNV samples taken from all spawned fish. IHNV incidences from the males and the females were 6.3 percent and 3.7 percent, respectively. As in past years, the incidence of IHNV in the adults increased significantly in the later takes. All positive lots were culled with the exception of two lots retained for a Fisheries Assistance Office late spring broodstock study. Only eggs from IHNV negative adults were used for shipment and production needs.

Egg Disposition

Disposition of the 7.8 million eyed eggs was as follows:

Dworshak NFH	3,832,200
Kooskia NFH	1,143,500
Hagerman NFH	1,207,396
IDFG	1,204,058
Oregon State Univ.	2,000
Destroyed	431,500

	7,820,654

Fingerlings from the eggs sent to Kooskia were later returned to Dworshak in July at 230 fish per pound.

Production Methods

IHNV problems plagued this particular brood year from start. Of the 3.6 million steelhead in Dworshak's nursery tanks on May 1, only 888,000 remained on station as of September 30, 1988. This number has been adjusted for actual and projected inventory losses and represents a loss of 75.3 percent, nearly all from IHN virus. Virtually every rearing unit of STT experienced IHNV losses with exception of five nursery tanks and a couple of ponds in System II.

Table 13 gives a month by month overview of the effect the IHN virus had on the fish from the various egg takes:

Table 13. Monthly STT mortality losses by egg take - 1988.

	Initial	April		May		June		July		TOTAL	
Tk	No.*	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
1	99.8	4.5	6.6	22.7	23.8	6.5	8.9	0.3	0.4	33.7	33.8
2	117.0	4.4	11.0	66.3	58.9	6.1	13.2	0.3	0.6	77.1	65.9
3	190.9	3.8	9.6	117.9	63.0	28.7	41.5	0.7	1.7	151.1	79.2
4	240.0	0.0	0.0	70.9	29.5	71.8	42.5	1.3	1.3	144.0	60.0
5	80.0	0.0	0.0	0.4	0.5	26.5	33.2	5.3	10.0	32.2	40.2
6	1366.0	0.0	0.0	72.6	5.3	1001.6	77.4	32.2	11.0	1106.4	81.0
7	510.0	0.0	0.0	18.2	3.6	330.4	67.2	28.0	17.4	376.6	73.8
8	1006.8	0.0	0.0	55.7	5.5	311.7	32.8	102.0	16.0	469.3	46.6
	3610.4	12.6	0.3	424.7	11.8	1783.2	56.2	169.9	12.2	2,390.4	66.2

* All numbers of fish in thousands

The above table demonstrates the magnitude of IHN losses in 1988. Two-thirds of the fish that were on hand at initial loading were lost by the time the fish were ponded the end of July. Since that time, only an additional 9 percent have died, bringing the cumulative overall loss to 75 percent on September 30, 1988.

Initial loading of the ponds began July 12 when 111,192 fingerlings were brought back from Kooskia and placed into two System II ponds. This was done to "test the waters", to see how the returnees would fare at Dworshak when so many fish were being lost to IHNV in the nursery. Dworshak's nursery fish were ponded into System 3 from July 14 through August 2. Because of traveling screen problems at the intake and accompanying water shortage, the fingerlings were ponded at 120,000 per pond when possible to reduce the number of ponds being used.

On July 23 and 24 the remaining STT fingerlings from Kooskia were hauled back to ponds in Systems II and III. Twelve truckloads were needed to return the 700,000 fish, weighing 5300 pounds. Poor water conditions combined with "Ich" and bacterial gill problems hastened the move. Over the next month, 22 percent of these fingerlings died despite regular formalin baths. IHNV problems in the returnees showed up 8 to 12 weeks later, taking an additional 8 percent of the later returnees, and 4 percent of the early returnees.

On September 30, 1988, Dworshak had the following STT inventory (data adjusted for inventory losses subsequent to September 30):

Table 14. Dworshak STT inventory - September 30, 1988.

Location	Number	Weight(lb)	No/Lb	Length (mm)
System II	402,787	11,475	35.1	106
System III	952,141	17,063	55.8	92
Total	1,355,019	28,538	47.5	97

Another 90,000 STT fingerlings, from "B" stock, are expected to be returned from Hagerman NFH in November 1988. Including these fish, Dworshak should release approximately 1.3 to 1.4 million smolts in the spring of 1989.

Disposition of Excess Steelhead and Carcasses

Adult carcasses from holding mortality and experimental groups were disposed of at the local landfill. Carcasses from spawned adults and from health sampling were donated to Idaho Department of Education for processing and distribution to food banks and public institutions. The Nez Perce Tribe also received fish.

Landfill	332	(mortality, experimental groups)
Dept. of Education	2,832	(food bank - 33,984 lbs.)
Nez Perce Tribe	258	(food fish - 3,096 lbs.)
Outplants	540	(enhancement)

The 540 excess adults were outplanted in April 1988, as shown below in Table 15.

Table 15. Excess STT adult outplants - 1988.

Date	Release Site	Number	Weight (Lb.)
4/21/88	American River	148	1,776
4/22/88	American River	155	1,860
4/25/88	American River	237	2,844
Totals		540	6,480

Rainbow Trout Production

Since 1985, rainbow trout (RBT) for Dworshak Reservoir have been supplied from another hatchery because of Dworshak's IHNV disease status. For the third successive year, Hagerman NFH in southern Idaho produced the necessary trout to meet mitigation requirements. The $21,000 cost for rearing and distribution was reimbursed by Dworshak. Hagerman stocked 294,906 RBT weighing 28,120 pounds at the Dent Acres boat ramp from May 31 through June 8. The fish were of the Arlee and Shasta strains.

Spring Chinook Salmon Production
- Brood Year 1986 -

Entering the fiscal year, a total of 1,541,117 SCS, weighing 45,460 pounds, was being reared in Dworshak's LSRCP raceways. A shipment of 192,000 went to Kooskia NFH the week of October 19. These fish were part of an early rearing program at Dworshak.

Monthly production parameters for this brood year are shown in Table 16.

Table 16. Brood Year 1986 SCS performance.

Date	Number	No./Lb.	Growth (in.)	Mortality (%)	Temperature (F)
10/01/87	1,541,117	33.9	--	--	--
11/01/87	1,334,479	33.0	0.49	0.07	53.7
12/01/87	1,332,729	29.2	0.40	0.07	48.6
1/01/88	1,331,940	26.9	0.13	0.06	42.8
2/01/88	1,329,567	25.6	0.09	0.06	39.6
3/01/88	1,327,206	22.8	0.21	0.06	39.5
Release*	1,332,257	20.9	--	--	--

*Inventory corrected

Several tagging operations were conducted throughout the year. Pit tags were applied by National Marine Fisheries Service personnel December 15 and 16, 1987, with freeze-branding by IDFG on December 12. This tag group was part of a study assessing the effect photoperiod advancement had on smoltification. Lengthened photoperiods were produced by the installation of controlled flood lights on holding pond raceways 7 and 8. Other tag groups included 60,000 freeze-branded fish and 180,000 fingerlings with CWTs, which were controls for the 1987 fall release.

Fish health and condition were excellent throughout the year with only minimal BKD observed. Outplanting of 200,105 fish on March 17 by IDFG marked the first off-station smolt release in Dworshak's history. These fish were released March 14, 1988, in the Lochsa River near Powell. A release summary is provided in Table 17.

Table 17. SCS Smolt release summary - 1988.

Type of Release	Number	No./Lb.	Weight (Lb.)	Length (in.)
Direct	1,132,152	20.6	54,940	5.3
Outplant	200,105	22.4	8,927	5.2
Totals	1,332,257	20.9	63,867	5.3

- Brood Year 1987 -

This brood year performed well with minimal losses to disease. Fish transferred from this brood year are summarized in Table 18.

Table 18. Brood Year 1987 SCS releases.

Fingerling Pgm.	Date	No.	Wt.	No/lb	L(mm)	Site
Outplants	3/88	209,989	1,346	156	67	American River Newsome Creek Lolo Creek
Direct Releases:						
0-age	3/88	222,737	2,615	85.6	82	Clrwtr. River
Sub-yearlings	9/88	192,090	5,800	33.1	109	Clrwtr. River

An additional 301,575 SCS fingerlings weighing 2897 pounds, were transferred to IDFG's Red River holding ponds, in June, at 104 per pound (77 mm).

As of September 30, 1988, Dworshak had 1.7 million Brood Year 1987 fingerlings on station, averaging 105 mm in length for release in April 1989. The fish were in good health, aside from a slight BKD problem for which medicated feed was given.

- Brood Year 1988 -

Adult Collection

This year's return of spring chinook salmon adults to Dworshak and Kooskia NFHs was excellent, totaling 2,567 fish, as shown in Table 19.

Table 19. Brood Year 1988 SCS adult returns.

Site	Male Nos.	Female Nos.	Totals
Kooskia NFH	282	313	595
Dworshak NFH	935	1037	1972
	---	----	----
	1217	1350	2567

Dworshak's ladder operated from May 17 until September 6. The peak of the run occurred from June 15 to July 10. Surprisingly, over 550 fish were collected in August and into the first week of September. Increased water flows (5000 cfs) in the North Fork during this period likely contributed to the later returns.

Adults were transferred from Kooskia on a weekly basis, from early May to late July, as has been standard practice since 1978; warmer water temperatures prevent holding the adults until spawning.

The male to female ratio this year was 1.0:1.1, and is summarized in Table 20.

Table 20. Brood Year 1988 SCS adult sex ratio summary.

Site	Male Nos.	Female Nos.	Totals
Kooskia NFH	282	313	595
Dworshak NFH	935	1037	1972
	---	----	----
	1217	1350	2567

III-ocean fish predominated in the returns, which helped boost this year's average number of eggs per female to 4,615. This compares with 1987's fecundity rate of 3,526 when only 16.3 percent of the returns were III-oceans. Table 21 below sums up the age structure of the returns.

Table 21. Brood Year 1988 SCS adult returns age structure summary.

	Kooskia NFH	Dworshak NFH	Total
I-ocean	39	163	202 (7.9%)
II-ocean	363	569	932 (36.3%)
III-ocean	193	1240	1433 (55.8%)
	---	----	----
	595	1972	2567

Returning broodstock were anesthetized with Tricaine Methanesulfonate (MS-222), sexed, measured, and inoculated with Erythromycin Phosphate (20 mg/kg body weight). Open wounds were swabbed with malachite green. The fish were then held until spawning in one of the two adult holding ponds. Flow-through malachite green treatments were administered 3 to 5 times weekly to suppress fungal problems. The pre-spawning mortality was only 9 percent this year, compared with 16.6 percent in 1987.

Spawning Procedures

Spawning operations began August 22 and concluded September 6. Spawning followed the protocol of earlier years for the most part. Brood fish were anesthetized with MS-222 and all green adults returned to the holding ponds. Sperm was collected from the males and combined with the eggs taken from killed and bled females. Crosses were made between two males and two females with exception of Ron Pascho's (SNFRC) BKD experimental lots (300) which were one male to one female whenever possible. Eggs from two females were placed in each Heath incubator tray for 30 minutes of water hardening in buffered iodophore (75 mg/l) for water hardening and eye-up. Eggs for the Pascho experiment were water hardened and eyed-up in individual colanders, combined with eggs from another female and then hatched in Heath trays.

Extensive health lab sampling for IHN and bacterial kidney disease was required. The Pascho experiment needed kidney samples to be taken from each adult for BKD analysis, and ovarian fluid and spleen samples from each female for IHNV. Kidney samples were also taken from each adult used in the Kooskia program, with additional spleen samples from the males and ovarian samples from the females. Dworshak's program required subsampling for IHNV, BKD, IPN, VEN, ERM, Myxobolus spp., and furunculosis.

The high fecundity rate mentioned earlier, together with an extraordinary eye-up of 96 percent, helped make this a most successful SCS brood year. Over 4.4 million eyed eggs were produced from the 4.9 million green eggs taken. All normal SCS production programs should be met through the next rearing cycle and several additional programs accomplished. The 1988 SCS spawning statistics are found in Table 22.

Table 22. Brood Year 1988 SCS spawning summary.

Take	Green Eggs	Eyed Eggs	Eye-Up (%)	No. Fmls	Egg/ Fml.	Disposition: Eyed BKD+eggs Destryd	Disposition: Dworshak	Disposition: Kooskia
1	717,814	681,587	94.9	140	5127	5,293	676,294	0
2	1,009,530	976,122	96.7	214	4625	146,250	304,872	525,000
3	387,692	366,295	94.3	84	4615	13,518	352,777	0
4	1,064,436	1,045,765	98.2	233	4568	30,374	1,015,391	0
5	825,090	813,250	98.6	189	4366	39,750	473,500	300,000
6	549,000	490,806	89.4	125	4392	26,352	353,954	110,500
7	357,280	340,000	95.2	79	4522	0	130,250	209,750
Ttl.	4,910,842	4,713,825	96.0	1064	4615	261,537	3,307,038	1,145,250

A total of 361,743 eggs was received from IDFG's Red River facility after eyeing up at Kooskia. Eye-up for the nine egg takes averaged 72.8 percent, producing 263,250 eyed eggs. Fecundity for this program was 4,306 eggs per female. Early rearing will be at Dworshak with resulting fingerlings returning to Red River in June 1989 at 175 fish per pound.

Special Studies
- Steelhead and Spring Chinook -

Ozone Protection Using a Recycled Water Flow

The results of the ozone study are somewhat mixed, possibly due to two interruptions in ozone protection which occurred because of disruptions in the electrical power supply.

In the first study two groups of 40,000 STT fingerlings were brought back from Kooskia and split into two subgroups of 20,000 fish, with one of each subgroup going into heated, raw water and one into ozonated, reuse water. Two months later, losses in raw water subgroups from IHNV averaged 81.9 percent while the ozone subgroups averaged losses of 63.1 percent. The difference between the average losses is not significant due to limited replicates in the study.

The second ozone study had unexpected results as shown in Table 23.

Table 23. STT IHNV losses in ozone study - 1988.

Trtmt	No. at Initial Loading	Mortality Number (%) May	June	July	Total
Ozone	751,800	34,101(4.5)	245,204(34.2)	95,932(20.3)	375,237(49.9)
Cntrl	255,000	21,578(8.5)	66,454(28.5)	6,033 (3.6)	94,065(36.9)

Two losses of electrical power over the course of the experiment caused raw water to be introduced into the ozone/reuse system. The IHN virus may have been introduced at these times, with reuse compounding its presence causing relatively higher losses.

Because of the raw water exposure and apparent over-estimated ozone demand, the reuse/ozone study was terminated after two months with similar IHNV losses as the control group. It is believed that if enough ozone could be generated to take care of the reuse/ozone demand and leave a low residual of ozone in the system, the system would offer protection from IHNV.

Diet Study

On May 23, 360,000 swim-up fry from Take 7 were randomly split into three treatment groups, 4 tanks each, 30,000 fish per tank. One group, as control, received the standard juvenile diet of Oregon Moist Pellet (OMP), while the remaining two groups were fed BioDiet and Rangen semi-moist feed. Feeding rates followed manufacturers' recommendations and Dworshak cultural methods.

Mortality data was collected over the next 2 1/2 months as the nursery fish experienced an IHNV outbreak. Analysis of data and Table 24 below indicate no significant differences between any of the diets.

Table 24. STT IHNV losses in diet study - 1988.

	Diet		
	OMP (control)	Bio-Diet	Rangen
Average Cumulative Mortality (%)	66.3	86.6	54.1
Standard Deviation	36.3	11.3	34.7

Because no significant differences were observed, no attempt will be made in the future to alleviate IHN problems by diet alterations.

Size at Return From Kooskia

Results from this experiment support the validity of the assumption that the larger the fish at return, the greater the resistance it will have to IHN virus. However, this does not take in account timing of returns which may also play a major role in virus incidence. The STT fingerlings early reared at Kooskia, all Take 5 fish, were returned to Dworshak at four separate times.

The first group returned to Dworshak's nursery on May 27, a group further subdivided and placed into ozone and raw water treatments, as discussed in the experiment above. The second lot to return was a 40,000 fish group which had been split into vaccinated and control subgroups by Oregon State University. These fish came back to Dworshak on June 23, and were treated as a single group, although a discussion of the experiment below details mortality differences between two sub-groups. The third group came back on July 12 to "test the waters" for the 700,000 STT remaining at Kooskia. The fourth group returned on July 23 when it became absolutely necessary to move the fish from Kooskia due to deteriorating health and poor water conditions. Table 25 gives a summary of the relative survivals of these four groups.

Table 25. STT IHNV losses in Kooskia return study - 1988.

			Data At Return		Cumulative Morts (%) Thru:		
No.	Subgrp	Date	Number	No/Lb	1 Aug	1 Sep	1 Oct
1	Ozn/Reuse	5/27	40,000	680	81.9		
	Raw/Htd	5/27	40,000	680	63.1	-*	-
	Total/Avg		80,000		72.5		
2	Vaccntd	6/23	18,713	230	0.8	4.0	9.6
	Control	6/23	19,829	230	1.2	7.8	12.9
	Total/Avg		39,486		1.0	5.8	11.0
3	-	7/12	111,192	150	4.1	6.3	6.4
4	-	7/23	698,114	131	3.5	21.5**	27.1**

*Combined at ponding with other fish, therefore, information unavailable.
**Ichtyophthirius spp. and poor health losses involved.

It should be noted that this experiment was originally set up with more replications, better controls, more equal numbers, and specified samples counts (no. fish per pound) for return groups. Fate and IHNV intervened, and all the best-made plans went astray. What could be done to salvage the study was done, and the values and groups discussed above are one attempt to address the question of "What is the appropriate size at return?"

Based on above results, early July would have probably been best for the returnees. Fingerlings returned later were infected by IHNV but also received heavy losses from 'Ich' carried over from Kooskia on transfer.

Vaccination Study

As part of a cooperative study with Jo-Ann Leong from Oregon State University, 20,000 vaccinated and 20,000 control STT fingerlings (Dworshak's Take 5) were returned from Kooskia to Dworshak's nursery on June 23 at 230 per pound. These fish were from Kooskia's group 2 (see Table 25). Overall, there was no significant difference between the average 4.1 percent mortality experienced by the four vaccinated tanks of fish and 7.8 percent loss experienced by the fish in control tanks. Statistical comparisons could only be made while the fish were in the eight nursery tanks. Mortality trends in the two groups were quite similar even after combining the two groups (each containing four treatment tanks) into common Burrow's ponds. Through September 30, 1988, cumulative mortality in the vaccinated group was 9.6 percent, as compared with the 12.9 percent in the control group of fish.

An additional static toxicity test was run on paired groups of fingerlings from the two treatment groups, exposing the fish to three levels of IHNV diluted from a stock solution. Test results were quite variable and inconclusive at this point.

Horizontal Transmission of IHNV

On June 21, four groups of 100 fish each were taken from Tank 1, which had not yet broken with IHNV, and placed into floating, screened egg baskets. Two of the baskets were put into Tank 94, which had just begun losing significant numbers to IHNV several days earlier. The other two baskets were placed back into Tank 1 as a control. Both of the baskets in Tank 94 had mortalities after several days. However, the screen in these baskets allowed smaller fish from the tank to enter resulting in the mortality data being invalid. This experiment will be repeated in the future.

Spring Chinook

Treatment with Erythromycin Phosphate

In late summer and early fall 1988, a number of SCS fingerlings in various raceways became bloated and sluggish, prompting suspicions of bacterial kidney disease (BKD). Internal examinations of fish from several raceways revealed presence of lesions and, microscopically, bacteria. This, together with gradually rising daily mortalities (400 to 500, but still less than 0.02 percent), prompted a decision to begin a 21-day treatment of 24 raceways with feed containing 4.5 percent erythromycin. Six randomly selected control raceways were kept on non-medicated feed. A report on the efficacy of the treatment will be prepared after short- and mid-term effects on mortality can be assessed. After two weeks of treatment, daily mortality in the raceways as of September 30, 1988, had trended downward to less than 200 fish. So far, there appears to be no significant differences between daily mortality numbers in the two groups.

Pascho/Elliot BKD Experiment

Purpose of this experiment is to determine whether SCS smolts transported by barge from Lower Granite Dam to the ocean return as adults in proportionately greater numbers than do their non-transported siblings, and whether BKD positive parentage will have any effect on the transportation and return question. This experiment is being conducted in cooperation with Ron Pascho and Diane Elliot of the Seattle National Fisheries Research Center (SNFRC).

During Dworshak's 1988 SCS spawning season, 300 females were sampled and their eggs individually fertilized and incubated in colanders until eye-up. The SNFRC identified 30 egg spawns from high BKD-titre females and 30 spawns from low BKD-titre parents from 300 spawns initially involved. Spawns were randomly paired by twos within a titre group and eggs put down into Heath trays. The 15 high titre pairs are presently incubating in one Heath stack and the 15 low titre pairs in another.

Further random groupings of trays to tanks and raceways have already been assigned. Ultimately, three groups of 40,000 SCS fingerlings will be placed into the B-section of raceways, pit-tagged, and released in spring 1990. If the high titre group of fish undergoes a BKD infection, this would support the present practice of culling eggs from BKD positive parents because of increased likelihood of BKD outbreaks in those fish. It would also give the experiment two physiologically different groups of SCS for evaluation.

Periodic subsamples of fish from the two groups will be taken for BKD analysis by the SNFRC. Daily mortality will be monitored over the course of the experiment, with subsequent analysis being conducted in cooperation with the lab. Final results of this experiment, however, are years off when these SCS return as adults.

Amendment No. 1 (11/22/88)

Bureau of Sport Fisheries and Wildlife
Division of Fish Hatcheries

Station: Dworshak NFH

HATCHERY PRODUCTION SUMMARY

Period covered: Oct. 1, 1987 through Sept. 30, 1988

Density Index: 0.153 | Flow Index: 0.523 | Total Flow:

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		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
SCS 6-Dw-Kk-1	0	0	0	198,950	210	315	121	1.50	0.58	0.31	25.36		
SCS 6-UID(RR)4	0	0	0	1,334,594	34,673	55,872	24,578	1.61	.71	16.90	28.81		
SCS Dw(H)87-88Z	0	0	0	222,737	2,399	5,546	3,718	2.31	1.55	16.91	30.15		
SCS Dw(H)87-88S	1,541.1	45,517	4.05	1,044,233	58,768	87,085	39,479	1.48	.67	19.29	47.76	125.6	0.18
SCS 87-Kk-45	363.6	11,282	4.42		4,292	8,912	3,646	2.02	.85	11.63	45.62	34.67	0.31
STT Dw(H)-8701	0	0	0	684,111	96,107	151,037	38,028	1.57	.40	61.25	18.48		
STT Dw(H)-8702	0	0	0	829,349	109,666	187,180	48,651	1.71	.44	59.18	21.84		
STT Dw(H)-8802	524.4	13,935	4.18	0	9,770	15,068	16,163	1.54	.63	13.24	24.7	34.8	0.69
STT Dw(H)-8703	0	0	0	1,186,158	202,539	309,997	79,384	1.53	.39	72.30	19.58		
TOTALS													
AVERAGES													

Form 3-229 (Sept. 1971) *Amended

Bureau of Sport Fisheries and Wildlife
Division of Fish Hatcheries

HATCHERY PRODUCTION SUMMARY

Station: Dworshak NFH

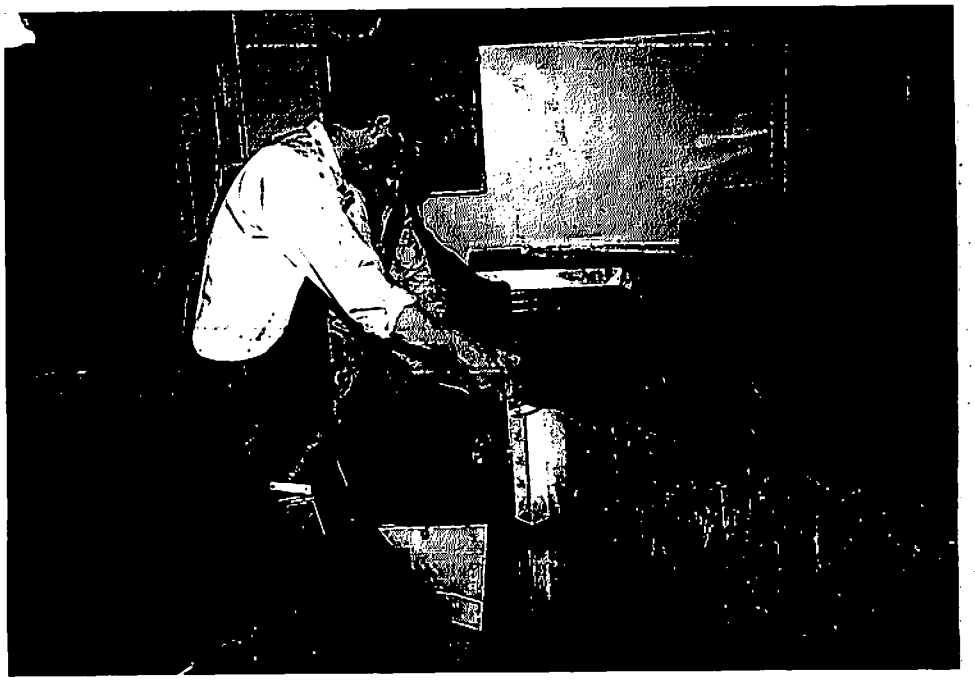
Period covered: Oct. 1, 1987 through Sept. 30, 1988

Density Index | Flow Index | Total Flow

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		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 Dw(H)8803	1,056.6	18,926	3.59	0	16,439	31,871	13,849	1.94	.84	14.71	19.74	50.25	0.48
TOTALS	3,485.7	90,660		5,500,132	534,863	852,883	257,617						
AVERAGES			3.97					1.59	.48	28.68	28.20	61.33	0.415

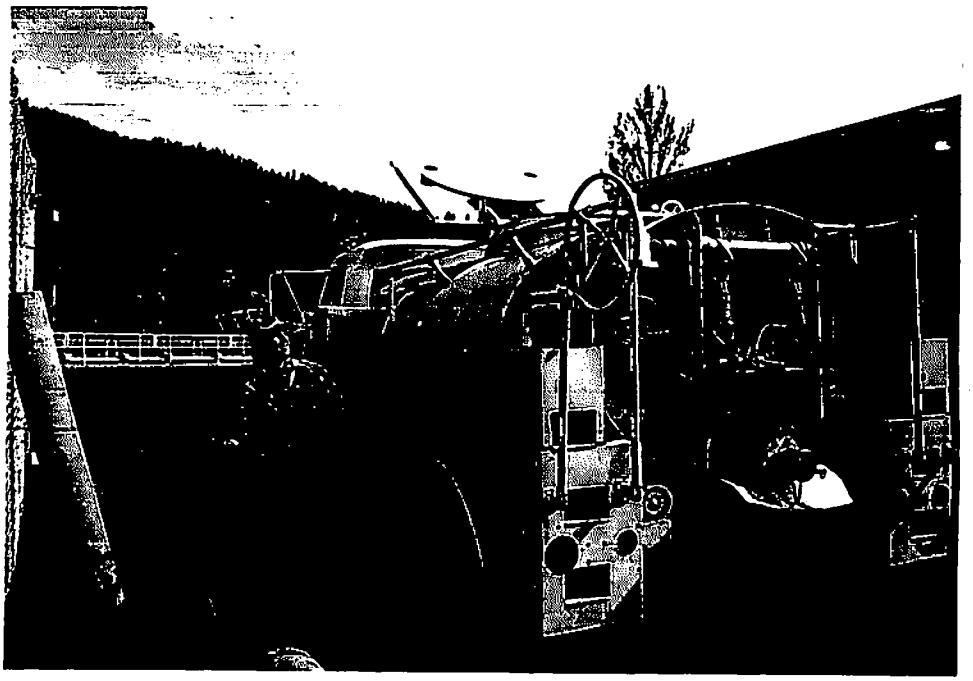
Form 3-229
(Sept. 1971)

*Amended



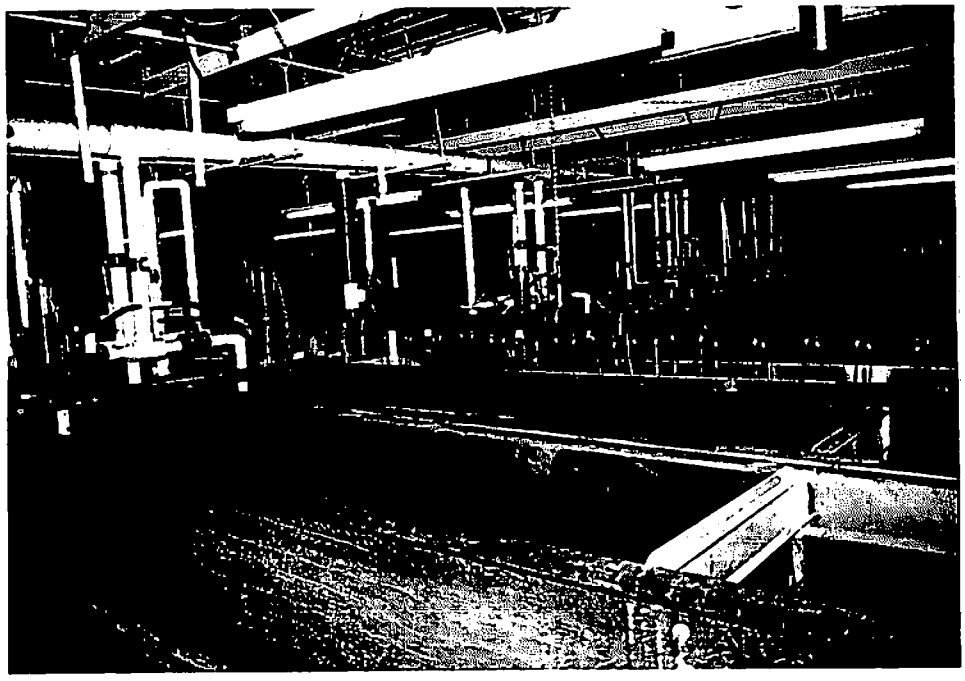
Steelhead broodstock sorting and checking for spawning ripeness.

Adult steelhead male oddity at spawning time.

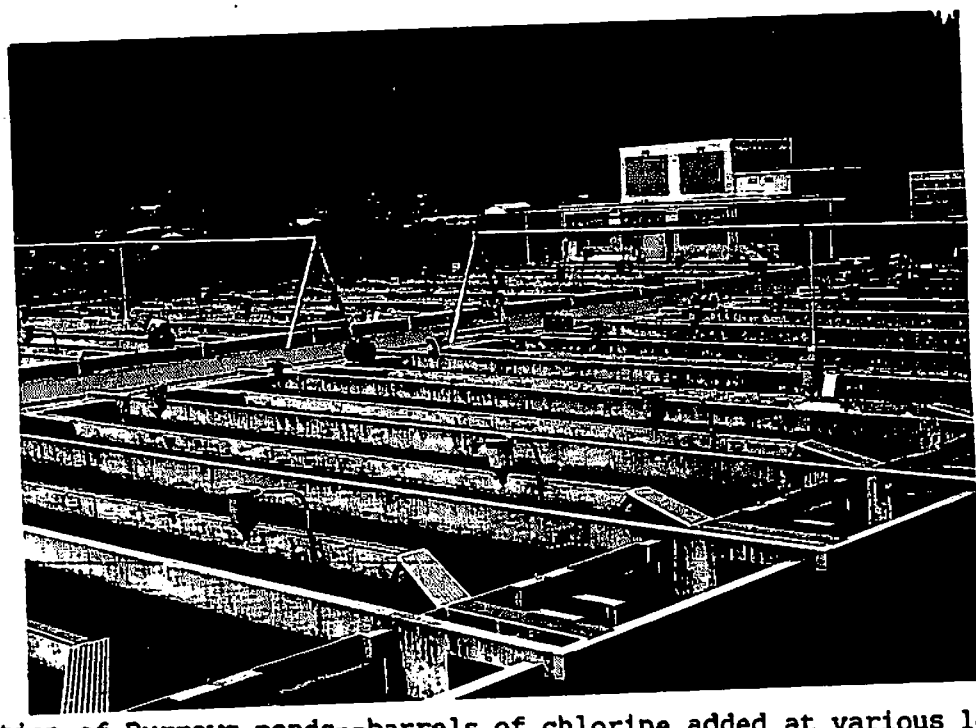


Loading of excess adult steelhead broodstock for off-site planting.

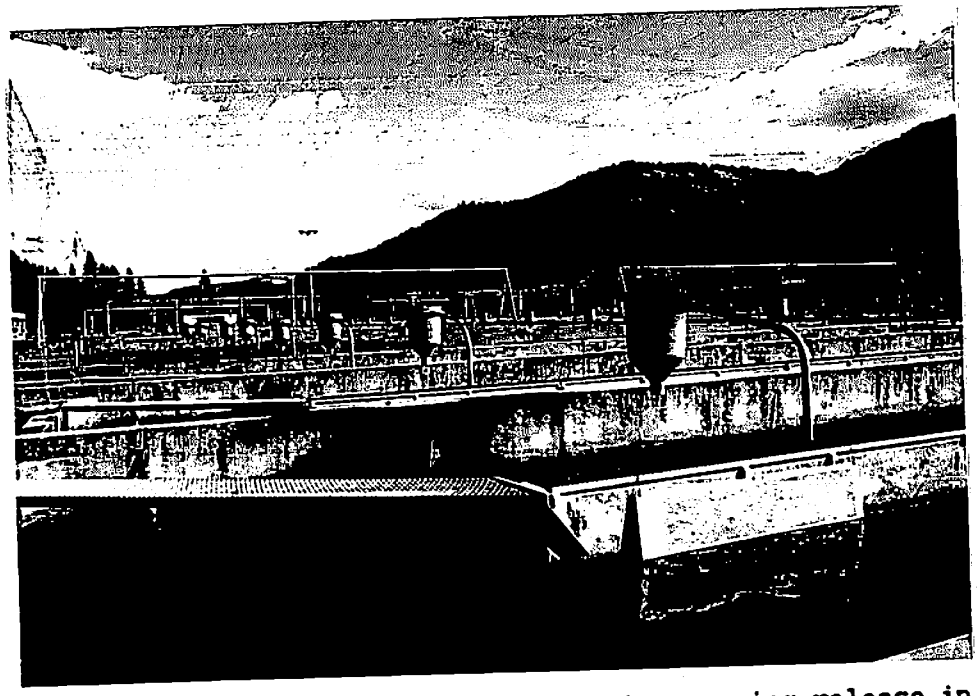
Steelhead spawning operation.



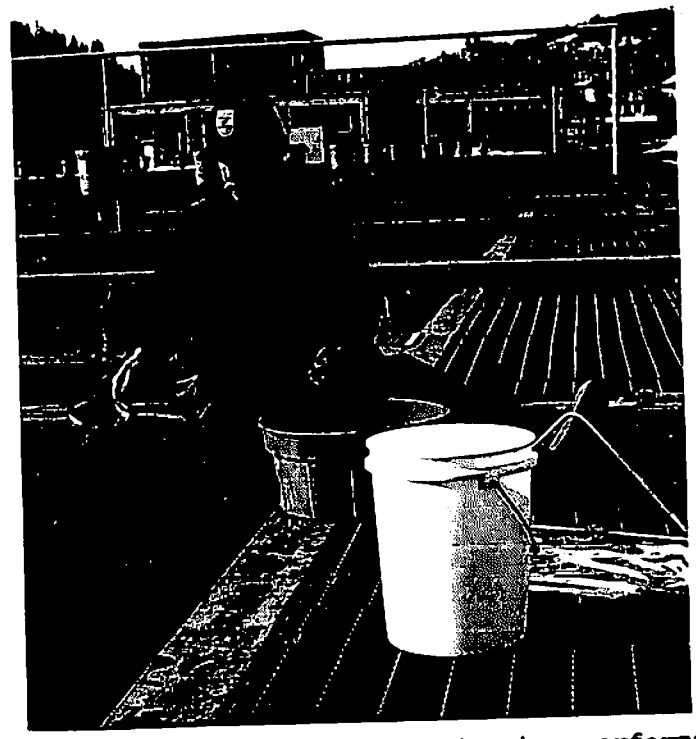
Nursery tanks holding eyed steelhead eggs in jar incubation.



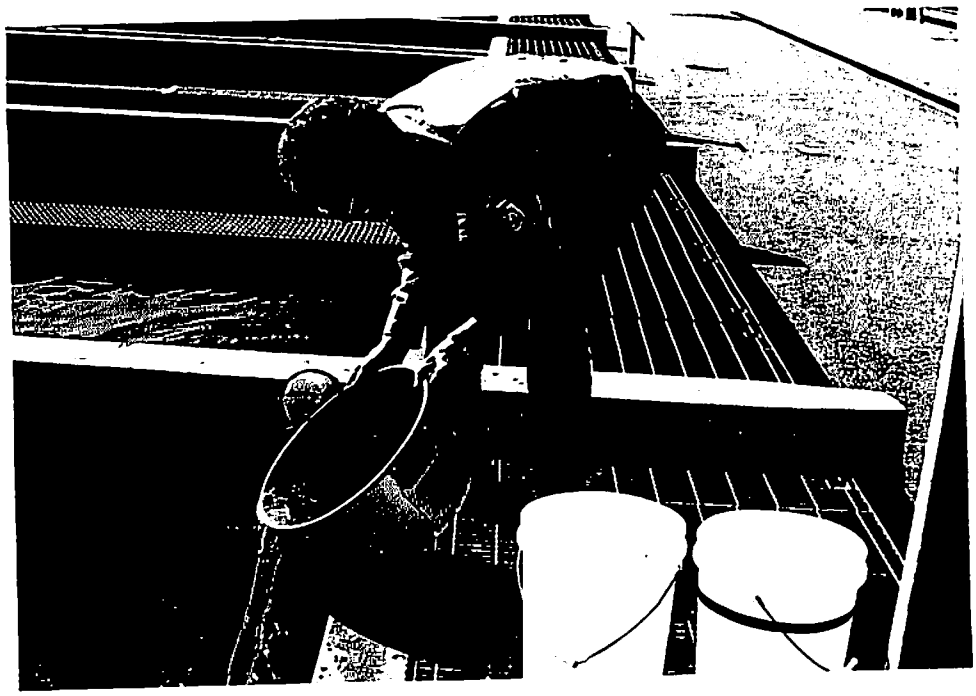
Disinfection of Burrows ponds--barrels of chlorine added at various locations.



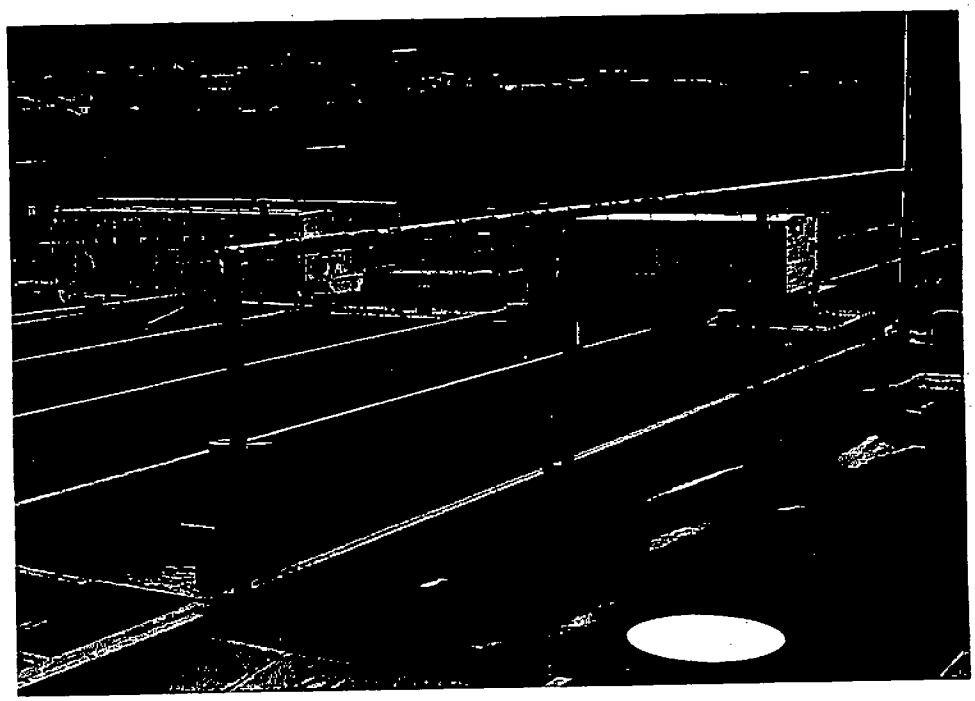
Demand feeders operating on steelhead production nearing release in April.



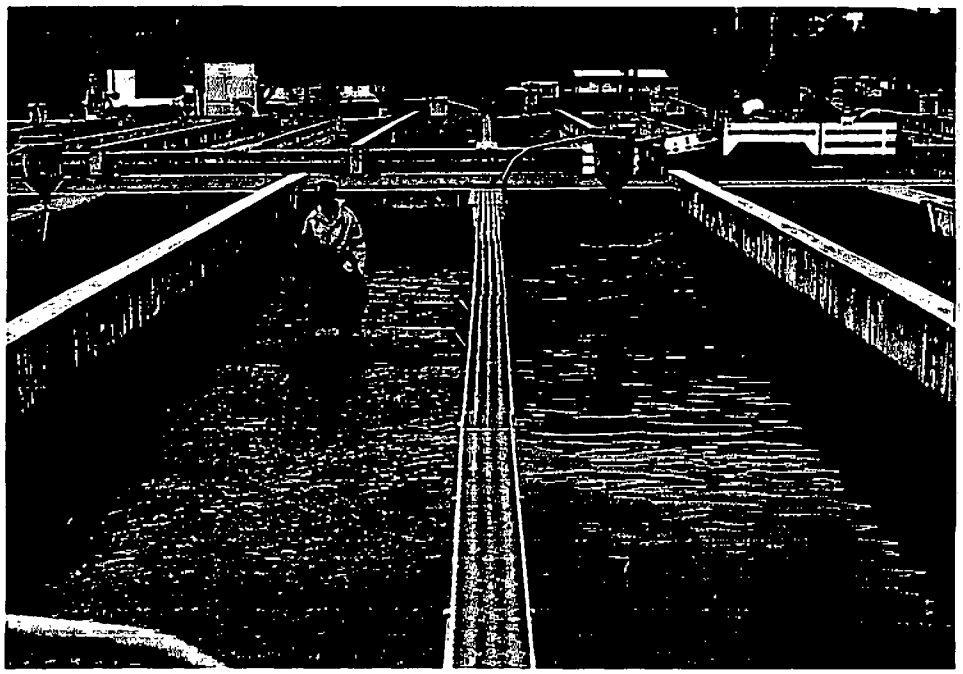
Sample counting steelhead for production performance.



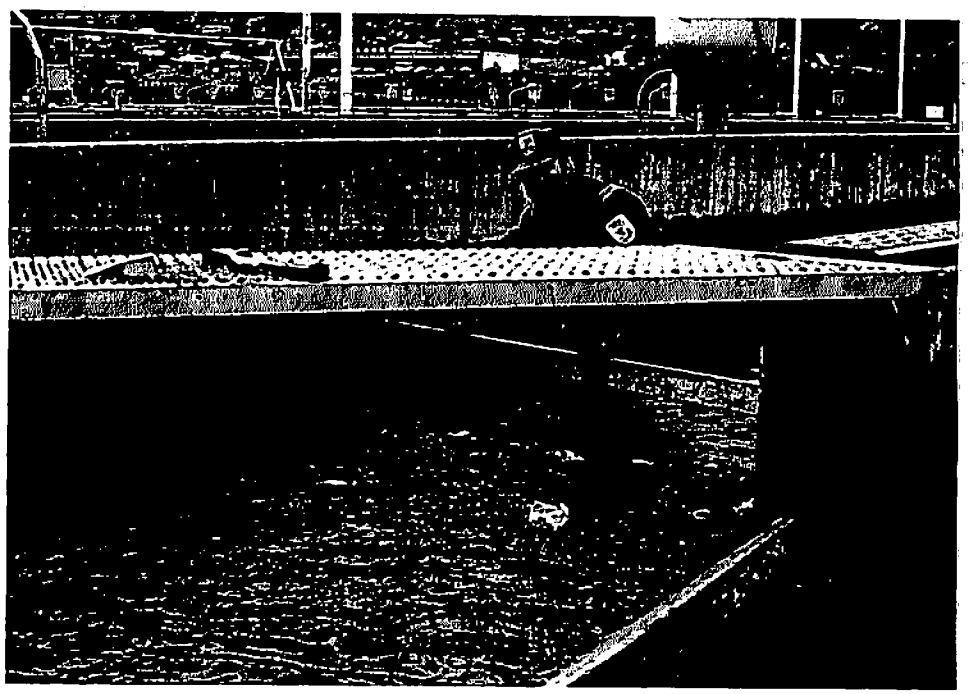
Fishery biologist, Dick Mueller, sample counting steelhead smolts prior to release in April.



Adipose fin clipping trailers operated by IDFG.

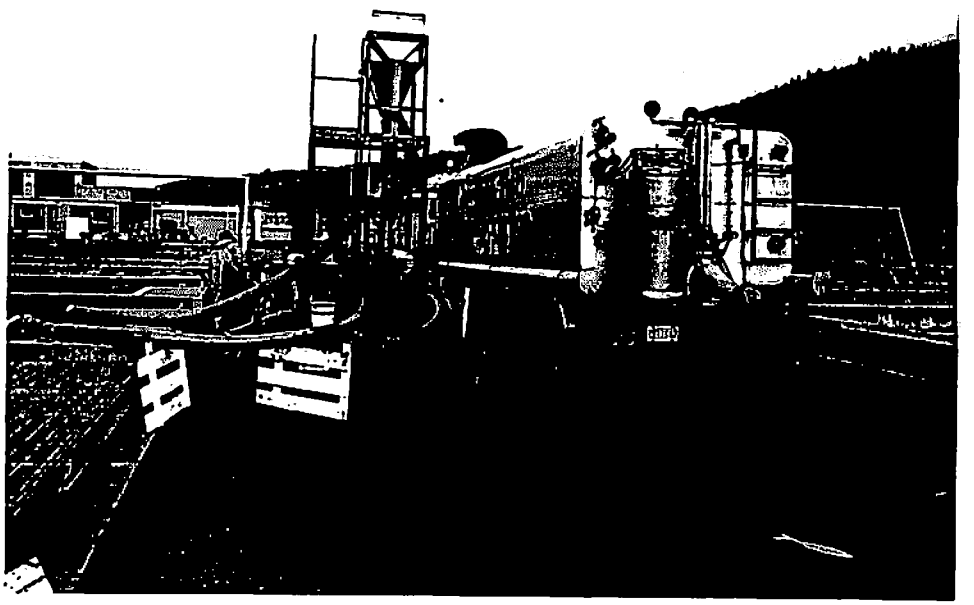


Crowding of steelhead smolts for a direct release from the hatchery.

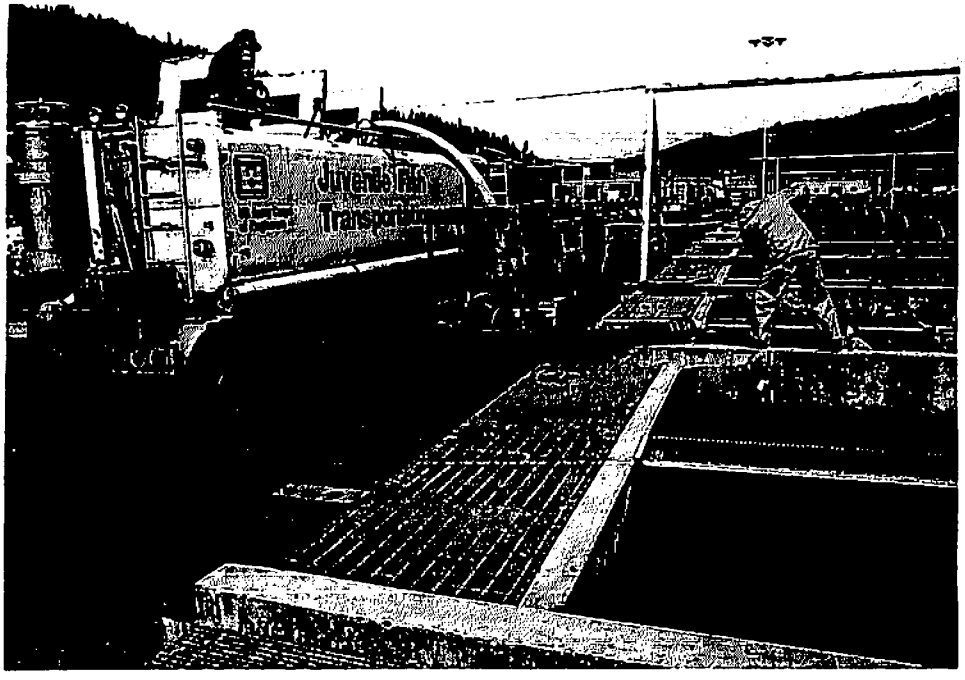


Fishery biologist, Kip Bottomley, crowding steelhead smolts for release.

A channel of steelhead smolts being directed from ponds to release at the main Clearwater side of the hatchery.

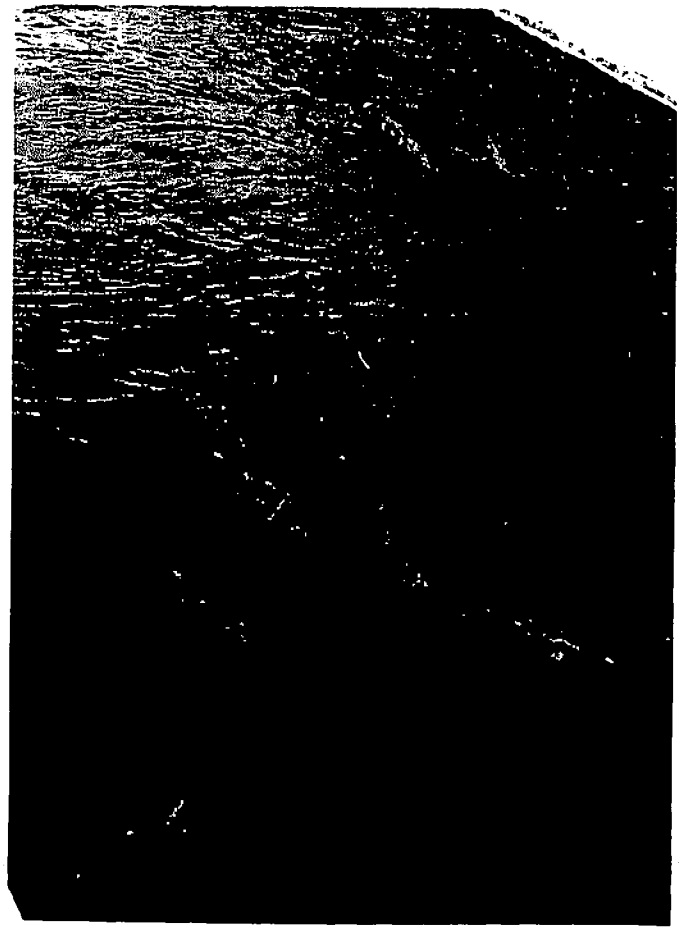


Loading steelhead smolts for transfer upriver into the South Fork of Clearwater River.

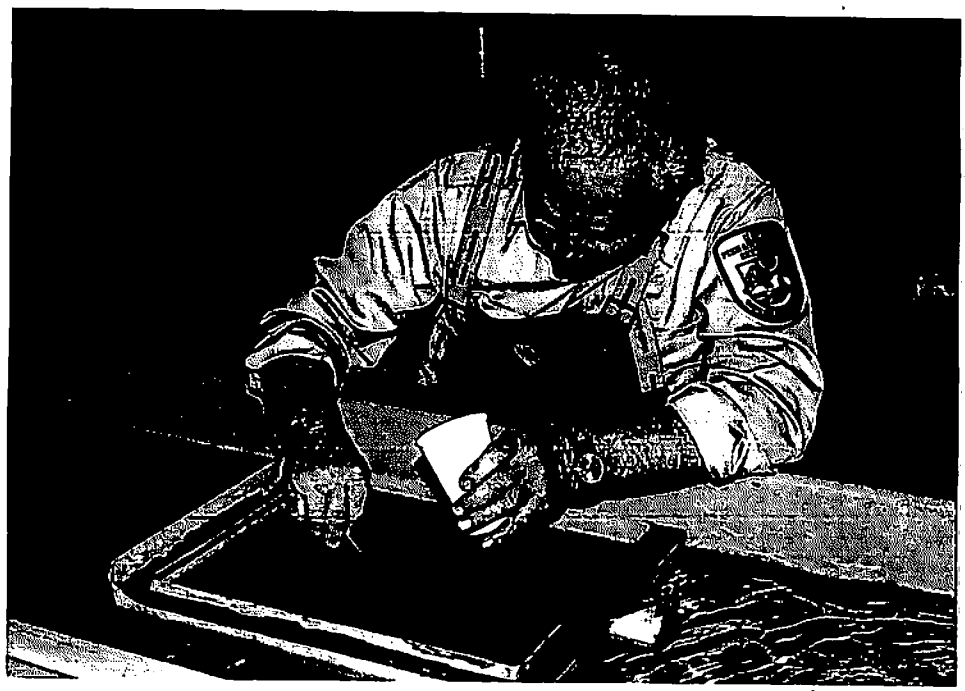


Corps of Engineers transport trucks assisting in transfer of steelhead smolts to off-site planting locations.

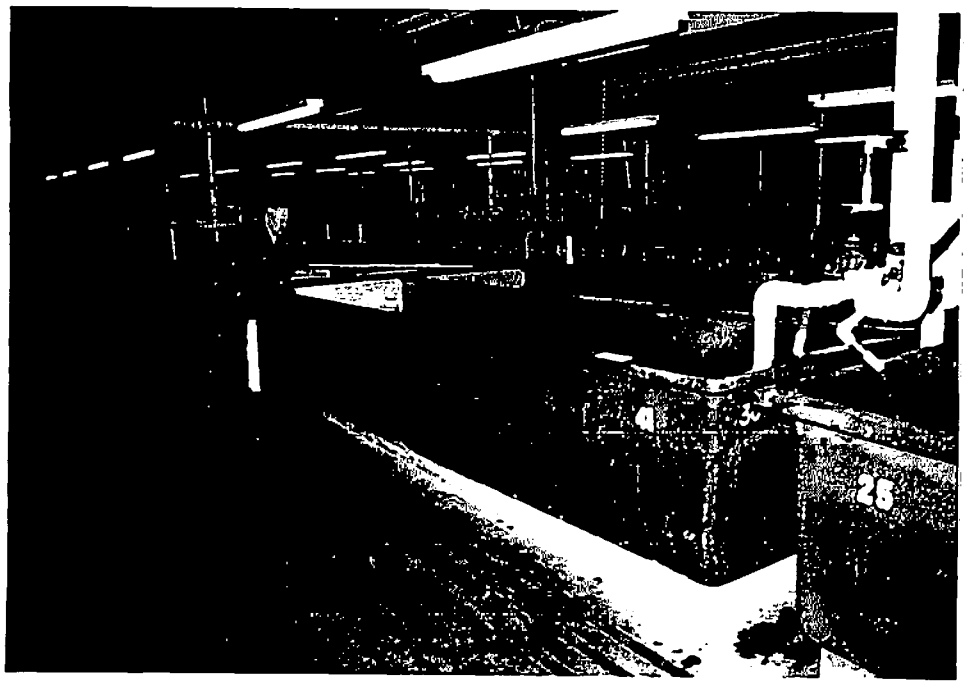
Station production crew - January 1988 - Back row left to right: Kip Bottomley, Ron Oatman, Tom Taggart, Doug Lawson, Greg Pratschner, and Dick Mueller; bottom row left to right: Richard Parks, John Vargas, Jim Rockowski and Hamilton McCleary.



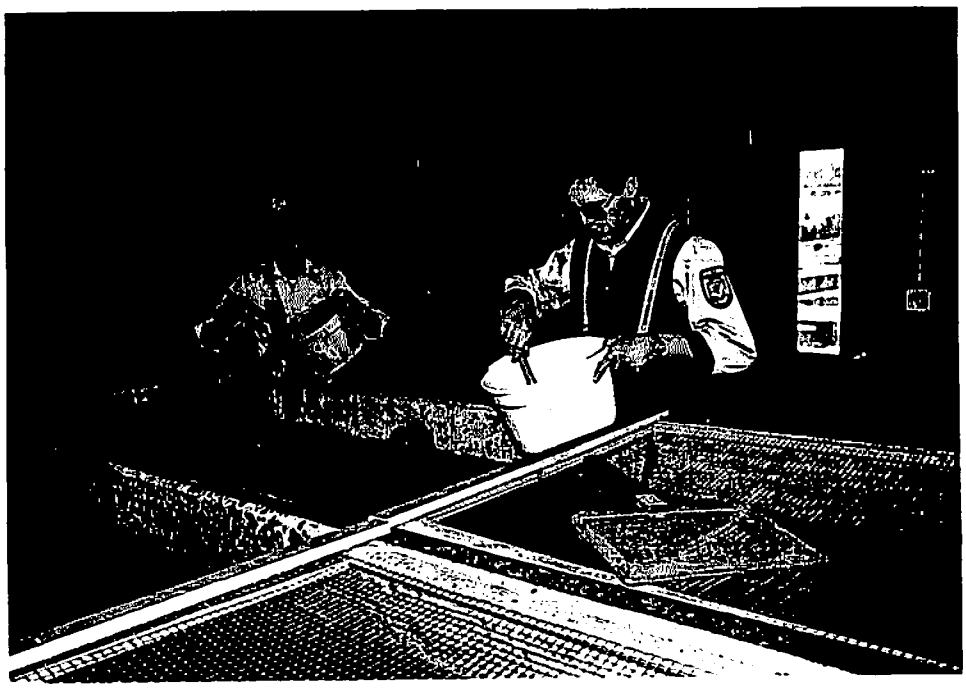
Spring chinook broodstock held in adult holding ponds prior to spawning.



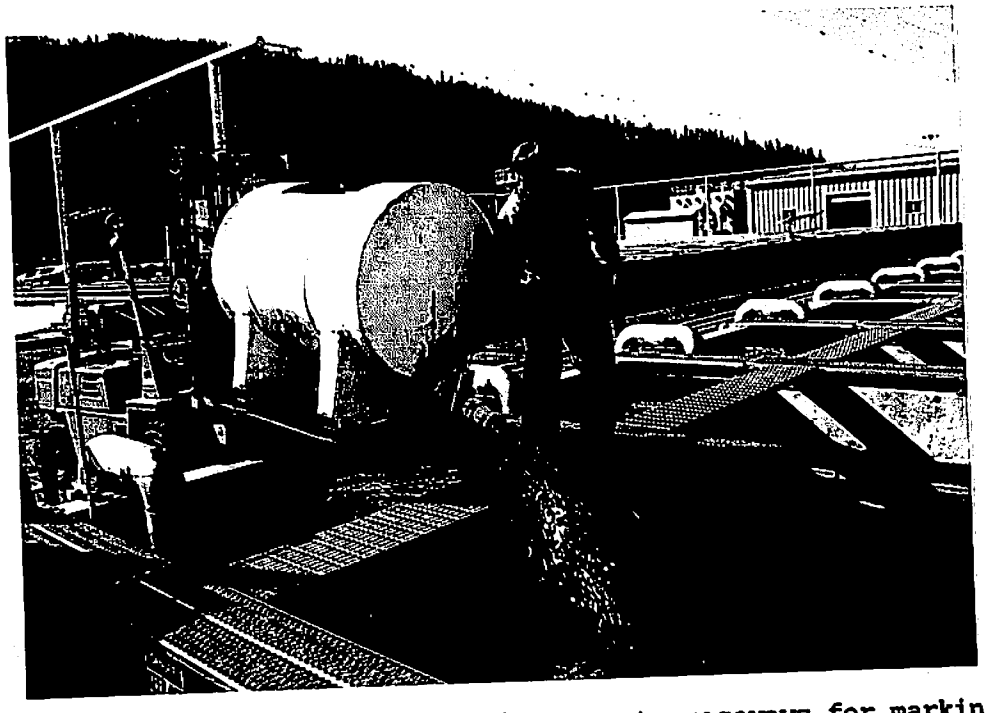
Tom Taggart, Lead Fish Culturist, cleaning spring chinook eggs.



Cleaning nursery tanks holding young spring chinook salmon.

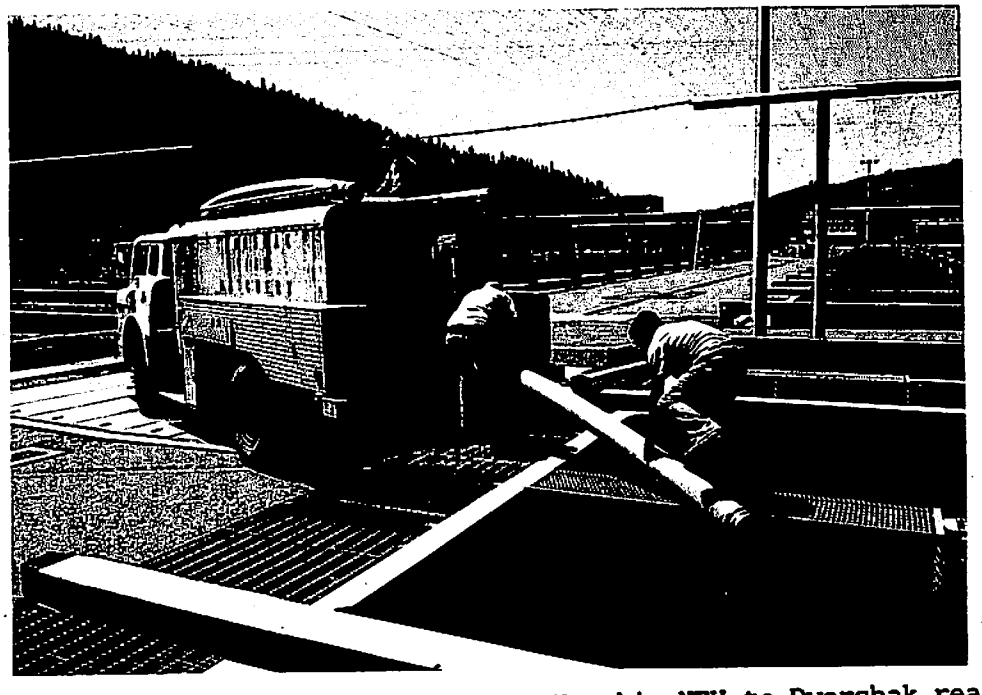


Hamilton McCleary and Richard Mueller sample counting 0-age spring chinook prior to transfer to raceways for marking and release in March 1988.

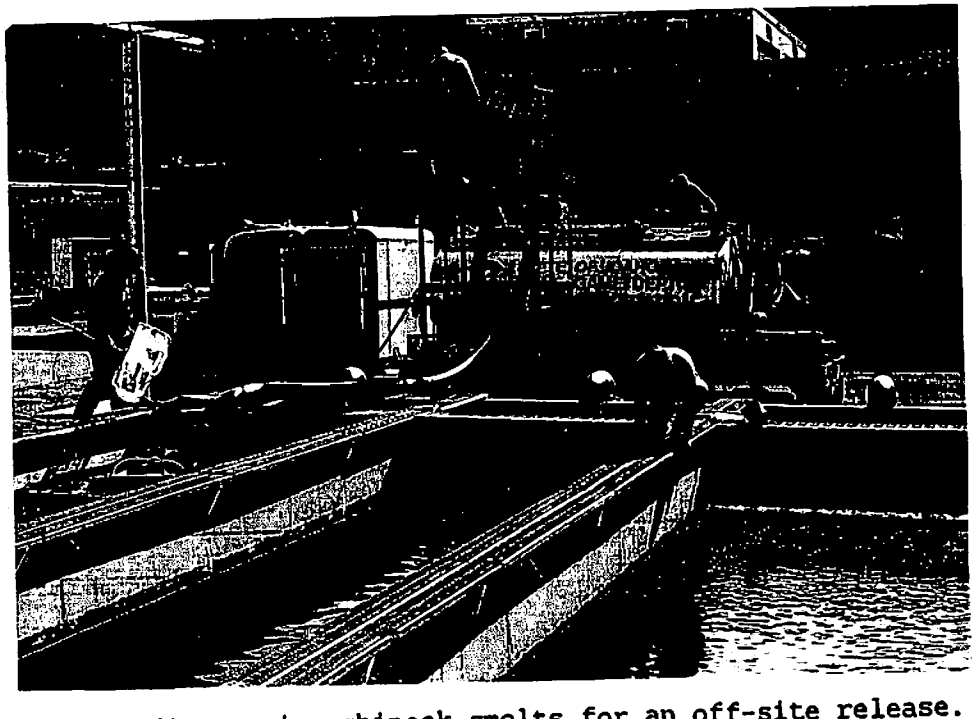


Transferring 0-age spring chinook study group to raceways for marking and later release.

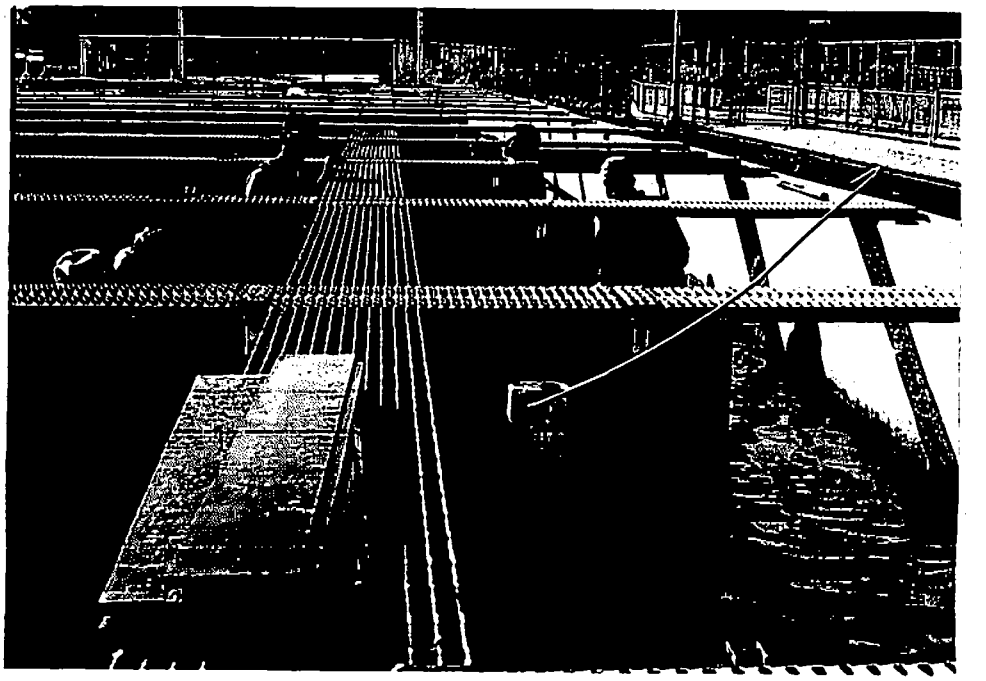
Loading spring chinook salmon fingerlings at Kooskia NFH for transfer and further rearing at Dworshak.



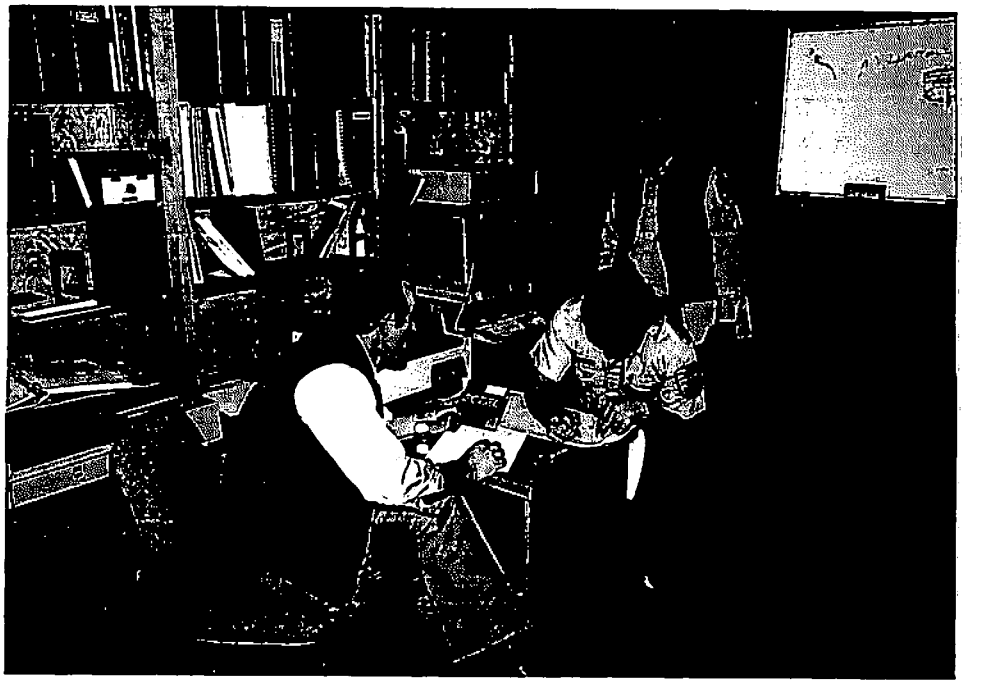
Returning spring chinook fingerlings from Kooskia NFH to Dworshak rearing ponds.



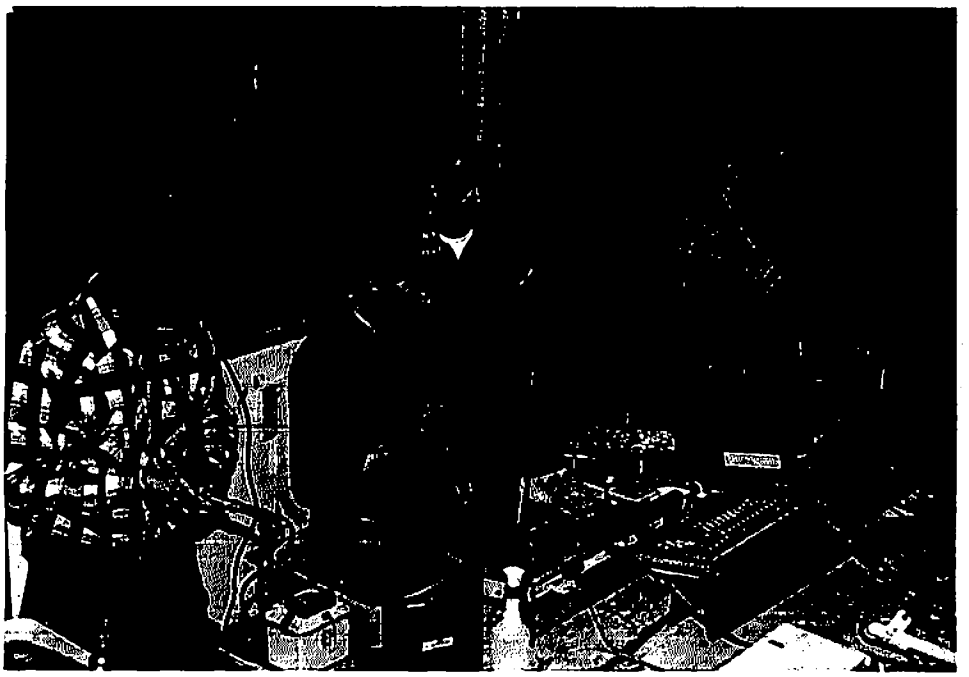
IDFG loading spring chinook smolts for an off-site release.



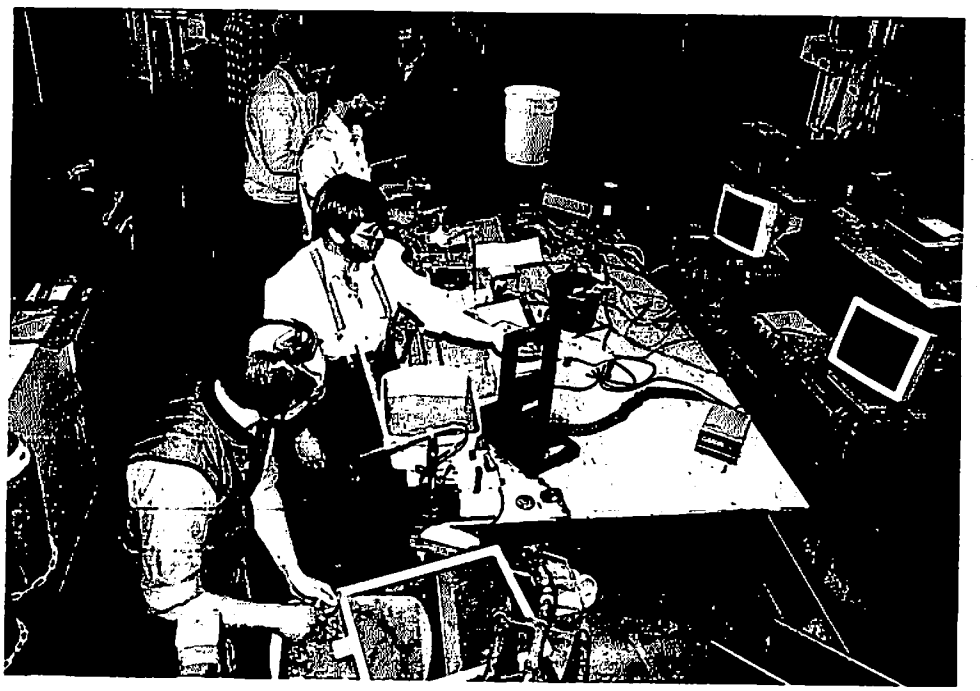
Releasing spring chinook smolts direct from hatchery site.



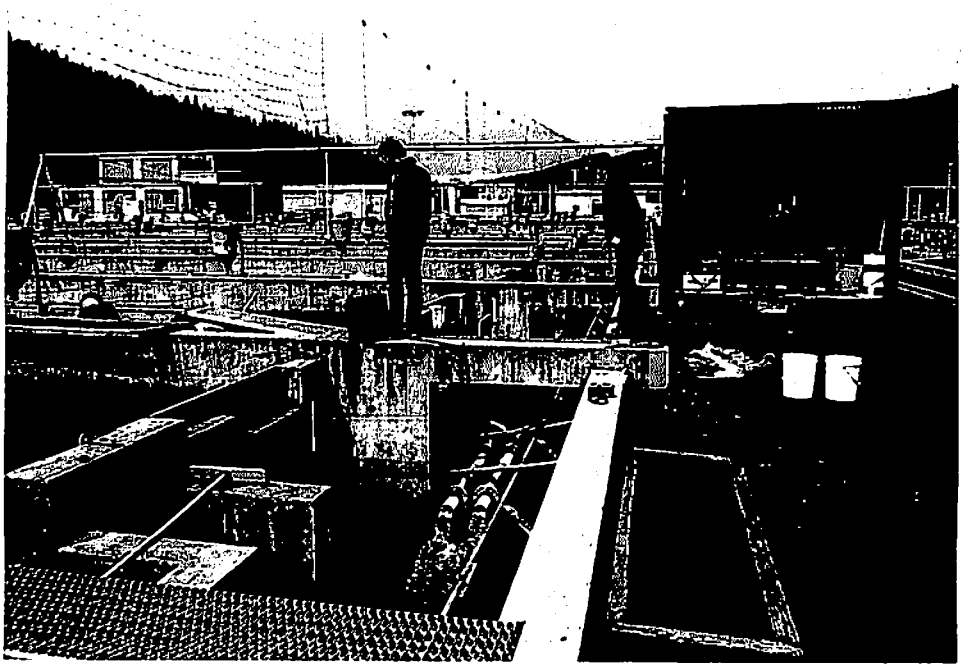
Production/lab computer room for data collection and storage.



Pit tagging of spring chinook fingerling by National Marine Fishery Services.



NMFS at station to "pit tag" steelhead smolts for study purposes.



Monitoring release of pit tagged steelhead smolts by NMFS.

REPAIRS/IMPROVEMENTS/NEW EQUIPMENT

Several major contracts, carried over from FY 1987 funding, were completed in FY 1988. A new electric fired boiler, replacing an oil-fired unit, was delivered at a cost of $36,880; installation scheduled in FY 1989. Paving of an area surrounding the new equipment storage building was completed in October 1987 at a cost of $18,300. New window shade replacements were installed in the office at $2300. Electric gate operators at $5000 were received and in operation on two valve closures. Metal "Koch" rings at $4500 replaced plastic media in main aeration degassers.

Major work projects funded in FY 1988 at a cost of $88,785 and completed during the year included the following:

-Metal building used for electrician's work area and storage had potential for added storage space.
  --constructed wood loft with stairway similar to existing structure to allow more efficient use of inside area - $2300.

-Warehouse west, a wood sided structure with composition roofing and overhead doors of poor quality required exterior maintenance repairs to prevent further deterioration.
  --metal siding and roofing and new overhead garage doors added at a cost of $7735.

-Electric boiler, purchased in FY 1987 at a cost of $36,880 replaces oil-fired boiler in Mechanical Building I.
  --oil boiler removed at $1950, electrical disconnect and associated hardware purchased at $24,100 for installation of new heating unit in FY 1989.

-Electrical supply furnishing the facility is inadequate for emergency carryover.
  --continued meetings with Clearwater Power Company and Corps of Engineers to correct problems and share funding costs between benefactors for added service.
  --alternate electric supply completed in July 1988 - cost $23,100 from hatchery O&M funds retained by COE to complete.
  NOTE: This need for an alternate source was clearly shown on June 6 when a power failure resulted in the hatchery having to operate two days or emergency standby generation (no other backup available). Cost to the project was $4400 including 64 hours of overtime pay for employees and diesel fuel expenses to operate the generators. The new connection provides electrical power from the Orofino substation assuring the hatchery of an alternate supply when the Ahsahka "sub" is out-of-service.

-Age of equipment dictates scheduled servicing and/or replacement to assure continued operation.
  --valves, pumps, motors and controls replaced and updated as required, cost $8100.

-Lighting fixtures in residences were antiquated and in need of replacement.
  --changed out lighting in four residences at $1200.

-Need for improved cooling system in laboratory after added expansion.
  --contract issued in September 1988 for added cooling units at $4000.

-Retaining wall with approximately 350 feet chain-link fencing installed along perimeter of hatchery in vicinity of fish ladder in FY 1987.
  --continued additional fencing and retaining wall, 200 feet, for enclosure of area--improving security, enhancing aesthetics of hatchery and providing Indian fishing access along North Fork River - cost $4500.

-Inside mechanical buildings require general clean-up and painting to enhance appearance and improve safety.
  --main pump building completed along with several smaller areas; additional work to follow with Mechanical I and II in succeeding years.

-Purchase of new piping and valves, cost $2300, was completed and installed for use in applying ozone treatment to the nursery reuse system in vicinity of System I clarifiers.

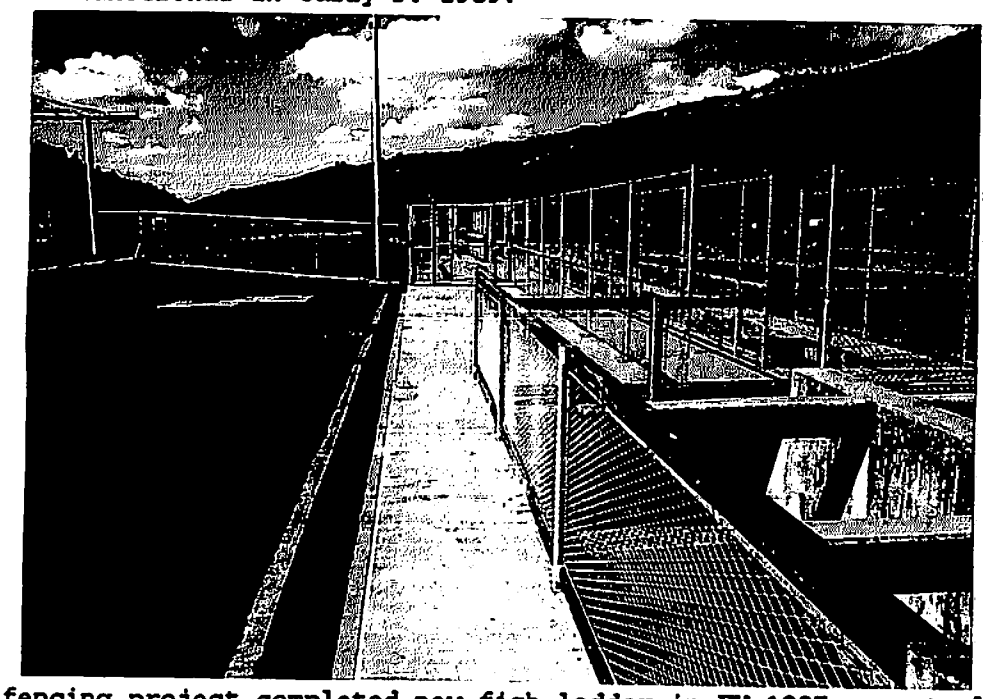
A special project requiring many hours of station labor to complete, involved the addition of a new 13' x 25' work area in the laboratory building. Remodeling of an existing wet lab area into a more usable space included installation of a dropped ceiling, wall paneling and finish, floor covering, new lighting and door entries. Cost to the Fish Health Center for materials was $5000. In addition, laboratory furnishings (cabinets, counter tops, etc.), purchased with FY 1987 funding, were installed for occupancy in March 1988.

On July 5, Dworshak received a serious blow when main pumps No. 4 and No. 5 had to be taken off line. The traveling screen, protecting the two pumps, became misaligned on track causing major damage and shut down of the screen. Several meetings were held with the COE, both at District and field level, to assess the damages and to initiate correction. The hatchery was given responsibility of dewatering the area to allow for the repairs. The COE, issued contracts totaling $36,000. Dewatering of the screen area met several major snags due to a heavy silt deposit preventing the stop logs from sealing. Over 60 hours were given by divers from Clearwater County Search and Rescue and a diver furnished by Dworshak FAO to free the area of debris and silt.

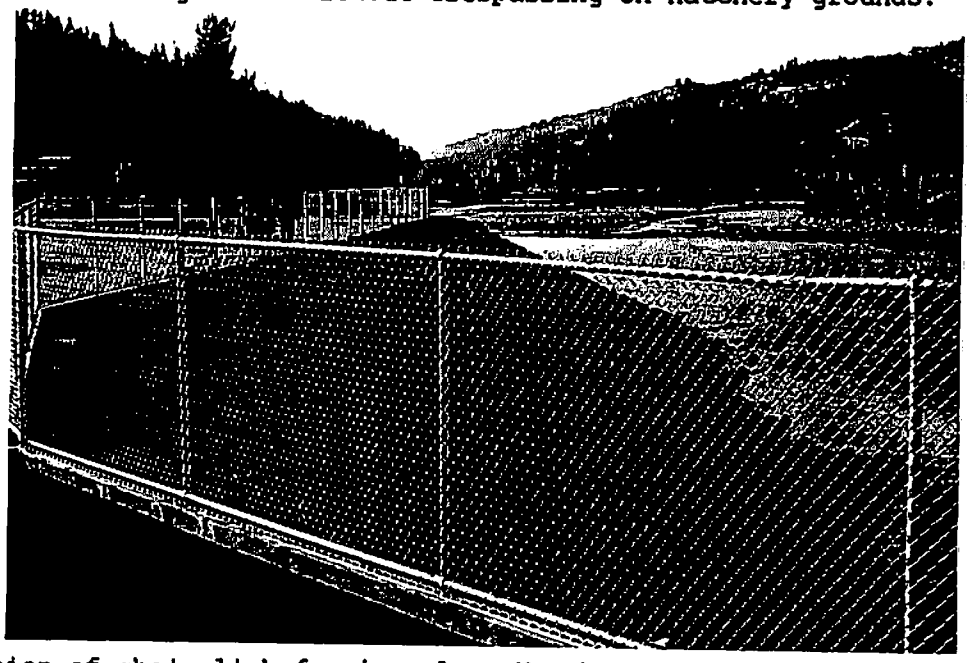
A meeting with COE personnel Bert Leonard, District Chief of Operations Division; Mike Taylor, Chief of Office Operations, Walla Walla; and Rodger Colgan, Dworshak Dam Project Engineer, was held at Dworshak on July 14. This meeting was of special interest to the hatchery as a letter shortly followed from the District office offering us technical support via Dworshak Dam. This support will assess maintenance needs and ease funding for major rehab projects. Work on Dworshak's traveling water screen was completed to allow operation of main pumps No. 4 and 5 to begin on September 6.

A major list of maintenance rehab and construction requirements for Dworshak was prepared in September and submitted to the District COE office in Walla Walla. A review of the listing, prioritizing and scheduling the work will be forthcoming in FY 1989.

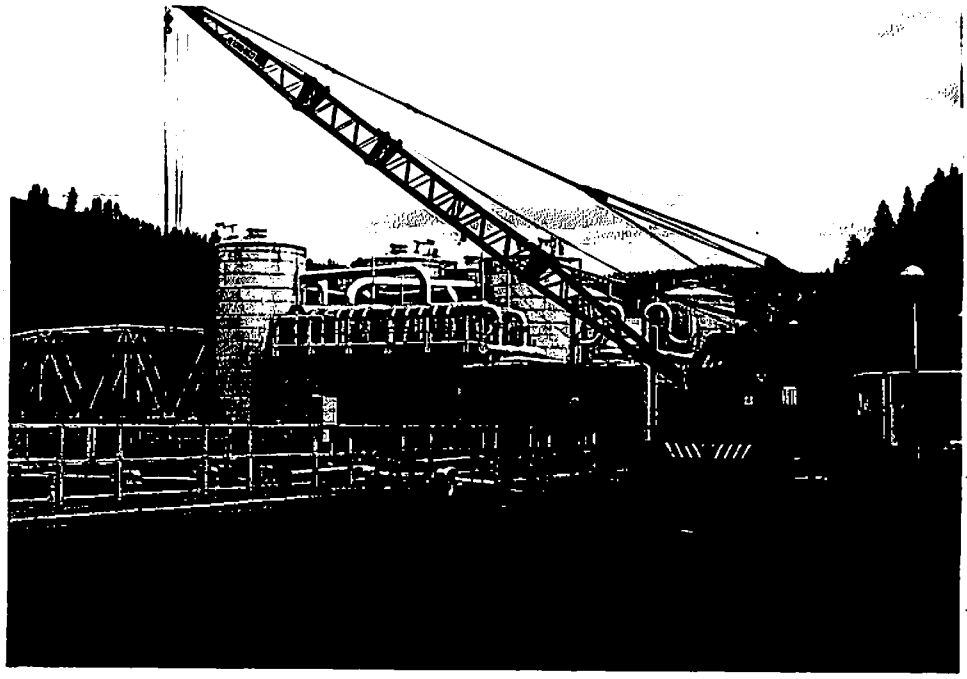
The computerized maintenance management system was nearing completion and should be functional in early FY 1989.



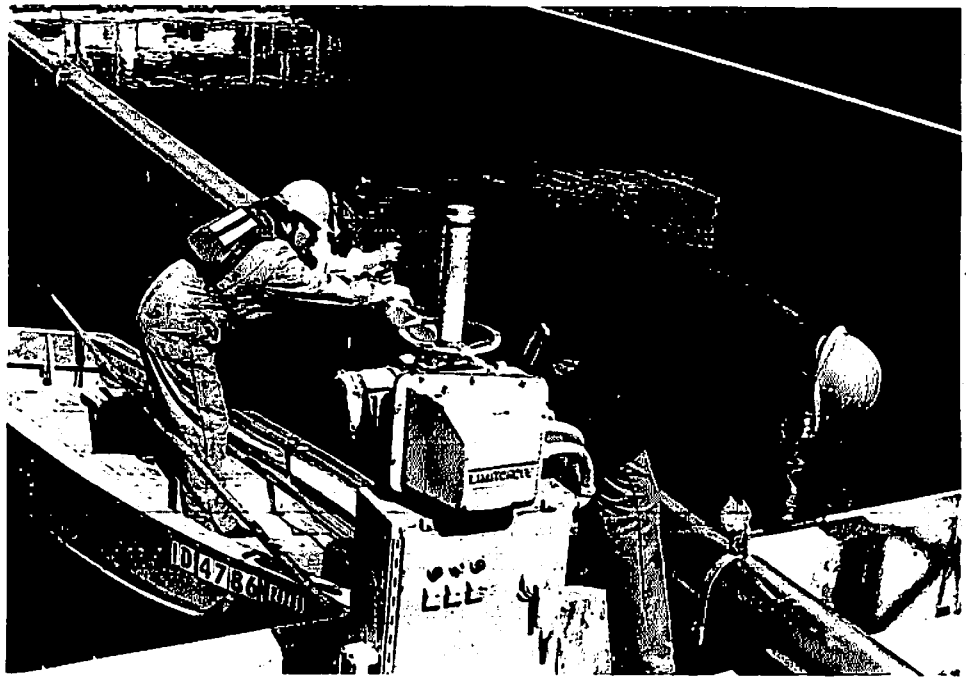
Major fencing project completed new fish ladder in FY 1987 - controls foot traffic to fishing sites without trespassing on hatchery grounds.



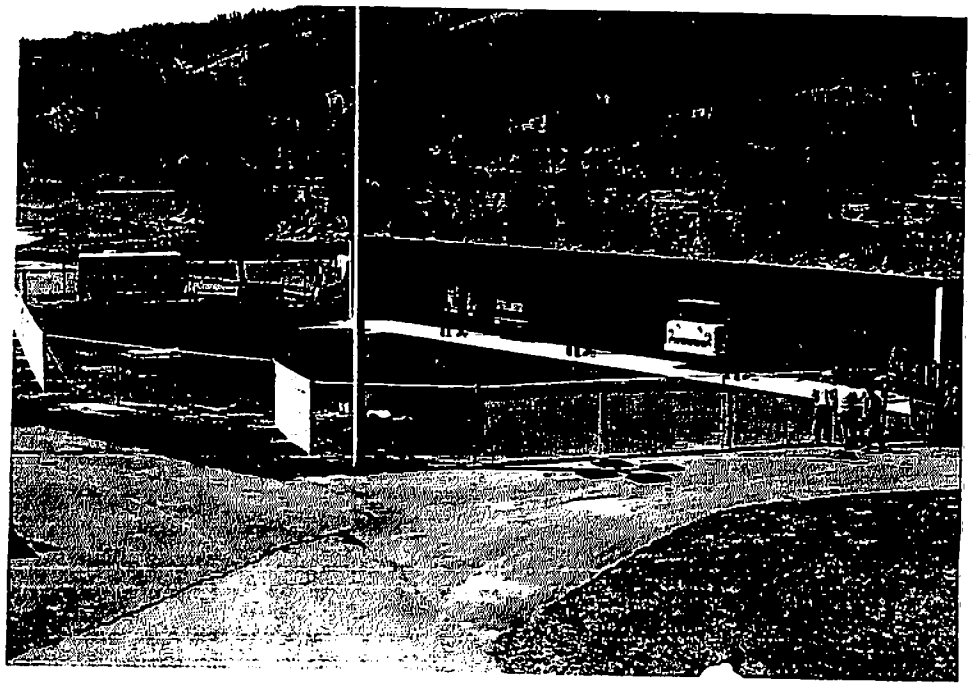
Completion of chain link fencing along North Fork perimeter of station grounds.



Crane from COE Dworshak Project assisting station personnel in installation of a pipeline for ozone testing the hatchery's nursery reuse system.

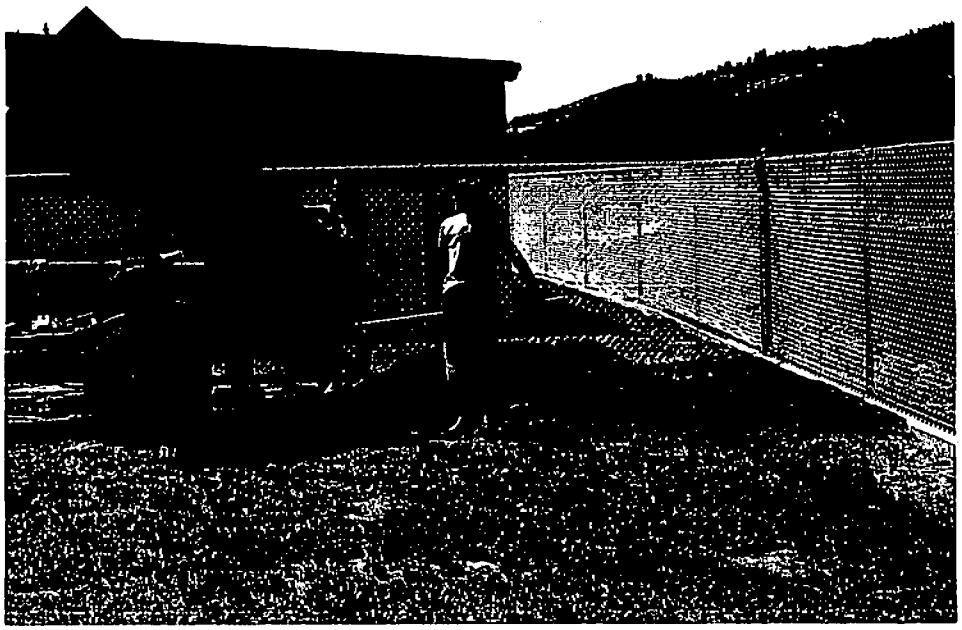


Installing O_3 line to service nursery reuse for testing ozone in a recycle flow on early steelhead rearing.



Fencing enclosure near new equipment storage area.

YCC enrollees assisting in a fencing project at site of new equipment storage area.

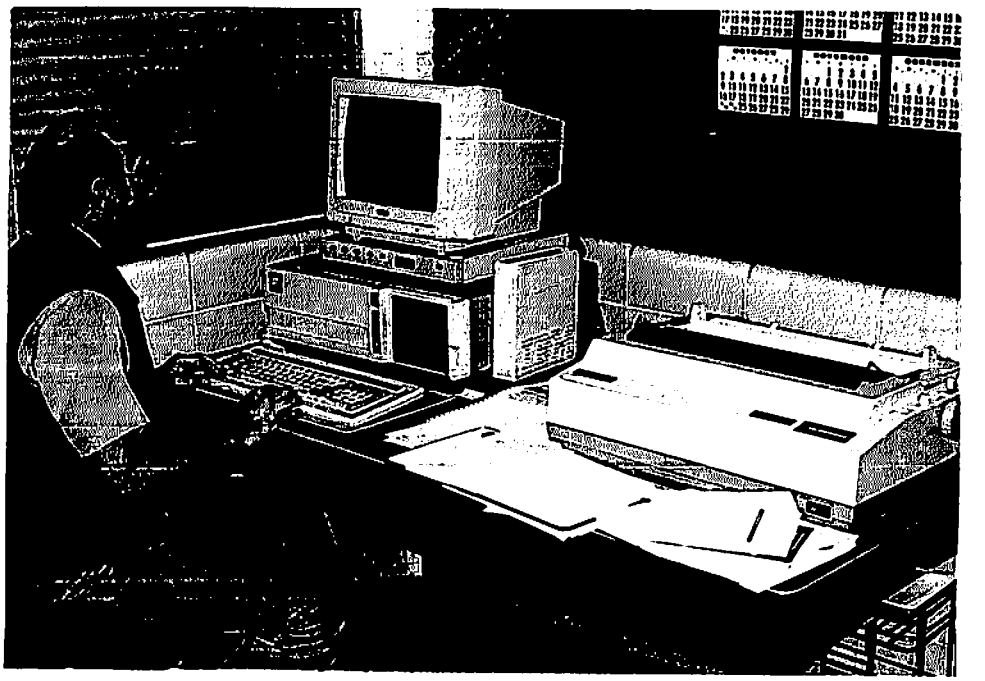


YCC enrollees assisting in backfill of new fence area.

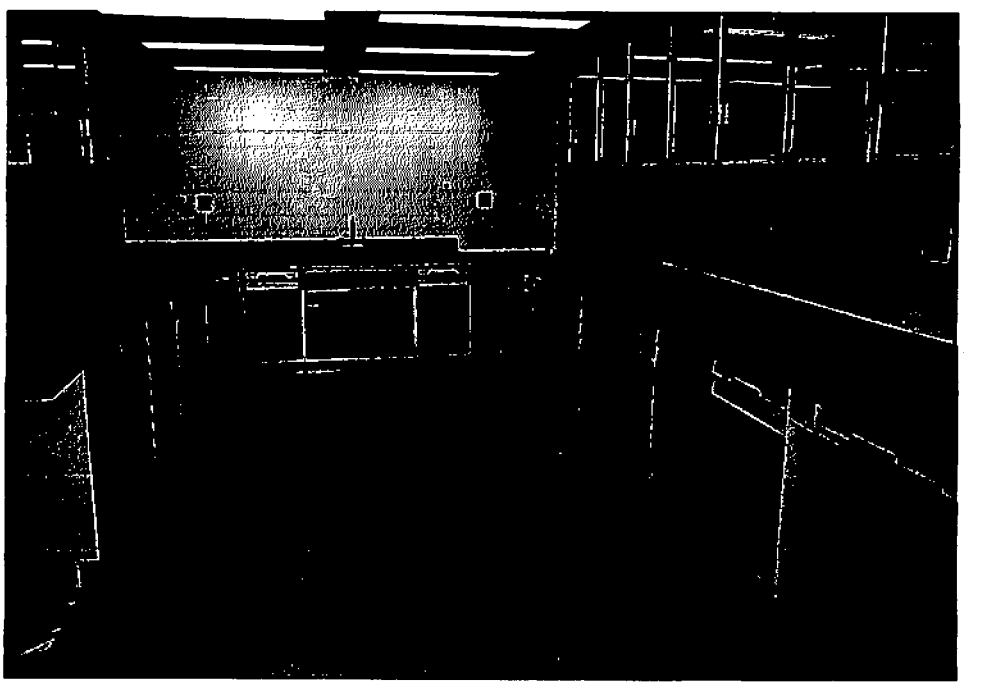
Clearwater County Search and Rescue divers assisting hatchery in traveling screen repairs - lowering diver by basket at river intake structure.

New equipment storage building.

West storage building with new metal roofing and siding.



Dave Owsley, engineer, entering data into the new computerized maintenance management system.



New laboratory facilities completed by station labor and equipped with new furnishings.

MEETINGS/TRAVEL/TRAINING

Manager Olson, Dave Owsley, and Dave Clifford met with Corps of Engineers officials and representatives of Clearwater Power, in Walla Walla on November 23 to review plans for an emergency power supply at Dworshak.

Station personnel Wayne Olson, Dave Owsley, Richard Bottomley, Greg Pratschner and Bruce McLeod traveled to Tacoma, Washington on November 30 to attend the Northwest Fish Culture Conference December 1-3.

Greg Pratschner traveled to Leavenworth NFH COmplex on December 14 returning on December 18. Site visits were made to Leavenworth, Entiat and Winthrop hatcheries.

Dave Owsley traveled to Portland on January 13 to attend a steering committee meeting in anticipation of the Fisheries Bioengineering Symposium in October.

Wayne Olson and Dave Owsley traveled to Walla Walla on February 9 to meet with the Corps of Engineers. Dworshak's FY 1990 preliminary budget request was reviewed, a follow-up on an emergency electrical backup system was made along with a review of Dworshak's fish distribution unit purchase.

Bruce McLeod, Olson and Owsley traveled to Boise and Hagerman February 17-19. Site visits were made to several hatcheries in the vicinity of Hagerman. Rangen feed company, in Buhl, was visited for a discussion on fish feeds. A meeting with IDFG, in Boise, on February 19 was held for the purpose of reviewing specifications on purchase of a new fish truck.

A meeting on Saturday, March 26 at the IDFG office in Lewiston, was attended by Manager Wayne Olson together with representatives from FWS, IDFG, CRITFC and Nez Perce Tribe to review steelhead run forecast data and broodstock needs of the hatchery.

Manager Olson attended meetings of the Steelhead Impact Committee held at the Clearwater County Courthouse, in Orofino, on January 21 and March 24.

Manager Olson attended a Division Manager meeting (Fisheries) in Portland on April 28 and visited the Regional Office on April 29.

A Public Information Meeting was held in Orofino by Walla Walla Corps of Engineers to review the new water supply routing from Dworshak Dam. This supply will furnish the new Clearwater Hatchery and also be available to Dworshak. The May 18 evening meeting was attended by Manager Olson.

A Regional Fisheries meeting, held in Reno, during the week of June 13, was attended by Wayne Olson, Bruce McLeod, Jon Streufert and Dave Owsley.

Manager Olson attended a fish marking meeting at IDFG headquarters, in Boise, June 8. FWS, NMFS, State, COE and research were represented.

An IHN committee meeting was held at Dworshak on July 7 with members John Miller, Jim Winton, Bill Miller, Joe Lientz and Wayne Olson attending. Jo-Ann Leong, Oregon State University; Sandra Ristow, Washington State University; and Mike Stewart, Lewiston Tribune reporter, were invited guests.

Bill Miller, FAO; Dave Bruhn, Hagerman NFH; and Wayne Olson traveled to Boise on August 24 to meet with IDFG. Purpose of the trip was to brief the State on Dworshak's steelhead production and to explore several options for replacing losses at Dworshak with production from Hagerman NFH. Miller and Olson presented a briefing of their meeting to the Nez Perce Tribal Executive Committee on August 25.

A coordination meeting was attended by Manager Olson at Hagerman NFH on September 1. Of interest was their steelhead program in which Dworshak eggs had been furnished earlier in the year. It appears that some excess fish could be returned this fall to offset Dworshak's high IHN losses. A meeting was later held at Dworshak on September 20 with IDFG and Nez Perce Tribe to discuss the impact that IHN disease losses may have on next year's Clearwater River releases.

Semi-annual coordination meeting held in Dworshak's conference room on March 27.

A number of employees participated in formal training courses:

-"Leadership/Supervisory Skills for Women" - 8-hour session, Pasco, Washington, November 19 - Mary Lou Galloway, and Diane Praest.

-"Powerful Writing Skills" - 8-hours session, Spokane, Washington, November 5 - Jim Rockowski, Doug Lawson and Dick Mueller.

-Supervision and Group Performance" - 40-hour session, Portland, Oregon, January 11-15 - Dave Clifford.

-"Budget Workshop" - 24-hour session, Portland, Oregon, February 2-4 - Mary Lou Galloway.

-"Managing Secretarial Stress" - 8-hour session, Lewiston, Idaho, February 1 - Diane Praest.

-"Pre-retirement Seminar" - 16-hour session, Portland, Oregon, March 29-30 - Clarence Moffett.

-"Introduction to Fish Health" - 40-hour session, Gresham, Oregon, March 21-25 - Kip Bottomley.

-"Dealing With Difficult People" - 8-hour session, Spokane, Washington, March 21 - Wayne Olson, Jim Rockowski and Bruce McLeod.

-"Coldwater Fish Culture" - 80-hour session, Bozeman, Montana - Kip Bottomley.

-"Introduction to Supervision" - 40-hour session, Portland, Oregon, July 18-22 - Jim Rockowski.

-"Leadership and Supervisory Skills for Technical Managers and Supervisors" - 8-hour session, Missoula, Montana, September 12 - Dave Owsley and Wayne Olson.

-Assertiveness Training" - 8-hour session, Lewiston, Idaho, November 5 - Mary Lou Galloway.

-"Time Management" - correspondence course - Richard Mueller and Doug Lawson.

-"Writing Analytical Reports" - correspondence course - Doug Lawson.

-"Programmed English Usage" - correspondence course - Jim Rockowski.

PUBLIC INFORMATION/VISITORS

The hatchery's "Take Pride in America" efforts included the presentation of structured group tours of the facility, news media outreach, interpretive exhibits, added public displays, the providing of guest speakers for evening talks to area campers in cooperation with the U.S. Corps of Engineers, and improvements to the main building visitor areas. Highlights were the continued volunteer program in which two workers provided 64 hours of informational services to visitors viewing steelhead spawning operations.

Ed Lamott, Spring Creek NFH, and Steve Leek, Little White Fish Health Center visited Dworshak on October 21.

Jan Rife, Director Leetown Research Center, West Virginia, visited the station on November 5.

Jim Rockowski and "Kip" Bottomley represented the hatchery at an Orofino High School career night on February 23.

An off-station program was presented by "Kip" Bottomley to 92 third grade students of Orofino Elementary School on March 16.

A number of visiting groups toured the station on Tuesday spawning days. Visitors to both stations showed an increase during March from activities of spawning, steelhead broodstock collection, and nice weather.

A tour of Dworshak facilities was given to four visitors from India on March 11. The visitors represented a Group Study Exchange team through Rotary International.

Numerous contacts were made with the news media (Lewiston Tribune, Clearwater Tribune, Idaho County Press, KOZE and KRLC radio stations) regarding steelhead adult collections and spawning operations.

Pennsylvania Fish Commission employees Dennis Ricker and Sherill Hood visited both stations on April 5 to view spawning operations, bird protective measures, water systems and production activities.

Numerous visitors were at both stations to view spawning operations and to tour facilities in the spring. Formal tours were given to 31 groups including 25 youth exchange students representing a number of foreign countries.

Manager Olson met several times with COE, USFS and Orofino Chamber of Commerce regarding an information display for Highway 12. Preliminary study is underway to complete the signing through a cooperative agreement between all groups.

A number of visitors viewed the large chinook broodstock in ponds from June through August. Of interest, a group of 22 international students from the University of Idaho visited Dworshak June 30.

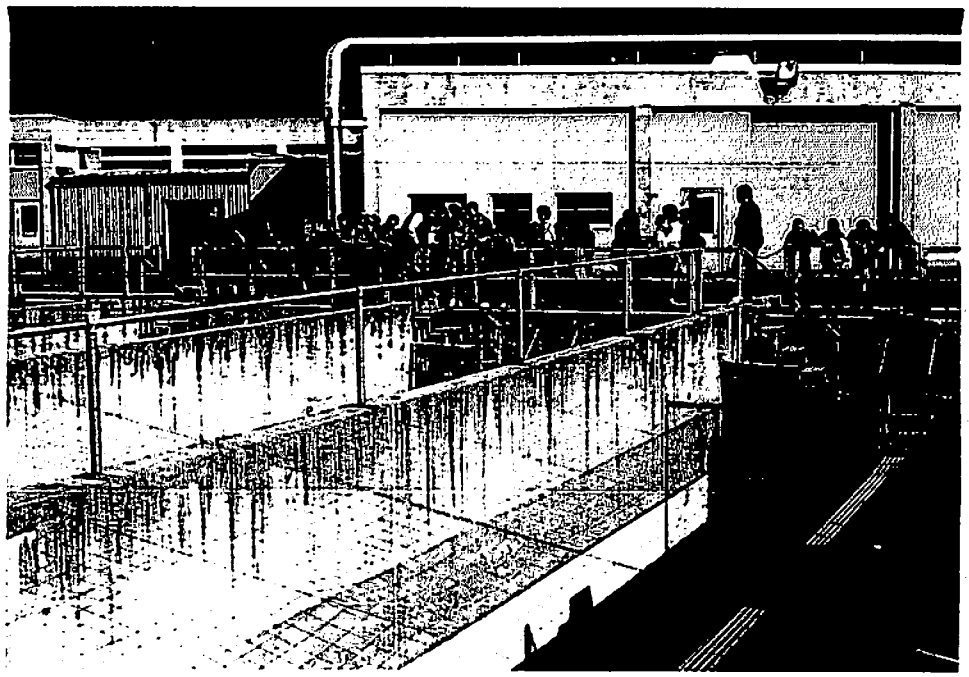
A Corps of Engineers' Management Intern Program of 12 participants visited Dworshak on August 17 for a review of the operation and tour of the facilities.

KLEW-TV of Lewiston, Idaho visited Dworshak on August 30 to film and to report on spring chinook spawning operations.

District Engineer, Lt. Col. Jim Walter of Walla Walla, visited the Dworshak hatchery on September 20 for a briefing on operations and a tour of the facilities.

Number of public visitors to the hatchery during the year was estimated at 30,000.

View of visitor parking area on a steelhead spawning day.



A school group viewing the adult broodstock holding facilities.

STAFFING

A classification review was made of Dworshak's Assistant Manager position resulting in an upgrading from GS-11 to GS-12. Announcement of the upcoming vacancy was made on December 28 with closure on January 19. The Assistant Manager's position was vacated upon Greg Pratschner's transfer to the Leavenworth Complex on January 31 closing on February 22. Few applicants were received despite all out efforts made in recruiting.

Jonathan Streufert, Fishery Biologist (Mgmt) transferred with promotion (GS-482-11) to Assistant Manager from Greers Ferry NFH, Heber Springs Arkansas, effective 4/24/88.

Hamilton R. McCleary, Animal Caretaker, WG-5, transferred with promotion to Leavenworth NFH Complex, Leavenworth, Washington, effective 7/31/88. Mr. McCleary's position remained unfilled at years' end.

Personnel actions resulted in promotions to the following employees:

-Nichols, Dawna M., Clerk-Typist, from GS-0322-2/1 to GS-0322-3/1, effective 1/03/88.

-Galloway, Mary Lou, from Clerk-Typist GS-0322-4/9 to Budget Assistant GS-0561-5/7, effective 2/28/88.

-Praest, Diane E., from Clerk-Typist GS-0322-4/3 to Secretary (Typing) GS-0318-5/2, effective 4/28/88.

-Clifford, David E., Maintenance Supervisor from WG-4749-8/5 to WS-4749-9/1, effective 5/08/88.

Personnel actions for temporary appointments included:

-Wright, Benjamin A., Laborer, WG-3502-2/1, temporary appointment, effective 4/03/88.

-Johnson, Barbara L., Clerk, GS-0303-1, temporary appointment, effective 5/11/88.

-Greenland, Rocky E., WG-3502, Laborer, extension of appointment, NTE 11/30/88, effective 6/01/88.

Two high school students, meeting the family financial requirements, were hired during the school year to work 15-20 hours each week (40 hours when school was not in session).

-Stamper, Denise R., Student Aid, YW-3506, effective 3/05/88.

-Eby, Sonia R., Student Aid, YW-3506, effective 3/05/88.

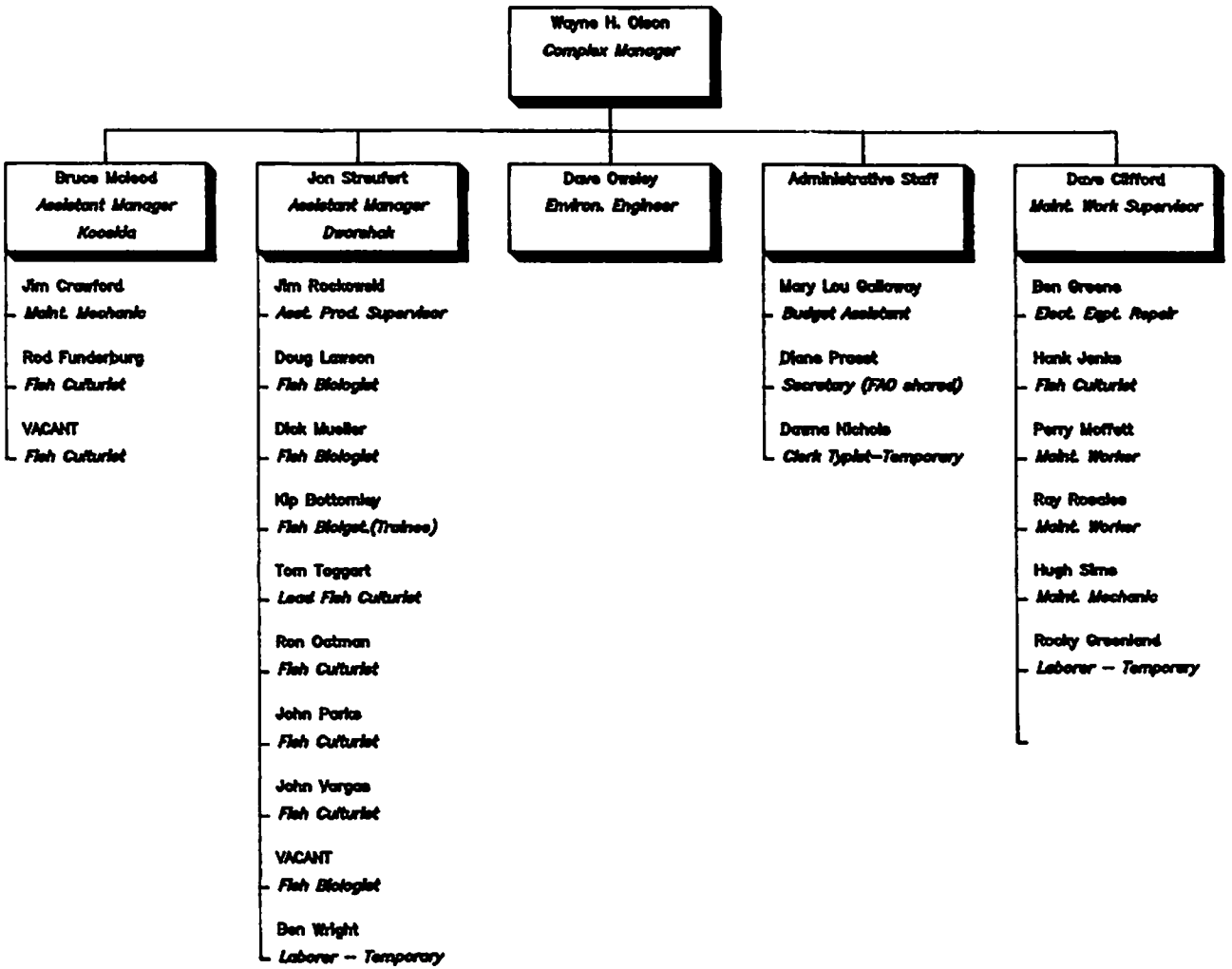
A YCC program began on June 6, ending July 30. Ten enrollees with Crew Leader Chad Easterbrook, YCC Social Services Assistant, GS-5, participated in the program.

Dworshak Employees
- FY 88 -

Name	Position Title	Period of Employment		Status
Anderson, Colette	YCC Enrollee	6/05/88 7/29/88	-	YCC Program
Bottomley, Richard J.	Fishery Biologist	10/01/87 9/30/88	-	Permanent
Call, Duane E.	YCC Enrollee	6/05/88 7/29/88	-	YCC Program
Carr, Dorinda D.	YCC Enrollee	6/05/88 7/01/88	-	YCC Program
Clifford, David E.	Work Supervisor (Maint.)	10/01/87 9/30/88	-	Permanent
Easterbrook, Chad L.	YCC Crew Leader	6/06/88 7/29/88	-	YCC Program
Eby, Sonia R.	Student Aid	3/05/88 8/20/88	-	Temporary
Galloway, Mary Lou	Budget Assistant	10/01/87 9/30/88	-	Permanent
Greene, Benny C.	Electrical Equipment Repairer	10/01/87 9/30/88	-	Permanent
Greenland, Rocky E.	Laborer	10/01/87 9/30/88	-	Temporary
Isbelle, Brian J.	YCC Enrollee	6/05/88 7/29/88	-	YCC Program
Jeffery, Melissa A.	YCC Enrollee	6/05/88 7/15/88	-	YCC Program
Jenks, Alfred H.	Animal Caretaker	10/01/87 9/30/88	-	Permanent
Johnson, Barbara L.	Clerk	5/11/88 9/10/88	-	Temporary
Lambrecht, David A.	YCC Enrollee	6/05/88 7/29/88	-	YCC Program
Lawson, Douglas L.	Fishery Biologist	10/01/87 9/30/88	-	Permanent
Littlejohn, Jolene R.	YCC Enrollee	6/05/88 7/29/88	-	YCC Program
Lonsbury, Tricia R.	YCC Enrollee	6/05/88 7/29/88	-	YCC Program
McCleary, Hamilton R.	Animal Caretaker	10/01/87 7/30/88	-	Permanent
Moffett, Clarence P.	Maintenance Worker	10/01/87 9/30/88	-	Permanent

Name	Position Title	Period of Employment	Status
Mueller, Richard A.	Fishery Biologist	10/01/87 - 9/30/88	Permanent
Nichols, Dawna M.	Clerk-Typist	10/01/87 - 9/30/88	Temporary
Oatman, Ronald W.	Animal Caretaker	10/01/87 - 9/30/88	Permanent
Olson, Wayne H.	Hatchery Manager	10/01/87 - 9/30/88	Permanent
Owsley, David E.	Environmental Engineer	10/01/87 - 9/30/88	Permanent
Parker, Michele L.	YCC Enrollee	7/05/88 - 7/15/88	YCC Program
Parks, Richard J.	Animal Caretaker	10/01/87 - 9/30/88	Permanent
Praest, Diane E.	Secretary (Typing)	10/01/87 - 9/30/88	Permanent
Pratschner, Greg A.	Fishery Biologist	10/01/87 - 1/31/88	Permanent
Rockowski, James J.	Fishery Biologist	10/01/87 - 9/30/88	Permanent
Rosales, Raymundo A.	Maintenance Worker	10/01/87 - 9/30/88	Permanent
Sims, Hubert M.	Maintenance Worker	10/01/87 - 9/30/88	Permanent
Spencer, Zane W.	YCC Enrollee	6/05/88 - 7/15/88	YCC Program
Stamper, Denise R.	Student Aid	3/05/88 - 9/30/88	Temporary
Streufert, Jonathan M.	Assistant Manager	4/24/88 - 9/30/88	Permanent
Taggart, Thomas M.	Animal Caretaker Leader	10/01/87 - 9/30/88	Permanent
Vargas, John J.	Animal Caretaker	10/01/87 - 9/30/88	Permanent
Wright, Benjamin A.	Laborer	4/04/88 - 9/30/88	Temporary
Young, Ryan O'.	YCC Enrollee	6/05/88 - 7/29/88	YCC Program

Dworshak–Kooskia Complex NFH
September 30, 1988



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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 Tribe
  Nez Perce Tribal Executive Committee (NPTEC)
  Fishery Technical Staff
- -National Marine Fisheries Service (NMFS)
- -University of Idaho
- -Washington State University
- -Clearwater National Forest
- -Clearwater County Sheriff Office
- -Oregon State University

Dworshak Fish Health Center and Dworshak Fisheries Assistance Office share facilities with the hatchery. Training assignments for personnel include various work with the two offices. The three Service groups are highly involved, together, in FWS activities on the Clearwater River.

The hatchery distribution truck was again made available in September to the Cooperative Fisheries Research Unit, in Moscow, for hauling fall chinook broodstock to the Lyons Ferry State Hatchery, in Washington, from the Ice Harbor Dam collecting site.

Steelhead carcasses were again received by a local processor on spawning days to be processed, frozen, and made available to several commodity programs administered under the Idaho Department of Education. The hatchery provided cold storage space for 37,000 pounds of processed fish until distribution could be 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 studies.

Provided instructors for Leetown Academy courses:

- -Greg Pratschner instructed sessions on feed calculation and feeding techniques at a Leetown Academy, "Coldwater Fish Production" course, held in Athens, Georgia, December 7-9.

- -Dave Owsley, Engineer, was guest instructor at the "Coolwater Fish Culture course, held in Moorhead, Minnesota, on March 24.

Dave Owsley, Engineer, appointed to "chair" the second annual "International Bioengineering Symposium" to be held in Portland in October 1988, attended several steering committee meetings and spent considerable time from the project to perform the functions of chairmanship.

Ennis NFH received the remaining fish trough feeders excessed from Dworshak. The station made available 128 feeders to Region 6. Also, picked up were a number of column degassers, including media, which Dworshak declared excess.

Spring Creek NFH received 1000 feet of 4" aluminum pipe declared surplus by the station.

Peter Gross, a fish culturist from Germany, arrived at Dworshak on August 2 for a 2-week work assignment. His visit was worked out previously with another contact in Germany who arranged for the trip. The experience appeared to be most valuable and highly appreciated. The staff enjoyed Peter's enthusiasm for work.

Annual
WILD BROODSTOCK SUMMARY

Station: Dworshak NFH			Period Covered: 10/01/87 through 9/30/88					
Species/Strain and Stock	Total Number Returned or Captured		Number Spawned		Eggs (E) Taken or Fish (F) Harvested		Eggs Retained for On-Station Production	Remarks
	Females	Males	Females	Males	Number	% Eyed		
1	2	3	4	5	6	7	8	9
SCS/Clearwater								
Clearwater	1037	935	1065*	955*	4,890,970	96.0	3,369,666	
STT/North Fork								
North Fork Clearwater B run	2833	941	1451	835	9,830,648	88.7	3,832,200	
Totals/Averages	3870	1876	2516	1790	14,721,618	91.1	7,201,866	

*Includes broodstock transferred from Kooskia NFH

Form 3-101 (Rev. 7/88)

FISH AND FISH EGG DISTRIBUTION SUMMARY

Station Dworshak NFH

Fiscal Year 1988

Species 1	Fish or Fish Egg Number 2	Fish		Management Area 5	State 6	Agency 7
		Total Weight 3	Size Length 4			
STT	1,429,516	235,331	7.95	North Fork-Clearwater R.	ID	State
STT	1,270,102	199,114	7.56	South Fork-Clearwater R.	ID	State
STT	540	6,480	N/A	South Fork-Clearwater R.	ID	State
STT	1,143,500	N/A	Eggs	Kooskia NFH	ID	Federal
STT	1,207,396	N/A	Eggs	Hagerman NFH	ID	Federal
STT	2,000	N/A	Eggs	Oregon State University	OR	Research
STT	1,021,808	N/A	Eggs	South Fork-Clearwater R.	ID	State
STT	182,250	N/A	Eggs	Red River Spawning Channel	ID	State
SCS	200,105	8,927	5.03	Lochsa River	ID	State
SCS	1,132,152	54,940	5.18	North Fork-Clearwater R.	ID	State
SCS	2,337	82	4.65	University of Idaho	ID	Research
SCS	2,089	2	1.04	University of Idaho	ID	Research
SCS	301,574	2,897	3.02	Red River Holding Ponds	ID	State

Form 3-102 (Rev. 4/88)

FISH AND FISH EGG DISTRIBUTION SUMMARY

Station Dworshak NFH

Fiscal Year 1988

Species 1	Fish or Fish Egg Number 2	Fish Total Weight 3	Fish ~~Size~~ Length 4	Management Area 5	State 6	Agency 7
SCS	1,500	6	2.23	University of Idaho	ID	Research
SCS	130,324	637	2.41	Kooskia NFH	ID	Federal
SCS	206,667	4,093	3.84	Kooskia NFH	ID	Federal
SCS	209,989	1,346	2.64	Clearwater River	ID	State
SCS	222,737	2,615	3.22	North Fork-Clearwater R.	ID	State
SCS	192,090	5,800	4.42	North Fork-Clearwater R.	ID	State
SCS	825,000	N/A	Eggs	Kooskia NFH	ID	Federal
SCS	198,950	6,911	4.65	Kooskia NFH	ID	Federal
Total Fish	5,500,672	529,181				

Form 3-102 (Rev. 4/88)

HATCHERY PRODUCTION SUMMARY (Intensive Culture)

Station: Dworshak NFH | Period Covered: 10/01/87 through 9/30/88

Species/Strain and Lot Number	Fish on Hand Last Day of Period					To Date This Fiscal Year				
	Number	Weight	Length	D.I.	F.I.	Weight Gain	Feed Expended		Conver-sion	Percent Survival
							Pounds	Costs		
1	2	3	4	5	6	7	8	9	10	11
SCS/Clearwater 6-Dw-Kk-1	0	0	0	0	0	210	315	121	1.50	
SCS/Clearwater 6-UID(RR)4	0	0	0	0	0	34,673	55,872	24,578	1.61	
SCS/Clearwater Dw(H)87-882	0	0	0	0	0	2,399	5,546	3,718	2.31	
SCS/Clearwater Dw(H)87-885	1,541,100	45,517	4.05	0.15	0.52	58,768	87,085	39,479	1.48	
SCS/Clearwater 87-Kk-45	363,600	11,282	4.42	0.15	0.52	4,292	8,912	3,646	2.02	
STT/North Fork Dw(H)-8701	0	0	0	0	0	96,107	151,037	38,028	1.57	
STT/North Fork Dw9H)-8702	0	0	0	0	0	109,666	187,180	48,651	1.71	
STT/North Fork Dw(H)-8703	0	0	0	0	0	202,539	309,997	79,384	1.53	
STT/North Fork Dw(H)-8802	524,400	14,935	4.18	0.15	0.52	9,770	15,068	6,163	1.54	
STT/North Fork Dw(H)-8803	1,056,600	18,926	3.59	0.15	0.52	16,439	31,871	13,849	1.94	
Totals/Averages	3,485,700	90,660	[redacted]	[redacted]	[redacted]	534,863	852,883	257,617	1.59	

Form 3-103a (Rev. 7/88)

FISH HEALTH ACTIVITIES SUMMARY -
NATIONAL FISH HATCHERY

Station Dworshak NFH

Fiscal Year 1988

Problem/Incident/Activity 1	Species 2	Therapeutic Treatment 3	Results/Comments 4
Pond disinfection	STT, SCS	Chlorine bath	Disinfection complete
Bacterial kidney disease	SCS	4.5% Erythromycin feed	Some control w/losses
Ichthyophthirius outbreak	SCS, STT	1:6000 formalin bath	Controlled
Fungus prophylaxis	SCS	Malachite green bath	Some control

Chemical Summary:

Chemical:	Purpose:	Total Amount Used:	Total Cost:
Hypochlorite	Disinfection	770 gal	$1640
Erythromycin	BKD treatment	540 lb.	4050
Formalin	Ich treatment	13.5 barrels	2025
Malachite green	Fungus treatment	110 lb.	1311
Wescodyne	Disinfection	50 gal	900

Form 3-108 (Rev. 4/88)

Station Dworshak NFH 14220

OPERATIONS/MAINTENANCE COST DATA

Fiscal Year 88

	Cost			
	Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
1. Salaries, Permanent (Including Benefits):	590,000			
2. Salaries, Temporary (Including Benefits):	54,000			
3. Operating Costs:				
A. Utilities	80,000			
1. Telephone				
2. Electricity _____ KWH				
3. Heating Oil _____ Gal				
4. Natural Gas _____ Cu Ft				
5. Other _____				
B. Vehicle Maintenance				
1. Distribution Vehicles # _____				
Total Mileage _____				

Form 3-110 (Rev. 4/88)

Station Dworshak NFH 14220

OPERATIONS/MAINTENANCE COST DATA

Fiscal Year 88

	Cost			
	Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
3. B.(cont) Vehicle Maintenance				
2. Non-Distribution Vehicles # ____				
Total Mileage ____	2,000			
C. Fuel for Vehicles				
1. Fuel (Dist.) ____ Gal				
2. Fuel (Non-Dist) ____ Gal	9,000			
D. Supplies				
1. Fish Food	190,000			
2. Chemicals a. Fish Related	17,000			
b. Non-Fish Related				

Form 3-110 (Continued) (Rev. 4/88)

OPERATIONS/MAINTENANCE COST DATA

Station Dworshak NFH 14220

Fiscal Year 88

	Cost			
	Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
3. D.(cont) Supplies				
3. Fertilizer				
4. Tags and Tagging Supplies	4,600			
5. Office Supplies	4,400			
6. Custodial Maintenance Supplies	58,000			
7. Other Supplies	4,000			
E. Travel / Training	9,000			
F. Moving Expenses	12,000			
G. Miscellaneous (List): RBT off-site rearing costs	22,000			

Form 3-110 (Continued) (Rev. 4/88)

Station Dworshak NFH 14220

OPERATIONS/MAINTENANCE COST DATA

Fiscal Year 88

	Cost			
	Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
4. Total Operations (Total: Lines 1, 2, and 3 A-G)	1,056,000			
5. Vehicles Purchased (List)				
6. Total Vehicles Purchased (Total: Line 5)				
7. Equipment Purchased (over $500)(List)				
8. Total Equipment (Total: Line 7)	12,000			
9. Cyclical Maintenance (List)				
10. Total Cyclical Maintenance (Total: Line 9)	74,500			
11. Quarters Maintenance (List)				
12. Total Quarters Maintenance (Total: Line 11)	1,500			
13. Total Maintenance (Total: Lines 6, 8, 10, 12)	88,000			

14. Grand Total (Total: Lines 4 and 13) $ 1,144,000

Form 3-110 (Continued) (Rev. 4/88)

FIVE YEAR HATCHERY PRODUCTION SUMMARY

Station Dworshak NFH 14220

		Fiscal Year				
		1988	1987	1986	1985	1984
I. Fish Production Data						
Intensive Culture:						
Fish Weight Gain (pounds)		534,863	499,038	448,840	294,539	364,591
Fish Numbers	Million	9	8.8	7.8	6.6	8
Percent Survival		--	--	--	--	--
Feed Conversion		1.59	1.5	1.48	1.78	1.55
Extensive Culture:						
Fish Weight Gain (pounds)		--	--	--	--	--
Fish Numbers Phase I		--	--	--	--	--
Phase II		--	--	--	--	--
Percent Survival Phase I		--	--	--	--	--
Phase II		--	--	--	--	--
Pounds per Acre Phase I		--	--	--	--	--
Phase II		--	--	--	--	--
II. Broodstock Production Data:						
Number of Females Spawned		2,516	2,420	1,393	1,634	1,680
Number of Eggs	Million	14.7	12.7	8.7	9.1	11.3
Number of Fish		--	--	--	--	--
III. Management Data:						
Full-Time Equivalents		21.7	21.7	22.9	23.2	23.0
Operational Costs		578,000	697,000	662,000	586,000	580,000
Maintenance Costs		566,000	534,900	532,000	532,000	480,000

Form 3-115 (Rev. 4/88)

PUBLIC RELATIONS

Station Dworshak NFH 14220 Fiscal Year 88

1. Presentations:	Number of Groups	Number of People
On Site	43	668
Off Site	8	213

2. Number of Visitors:	
Official	155
Public	30,000

3. Other Public Relation Activities:

Type of Activity	

Remarks:

Form 3-172 (Rev. 4/88)