

ANNUAL REPORT
FISCAL YEAR 1987
DWORSHAK NATIONAL FISH HATCHERY
AHSAHKA, IDAHO
OCTOBER 1, 1986 - SEPTEMBER 30, 1987

Submitted by:

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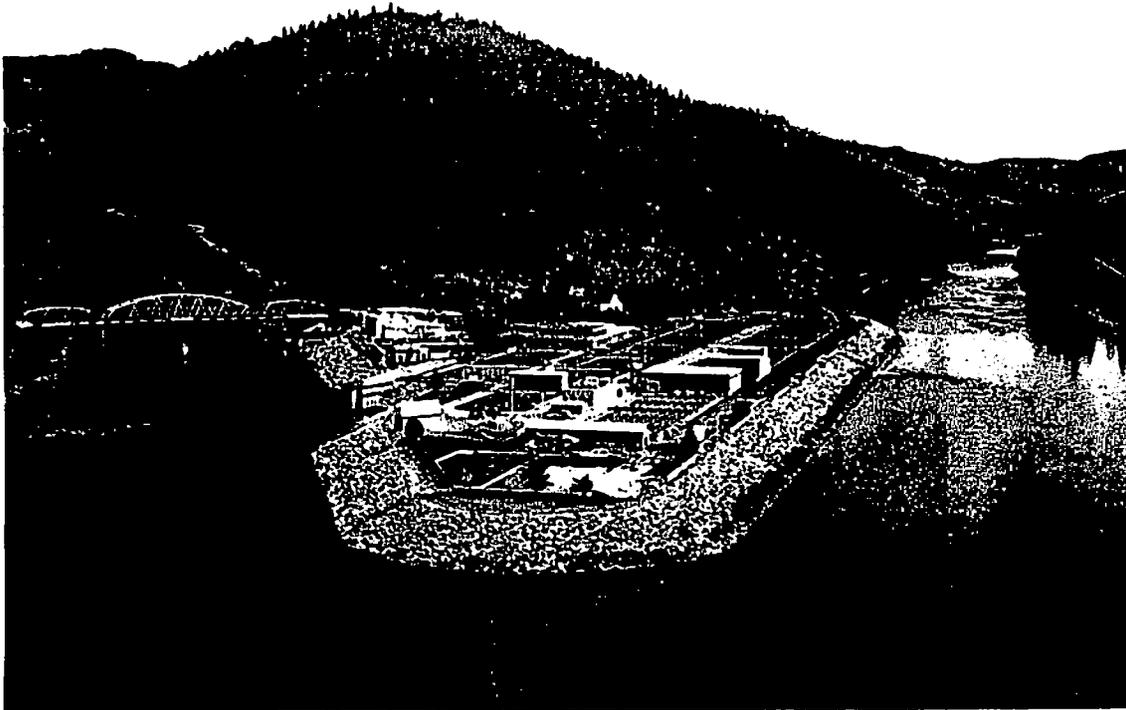
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INTRODUCTION

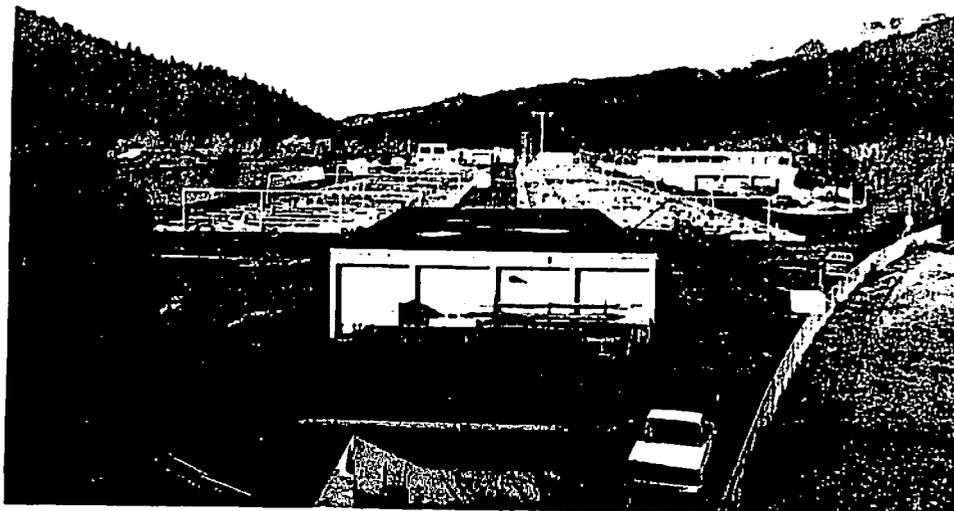
Dworshak National Fish Hatchery is located at the confluence of the North Fork of the Clearwater River and the main stem Clearwater River near the unincorporated town of Ahsahka, in north central Idaho. The site is 3 miles west of Orofino (population 3,800) on the north bank of the Clearwater River,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

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



Aerial view of the hatchery looking upriver.



View of hatchery looking west from Service bridge.

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. Subsequent construction modified some of the features. New design concepts continue to be incorporated into the hatchery.

Additional construction, completed in 1982, under the Lower Snake River Compensation Plan (LSRCP), expanded facilities to rear spring chinook salmon.

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

Reservoir. Spring chinook smolts are presently being released at the hatchery site. As the result of Dworshak's Infectious Hematopoietic Necrosis Virus (IHNV) disease status, in effect since 1983, rainbow trout production has since been assigned to Hagerman NFH for stocking Dworshak Reservoir. Costs for this program will remain 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:

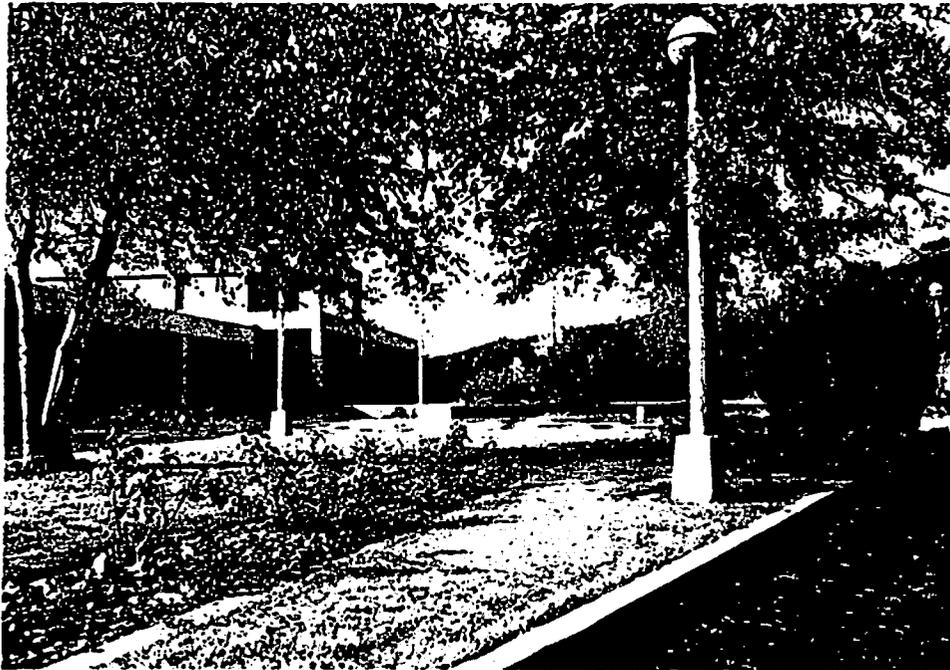
Steelhead	2.3 million	450,000 pounds
Spring Chinook	1.6 million	90,000 pounds

Kooskia National Fish Hatchery, located 35 miles upriver, has operated as a complex with Dworshak since 1978 to produce spring chinook smolts and steelhead fingerling; steelhead being returned to Dworshak at 250 per pound in an effort to manage around IHNV.

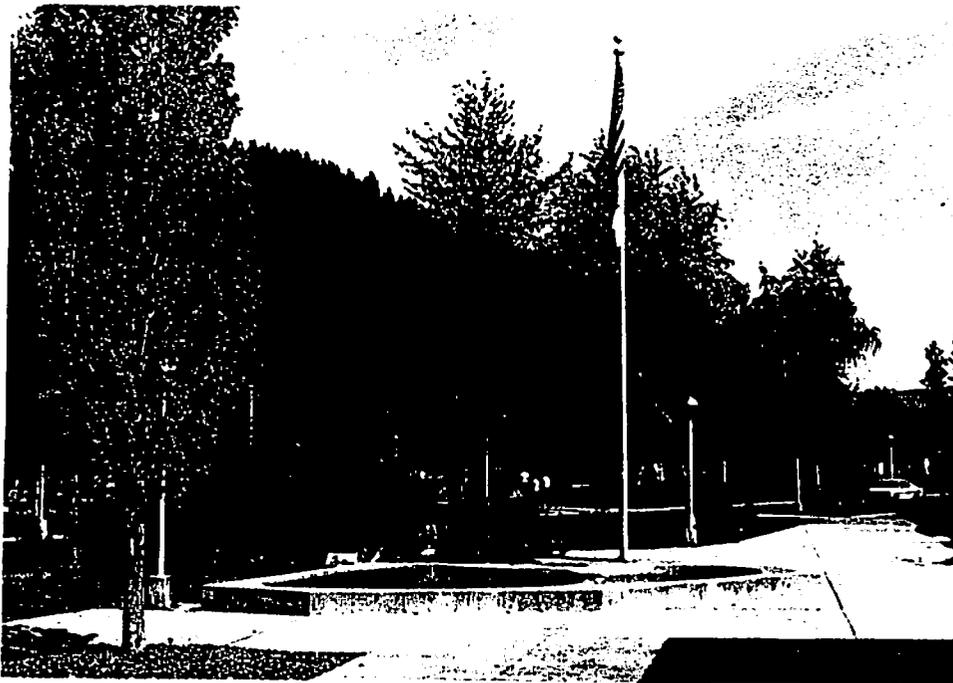
This report covers the period of hatchery activities from October 1, 1986 to September 30, 1987.



Main hatchery building.



Hatchery building entrance.



Visitor area near front of hatchery building.

STATION HIGHLIGHTS

O&M funding from the Corps of Engineers (COE) was \$1,041,900 (subactivity 1935); primarily for steelhead production. In addition, \$46,000 was annual work planned to the Dworshak Fish Health Center (FHC). Funds totaling \$190,000 (subactivity 4710) were provided by the LSRCP for production of spring chinook salmon. The Youth Conservation Corps (YCC) contributed labor costs for an 8-week summer program employing 10 enrollees and 1 crew leader. Total O&M funding, exclusive of FHC and YCC, was \$1,231,900. Of this amount, salaries accounted for \$608,500 or 49 percent.

Cost per pound of all fish produced was \$2.46, based upon a production gain of 499,038 pounds. This cost reflects equipment repair and maintenance, facility care, rehabilitation, travel and training, and direct production expenses. Production costs alone (labor, fish food, mineral addition, drugs and chemicals) were \$697,000 or \$1.39 per pound.

A total of 21.7 staff-years was used during the year for a 23,000 pound production gain per staff-year employed. This increased to 37,805 pounds when based upon direct production responsibilities of 13.2 staff years.

Food conversion (pounds of food to produce 1 pound of fish) was 1.5. This figure is calculated from 746,401 pounds of feed fed to produce a gain of 499,038 pounds.

The fish ladder operated from January 5 until May 12, 1987 for the collection of 5415 steelhead adults. Some 8.4 million eggs were taken from females spawned. A total of 3.6 million eyed eggs were moved to Kooskia with 2.7 million fingerling returned to Dworshak beginning in mid-May and ending in late June.

The station, for the first time, regulated the fish ladder to assure adequate escapement of steelhead into the hatchery for brood stock purposes while limiting numbers by periodic closure of the ladder entrance. Fish returning that were considered excess to the spawning program were tagged with colored plastic ties and returned to the river. Dworshak Fisheries Assistance Office (FAO) monitored the program to determine ratio of tags returned from fish collected at the hatchery to those contributing to the fishery. It appeared that a number of tagged fish were caught in both the Indian and sport harvest.

Although the fall steelhead fishing season was again a success, spring 1987 saw less than ideal main stem river conditions which confined fishing to the North Fork. Fishing in the vicinity of the hatchery, upriver to Dworshak Dam, was excellent in March and April with "bobbers and jigs" the popular gear used.



Steelhead fishermen fishing the North Fork in spring 1987.

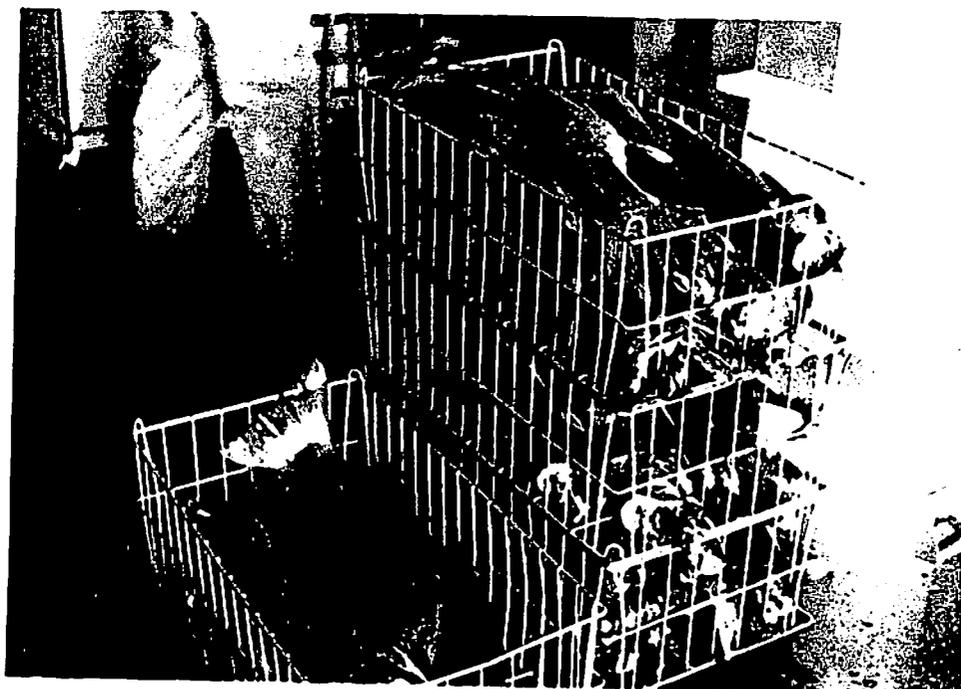


Fishing season nearing an end--high water flows commenced from spillage over Dworshak Dam to assist young steelhead smolts in downriver migration--April 1987.

Quality of smolt production at release time was excellent according to fish health reports. A record release of 1.7 million spring chinook was made in early April. An additional 500,000 are possible by utilizing ponds formerly reserved for rainbow trout production. The hatchery's steelhead release of 2.1 million, down 200,000 from the production plan (IHN losses), followed the chinook program by 2 weeks with all fish planted by late April. Water flows complemented the outmigration of both spring chinook and steelhead at release time, however, low water conditions were reason for concern in later weeks. Still it appeared that Dworshak's releases faired quite well going downriver.

How do we know - citation

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 3800 carcasses, weighing nearly 46,000 pounds, were distributed. Of this total, the Nez Perce Indian Tribe received 482 fish.



Baskets of steelhead carcasses ready for processing.



Loading steelhead carcasses for processing and later distribution to food programs.

Spring chinook returned to the Clearwater River in record numbers. A total of 2626 adult salmon were collected with Dworshak returns numbering 1979 and Kooskia 647. These numbers far exceeded earlier run predictions and must be considered a positive indicator for future success of chinook salmon in the Clearwater. ^{Why} A total of 4.3 million eggs were collected which assured the hatchery of meeting its entire egg requirement from Clearwater River returnees only.



Greg Pratschner holding spring chinook with Dick Mueller observing.

Production programs performed well despite IHN problems in steelhead. Encouraging was the reduction in IHN virus over past years. Mortality through the summer rearing season was less than one-half of the previous year losses. Steelhead fingerling in Dworshak's nursery showed high survival through their early rearing stages and continued to perform well in outside ponds; a similar situation as last year. *poor sentence*

No real breakthrough was seen in the various studies addressing IHN virus. Controls performed equally as well as fish on ozonated treated water. Interesting to note, Dworshak's overall nursery program on single-pass river water incurred low mortality to IHN. Vaccinated fish and their controls both survived without a disease incidence. Pond design differences between raceways and Burrows were comparable in results. Techniques employed in managing production around the disease, which may always be present but hopefully at a lesser incidence, appear to be the only approach to use at this time. A major effort will be taken next year (Brood Year 1988) to use ozone treated water as makeup in a 32-nursery tank reuse system.

Since 1983, the major part of Dworshak's early steelhead rearing had been started at Kooskia due to anticipated heavy losses from IHN at Dworshak. This year's program was no exception. However, for two successive years, a trend has been noticed where young steelhead are showing less incidence of the disease when started at Dworshak, where as, losses appear to be increasing in those fish received from Kooskia's well water rearing. For this reason, we are planning to change rearing programs between the two hatcheries. Beginning with Brood Year 1988, Dworshak will carry the major part of the early steelhead program while Kooskia holds a smaller number for control purposes and for several studies designed for spring 1988.

The hatchery's involvement in "Take Pride in America" included group tours of the facility, news media outreach, interpretive exhibits, added public displays, and improvements to the main building visitor area. A highlight was the successful initiation of a volunteer program in which two workers provided 62 hours of informational services to visitors viewing steelhead spawning operations.



Volunteer Bob Adams explaining spawning operations to visiting public.

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 15,000 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.

Special Achievement Awards for performance during FY 1986 were presented to Bob Austin, Greg Pratschner, Sharon Russell, Diane Praest, Mary Lou Galloway, Tom Taggart, Hubert Sims, Dave Owsley, Dave Clifford and Rocky McCleary. Also sharing in a \$2100 group award were Ray Rosales, Hank Jenks, Perry Moffett, Ben Greene, Dave Clifford, Hubert Sims, and Dave Owsley. This latter award was for efforts shown in the installation of major pumps Nos. 4 and 5 at a cost savings of \$142,700 to the government.



Recipients of a group award (\$2100) for pump installation and electrical work in main pump station. Left to right: Perry Moffett, Hank Jenks, Ray Rosales, Dave Clifford, Ben Greene, Dave Owsley, and Hubert Sims.

FISH CULTURE OPERATIONS
Steelhead Production

- Brood Year 1986 -

Although mortality as a whole subsided, the steelhead program entered the year (October 1, 1986) experiencing significant IHN virus related losses. Epizootics of IHN in ponds, particularly in Systems I and III caused size variation which later contributed to the bulk of the mortality (pinheads). By early December, all systems had been placed on reuse with changeover to single pass occurring just prior to distribution in the spring.

Growth restrictions by decreasing water temperature could not be employed due to replacement of populations destroyed (IHN mandated) during the summer. Warmer water temperatures were necessary to benefit smaller steelhead while growth of larger steelhead was regulated through feeding. Steelhead outplanting and direct releases were completed April 24 with all fish in excellent condition and health. Despite concern over later low river flows, it appeared that the smolts were released at an ideal time to take advantage of high river conditions.

System I

System I, originating from the middle spectrum of the run, was restocked (7 ponds) with Dworshak reared fish (later takes) due to high IHN mortality and the destruction of highly infected ponds (3) late in the year. Mortality related to IHN declined steadily throughout October. Mortality consisted primarily of pinheads in the later months.

System I placement on reuse water with mineral supplementation (20 mg/l Na+, 8 mg/l K+) occurred December 2. Mineral pump problems in December created mineral imbalances, but no associated problems were observed. Steelhead performance was good to excellent throughout the year resulting in a reduction of water temperature in early March.

Idaho Fish and Game (IDF&G) personnel conducted adipose fin clipping in November; coded-wire tagging and freeze branding were completed in January. Inventories by both FWS and IDF&G crews were in close agreement. Releases (outplant and direct) occurred April 13-20 with fish in excellent condition and health. A monthly performance summary is provided below:

<u>Date</u>	<u>Number</u>	<u>Size No/lb.</u>	<u>Growth (in.)</u>	<u>% Mortality</u>	<u>Temperature (°F)</u>
Oct 1	674,944	29.8	----	----	----
Nov 1	657,347	20.1	0.61	2.33	53.2
Dec 1	641,227	16.0	0.37	0.49	48.8
Jan 1	637,580	11.1	0.68	0.57	50.0
Feb 1	633,319	8.6	0.66	0.32	53.3
Mar 1	630,808	6.7	0.64	0.40	53.5
Apr 1	629,178	5.9	0.18	0.26	44.8
Released	632,127	5.65			

System II

Steelhead in System II were derived entirely from egg takes 9, 10 and 11 with exception of one pond stocked from Dworshak reared take 14. IHN related mortality was significant during October, but far less than experienced in prior months. The rise in mortality during December was confined to pinhead dropout. There were no new IHN confirmations during the year.

Conversion to reuse water with minerals began December 11, ending April 15 shortly before release. Steelhead performed very good throughout the year while remaining in agreement with projections.

Adipose fin clipping was completed in November. Three ponds received freeze brands and coded-wire tags in January. Fish quality and health were excellent at time of release. Monthly parameters are summarized below:

<u>Date</u>	<u>Number</u>	<u>Size No/lb.</u>	<u>Growth (in.)</u>	<u>% Mortality</u>	<u>Temperature (°F)</u>
Oct 1	806,114	39.7	----	----	----
Nov 1	776,629	24.0	0.58	3.66	53.2
Dec 1	734,976	17.4	0.48	0.54	48.8
Jan 1	727,691	10.7	0.90	0.99	50.2
Feb 1	725,824	8.5	0.67	0.41	53.9
Mar 1	723,711	6.4	0.71	0.29	54.1
Apr 1	721,660	5.9	0.14	0.28	44.2
Released	708,224	5.6			

System III

System inventory in October revealed 3.7 percent fewer fish in population than originally anticipated based on high mortalities experience in Fiscal Year 1986. Mortality during October and November, although lower than previous months, continued in ponds having chronic IHN mortality. There were two ponds confirmed with IHN (57 and 65) during November.

Conversion to reuse and minerals was on November 18. Despite boiler problems in November, which precluded the desired 54°F water temperature, fish growth and performance were good. Adipose fin clipping by IDF&G crews of all but four ponds was completed in November. The remaining ponds, two designated for tagging (freeze brand/CWT) and two experiencing chronic mortality, were marked in December.

Production goals were met and fish were in good health at release. A monthly summary is provided below:

<u>Date</u>	<u>Number</u>	<u>Size No/lb.</u>	<u>Growth (in.)</u>	<u>% Mortality</u>	<u>Temperature (°)</u>
Oct 1	813,086	31.8	----	----	----
Nov 1	788,540	19.0	0.80	3.4	53.2
Dec 1	774,530	14.6	0.48	1.8	50.5
Jan 1	768,174	9.4	0.93	0.8	51.2
Feb 1	764,208	7.3	0.44	0.4	53.7
Mar 1	761,829	6.1	0.74	0.3	54.0
Apr 1	759,444	5.2	0.34	0.3	45.9
Released	771,172	5.3			

Distribution

Steelhead smolt release began on April 13 with off-site plants and was completed April 24 with direct releases. Outplanting to various Clearwater drainage sites was accomplished using distribution trucks and drivers provided by Corps of Engineers (COE) and IDF&G. Fifty-five trips were required with no mortality recorded.

<u>Location</u>	<u>Number</u>	<u>Weight (lbs.)</u>	<u>Length (mm)</u>
Crooked River	200,162	36,991	203
Clear Creek	156,552	25,097	193
Mt. Idaho Bridge	298,070	56,171	204
Newsome Creek	208,863	38,884	203
American River	<u>41,527</u>	<u>7,380</u>	<u>200</u>
TOTAL AVERAGE	905,174	164,523	201

A summary of parameters for outplanting of smolts is provided as follows:

<u>Location</u>	<u>Number</u>	<u>Weight (lbs.)</u>	<u>Fish/lb.</u>	<u>Length (mm)</u>
System I	301,165	55,938	5.4	203
System II	331,612	59,669	5.6	201
System III	<u>272,397</u>	<u>48,916</u>	<u>5.6</u>	<u>201</u>
SUBTOTAL	905,174	164,523	5.5	201

Direct releases of smolts, at the hatchery site, are shown accordingly:

<u>Location</u>	<u>Number</u>	<u>Weight (lbs.)</u>	<u>Fish/lb.</u>	<u>Length (mm)</u>
System I	330,962	56,017	5.9	201
System II	376,612	66,416	5.7	203
System III	498,775	95,864	5.2	205
SUBTOTAL	1,206,349	218,297		
TOTAL	2,111,523	382,820	5.5	204

Fish Marking

Adipose fin clipping and tagging operations were completed February 3 by IDF&G personnel. Some 2.1 million steelhead were adipose clipped with 173,508 receiving coded-wire tags (CWT) and freeze brands. A summary of steelhead tagging operations is shown as follows:

<u>Pond</u>	<u>CWT #</u>	<u>Freeze Brand</u>	<u>Number</u>	<u>Purpose</u>	<u>Release Site</u>
39	5/18/36	None	20,317	IHNV+	Dworshak hatchery
9	10/29/31	RD R-3	19,021	SYS I	" "
51	10/29/33	RD R-3	19,747	SYS III	" "
50	10/29/32	RD R-3	2,470	SYS II	" "
48	10/29/32	RD R-3	18,377	SYS II	" "
13	10/29/40	LA R-3	16,758	Off-site	Crooked River
2	5/18/34	RA R-3	21,163	"	Clear Creek
38	10/29/40	LA R-3	9,964	"	Crooked River
38	10/29/41	LA R-3	7,987	"	" "
52	10/29/41	LA R-3	17,403	"	" "
57	5/18/35	RA R-3	16,288	"	Clear Creek
67	5/18/35	RA R-3	4,013	"	" "
	TOTAL MARKED		173,508		

- Brood Year 1987 -

Adult Collection

Brood Year 1987 steelhead operations began January 5 and continued through May 12. Ladder operations were continuous except during the period of March 2-30 when operation was regulated (open 45-48 hrs/wk). Ladder regulation enabled the enhancement of harvestable fish in the North Fork while providing adequate adults for spawning. During operation, a total of 5,415 adult steelhead entered Dworshak NFH which includes 129 Lyons Ferry strays. Partial ladder closure still allowed for 953 more adults than in FY 1986 with the largest weekly return occurring April 14.

Age Composition

	<u>Males</u>	<u>Females</u>	<u>Total*</u>	
I-Ocean	244	30	274	5.41%
II-Ocean	1217	3652	4869	91.95%
III-Ocean	<u>120</u>	<u>23</u>	<u>143</u>	2.64%
TOTALS	1581	3705	5286	
	29.9%	70.1%		

*Lyons Ferry strays not included.

Spawning protocol was essentially identical with 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 IHN samples taken from all spawned fish. IHN incidence from males and females was 7.1 percent and 6.3 percent respectively. All positive lots were culled with exception of those used experimentally. Only IHN negative eggs were used for shipment and production needs.

Tracking of individual egg lots and resulting progeny, through all phases of rearing, was performed to facilitate information concerning IHN outbreaks. In addition, progeny of I-salt males was kept separate through rearing since IHN epizootics were suspected to originate in progeny of brood years where I-salt males were used extensively (1984-1986).

Adult carcasses from holding mortality and experimental groups were disposed of at the local landfill. Carcasses from spawning and health sampling, anesthetized with carbon dioxide (250-350 mg/l), were donated to Idaho Department of Education for processing and distribution to food banks and public institutions. The Nez Perce Tribe also received fish.

Egg Disposition

Disposition of eyed eggs was as follows:

*Kooskia NFH	3,700,000
IDF&G spawning channels	1,500,000
Experimental ozone	880,000
FAO	<u>335,000</u>
TOTAL	6,415,000

*Eggs transferred to Kooskia NFH for early rearing, returning to Dworshak at 250-350/lb.

IHN Virus Incidence

IHNV incidence in adult steelhead is summarized accordingly:

	Percent		<u>Total</u>
	<u>Males</u>	<u>Females</u>	
Production	5.4	4.2	4.7
	34.9	52.5	43.4
FAO Study Groups			
Disposition of IHN positive eggs:			
FAO experimental		226,028	
Ozone experimental		98,682	
Destroyed		754,000	
TOTAL		1,078,710	

Disposition of Adults:

Disposition of excess steelhead adults and carcasses:

Idaho Dept. of Education	3,320 @ 39,840 pounds
Nez Perce Tribe	482 @ 5,784 pounds
Outplants	1,809 (enhancement)
Landfill	207 (mortality/experimental)

Production Methods

Initial loading of the Burrows ponds began May 11 with the return of fingerlings reared at Kooskia NFH and was completed with nursery reared (Dworshak) steelhead on September 16. System loading in relation to run spectrum was as follows: System I-early egg takes, System II-late takes and experimental groups, System III-middle and experimental groups.

External signs of IHNV were first evident in early June (System I) and by June 25 mortality was in excess of 1,500 fish per day. First observed signs of IHNV were nearly a month earlier than in 1986 (42 days since transfer from Kooskia NFH). Severe IHNV related mortality was experienced in System I and to a lesser degree in System III. System II, primarily composed of steelhead reared entirely at Dworshak, was the least effected. Similar to Brood Year 1986, IHNV primarily affected fish that were returned from Kooskia NFH. Monthly total steelhead mortality from IHNV was July (10.8%), August (3.5%) and September (1.3%). By September 30, fish health and quality were excellent with performance better than anticipated.

Monthly summary of system parameters:

System I (Dw-8701) -

<u>Date</u>	<u>Number</u>	<u>Size (#/lb.)</u>	<u>Growth (in.)</u>	<u>Mortality %</u>	<u>Temperature (°F)</u>
May 31	954,194	221	0.12	0.4	44.9
Jun 30	912,818	95	0.96	5.8	52.4
Jul 31	703,559	53	0.46	22.9	53.7
Aug 31	748,094	37	0.45	2.3	53.0
Sep 30	743,714	21	0.84	0.9	53.4

System II (Dw-8702) -

<u>Date</u>	<u>Number</u>	<u>Size (#/lb.)</u>	<u>Growth (in.)</u>	<u>Mortality %</u>	<u>Temperature (°F)</u>
Jun 30	383,986	237	0.40	0.24	52.5
Jul 31	494,040	100	0.80	0.002	53.7
Aug 31	1,019,606	75	0.60	1.57	53.0
Sep 30	1,019,643	45	0.50	0.50	53.4

System III (Dw-8703) -

<u>Date</u>	<u>Number</u>	<u>Size (#/lb.)</u>	<u>Growth (in.)</u>	<u>Mortality %</u>	<u>Temperature (°F)</u>
May 31	180,395	245.0	0.10	0.70	0.8
Jun 30	1,277,429	143.0	0.48	0.40	52.3
Jul 31	1,212,818	64.0	0.86	6.70	53.7
Aug 31	1,271,308	46.0	0.42	5.60	53.0
Sep 30	1,274,444	29.0	0.55	2.10	53.4

Rainbow Trout Production

Since 1985, rainbow trout for Dworshak Reservoir have been supplied from another hatchery as the result of Dworshak's IHNV disease status. Hagerman NFH, for the second successive year, produced trout necessary to meet mitigation requirements. The hatcheries' cost, \$18,131 for rearing and distribution, was reimbursed by Dworshak. Rainbow, a Kamloops strain, were stocked accordingly at the Dent Acres boat ramp.

	<u>Number Released</u>	<u>Weight (lb.)</u>	<u>Size (No./lb.)</u>
July 21	55,373	2,215	25.0
July 23	38,483	1,480	26.0
TOTAL	93,856	3,695	

All rainbow trout were released at the Dent Acres boat ramp.

Spring Chinook Salmon Production

- Brood Year 1985 -

On station October 1, 1986 were 1,802,222 spring chinook salmon weighing 37,421 pounds, at 48.2 fish per pound for the Lower Snake River Compensation program. This number of fish represented a survival of 98.1 percent since placement in the outside raceways in June 1986.

Through most of the production cycle, Bacterial Kidney Disease (BKD) was always evident although mortality was very minimal. Feeding of Erythromycin during the summer of 1986 did little to reduce the incidence of the pathogen. As with other production years, heavy infestations of the parasite Epitheliocystis occurred, however, no fish health problems were associated with this ectoparasite.

During January, IDF&G marked chinook in three raceways with either coded-wire tags (CWT) or freeze brands. A summary is given below:

<u>Number Marked</u>	<u>CWT No.</u>	<u>Freeze Brand</u>	<u>Purpose</u>
39,970	--	RA R-1	Water Budget
21,940	--	RA R-1	Water Budget
51,946	10/29/36	--	Control <i>Contribution</i>

Tagging operations revealed an apparent shortage of nearly 4 percent. We subsequently inventoried all raceways and verified the numbers. Additional raceway tail screen modifications were made during summer 1987 to further correct poorly fitting screens and prevent possible fish escapement.

Spring chinook were released on April 1-2. Fish held in converted holding pond raceways were pumped into a release channel and carried to the river through a planting line along the fish ladder. This release occurred during daylight hours for safety reasons. The remaining salmon were released during evening hours directly into the North Fork. This record release number of 1,710,710 spring chinook, weighing 92,633 pounds (18.5/lb.), should provide good returns to the Clearwater River in 1989 and 1990.

The Reservoir Control Center in Portland, Oregon authorized an increase in water release from Dworshak Dam to 6,500 cfs during the hours of 1800 to 2400 each release day (April 1, 2) to assist in downriver migration.

In addition to direct releases, 3,500 smolts were transported to the Marrowstone (Washington) Field Research Station by University of Idaho personnel as part of an ongoing BKD research study. Another 1,700 were transferred to the University of Idaho; 2,723 were placed in the Dworshak nursery for a BKD study.

- Brood Year 1986 -

During October 1986, eggs from chinook salmon returning to the Dworshak-Kooskia Complex and eggs received from Rapid River SFH were picked and inventoried. A summary of this count is presented as follows:

<u>Egg Source</u>	<u>Green Eggs</u>	<u>Percent Eyed</u>
Dworshak-Kooskia	1,241,175	75.1
Rapid River SFH	2,922,008	69.9

Of the eggs collected at Dworshak, all were destined to become the 1988 smolt release program for the Kooskia facility. A total of 675,000 eyed eggs were transported to Kooskia in October with 256,000 retained for rearing at Dworshak until transfer a year later when Kooskia's water conditions improved. Historically, summer water temperatures at Kooskia have caused severe Ichthyophtherius disease problems and high mortality when fish were held on Clear Creek water.

Fry were transferred to nursery tanks in mid-January after having been on chilled incubator water to increase hatching time. Feeding fry had accumulated 1,700 temperature units prior to transfer.

Internal fungus problems of past years was not evident for this group of salmon. Use of Biodiet in the cold rearing water temperatures may have been responsible. Mortality was minimal throughout nursery rearing ($\leq 0.20\%$ per month).

In May, 252,000 excess chinook fingerling were outplanted into Lolo Creek. The remaining 1,540,000 were moved to raceways in late May for final rearing.

To evaluate the potential for fall releases, 192,330 (40 per pound) were coded-wire tagged and released in late September. A control group will follow in spring 1988 for comparison.

Fish health and quality remained excellent throughout the year with only low levels of BKD noted. An Erythromycin feeding study failed to reveal any advantage to feeding the drug prophylactically.

A summary of spring chinook on station September 30, 1987 is shown:

<u>Lot</u>	<u>Number</u>	<u>Size (No./lb.)</u>	<u>Weight (lb.)</u>
6-UID(RR)-4	1,338,559	41.4	32,332
*6-Dw-Kk-1	195,931	29.2	6,710

*This group designated for Kooskia and released into Clear Creek, spring 1988.

- Brood Year 1987 -

A record, 2,017, adult salmon returned to the Dworshak NFH during the summer. The ladder was opened May 22 and closed September 8. In one 24-hour period, beginning May 27, it was estimated that between 200-250 adult salmon were collected. Heavy rains along with a change of water temperature (41 to 51°F) in the North Fork (selector gates installed at Dworshak Dam on May 26) may have contributed to this large movement of fish. Spawning operations were begun on August 24 and were completed on September 8. Following is a summary of spawning activities:

	<u>Dworshak NFH</u>			<u>Kooskia NFH</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Fish in run	807	1,210	2,017	261	381	642*
Sex ratio (% of run)	40	60		40.7	59.3	
Age composition (%)						
I-ocean			1			3
II-ocean			80			88
III-ocean			19			9
Total mortality	99	220	319	69	140	209
Percent mortality			15.8			32.6
Green eggs collected			3,316,340			759,326
Adults spawned	661	930	1,591	186	226	412
Eyed eggs			3,082,500			686,750
Percent eyed eggs			93			90
Eggs per female			3,566			3,360
IHNV positive (%)	2.8	7.7	5.6	1.7	2.6	2.2

*Actual return to Kooskia NFH was 687 fish; 17 fish died before transport, and 28 were released when the trap was closed.

A change from past years of incubating chinook eggs on chilled water was necessitated by an earlier decision of rearing the majority of Dworshak's Brood Year 1988 steelhead at Dworshak. The need for nursery tank space in early rearing of steelhead requires that all spring chinook be removed from the nursery by early April 1988. Ambient water temperatures, averaging 54°F, provided an excellent eye up of 93 percent. Feeding fry are anticipated to be ready for nursery tanks in November; two months earlier than if this group had been on colder water.

Of the nearly 3 million anticipated starting fry, 180,000 will be reared on a constant 54°F water supply to provide a size of 90 fish per pound by early March 1988. These fish will be used to assess the potential for a zero-age release. This group will receive coded-wire tags in March and be released in early April.

Additionally, Dworshak will retain +200,000 chinook for extended rearing for Kooskia NFH as in recent years. It is anticipated that these fish will be returned to Kooskia in fall 1988 at an average size of 30 per pound. The station is anticipating 1.6 million smolts, at 15 to 20 per pound, for release in April 1989.

Special Studies

- Steelhead and Rainbow Trout -

Calcium Supplementation

In recent years, steelhead reared initially at Kooskia NFH appear to be somewhat more refractive to IHN than siblings reared at Dworshak. There are significant differences between the two locations with respect to water quality. One significant difference is water hardness and calcium concentrations. Based on this observation and the work of the Scandinavian virologist, Post, which demonstrated that water calcium levels effectively blocked Viral Hemorrhagic Septicemia losses in cultured trout, we attempted to test the relationship between calcium levels and subsequent IHN losses at Dworshak.

Four "Living Stream" tanks, located in the Dworshak nursery, were loaded with 9,500 sibling swimup fry; all tanks reused 90 percent of the rearing water similar to the Burrows ponds. Two tanks received calcium chloride at a concentration of 15 mg/l (Kooskia's concentration) and two served as untreated controls. All fish were then treated according to established protocols for cultured fish; mortality and IHN incidence were analyzed frequently by the Dworshak Fish Health Center.

Mechanical problems prevented a valid experiment. We intend to repeat the study on a larger scale in 1988.

I-salt Segregation

In recent years, we have noticed an apparent association between the number of I-salt male steelhead spawned and subsequent IHN losses in their progeny. We decided to test a hypothesis that I-salt male steelhead provided the path of infection to juvenile steelhead reared at Dworshak. All crosses in which I-salt males were used were isolated throughout the rearing cycle and monitored for IHN incidence and total mortality. We suspected that if I-salt male steelhead were responsible for IHN, tanks/ponds containing their offspring should "break" first. This has not been the case, and there is apparently no relationship between I-salt male steelhead and subsequent IHN epizootics. A summary is presented below:

<u>Month</u>	<u>I-salt Ponds</u>	<u>Percent Mortality</u>	
		<u>Remainder of Production</u>	
May	0.32		0.57
June	0.50		2.16
July	4.31		9.78
August	5.88		3.17
September	0.92		1.20

Rainbow Trout Sentinel Experiments

Since September 1985, we have been receiving 100,000 eyed rainbow trout eggs from various sources bimonthly; incubating and rearing them in two hatchery locations: (1) in two circular tanks located in the main pumphouse, that is, the hatchery intake, and (2) in two rectangular tanks located in the Dworshak nursery; and monitoring them closely for the presence of IHN. The hypothesis of interest was whether or not we could detect a correlation between mature adult steelhead in the North Fork and IHN in juvenile salmonids or whether there was a seasonal aspect to IHN epizootics.

These tests have failed to detect either relationship. Mortality patterns were statistically similar between and within locations although there were more confirmations of the virus in the nursery. We terminated the study in May 1987 due to equipment problems and the lack of relevant information. The last confirmation of IHN in the rainbow populations was in May 1987.

Water Filtration for the Detection of IHN

In an attempt to isolate the IHN virus from the Dworshak fish rearing water, a Pellicon Cassette (tangential flow filtration system) was used to filter water from several locations on the hatchery. The time period involved was May 20 to July 14, 1987; IHN epizootics were evident during this period. Samples were collected and filtered by hatchery personnel and IHN analysis was performed by staff members of the Dworshak Fish Health Center. Of 18 filtrates, all were negative for the presence of the virus.

There were two problems with the procedure: normal fungal and bacterial flora contaminated tissue culture plates, and, initially, fetal bovine serum which enhances virus survival in water was not added to samples until early July.

We intend to develop a pre-filtration system for the water samples and repeat this study in 1988.

Vaccination of Steelhead Juveniles for IHN

On July 22, personnel from the Seattle National Fisheries Research Center, with assistance from hatchery personnel, used a newly developed killed (formalin) whole virus vaccine to immunize steelhead juveniles resident in ozone water supplied tanks of the Dworshak nursery. The vaccine was administered in two ways: (1) by interperitoneal injection, and (2) by immersion in hyperosmotic saline solution containing the killed virus. Controls consisted of siblings injected with saline only, immersed in saline only, or handled but not injected or immersed. All groups were isolated in individual ozone tanks until August 14 when they were moved to Burrows ponds in System III. No IHN occurred in any group, and

Efforts to infect the test fish by placing subsamples of 100 fish from each group in floating cages suspended in ponds with active IHN were successful. A summary is presented below:

	Handled		Vaccinated		Controls	
	Controls	Immersion	Immersion	Injection	Immersion	Injection
Start No.	19,831	15,706	13,252	13,252	14,061	16,688
To pond	81	85	85	85	81	85
No. ponded	19,733	15,671	13,052	13,052	14,016	16,070
Mortality	98	35	200	200	45	618
% Mortality	0.49	0.22	1.50	1.50	0.32	3.70

The high mortality for the injected group was apparently the result of the initial handling; the initial loss for the injected controls and the vaccine injected fish was 536 and 150 fish respectively.

Comparison of Burrows Ponds and Raceway Populations of Steelhead with Respect to IHN

On June 6, steelhead fingerlings derived from egg take 9 were transferred from Kooskia NFH. Half (117K) were placed in Burrows ponds and half (120K) were placed in LSRCR raceways. Total mortality and the incidence of IHN was monitored closely to detect any differences between locations (rearing unit configuration). Mortality was minimal with exception of the population in one Burrows pond (63) which contracted IHN. A summary is provided below:

	Raceway Number		Burrows Pond Number	
	27	28	63	79
Initial Number	60,022	60,055	77,618	39,481
Loss	841	377	29,196	276
% Loss	10.40	0.63	37.62	0.70

Ozone Experiments

Steelhead eggs (879,000) derived from egg takes 11 through 15 were used to assess the efficacy of ozone water disinfection to control IHN. The experimental design was similar to that used in the successful 1985 experiments. Of the five test groups, IHN was isolated from only three tanks, all derived from egg take 11. IHN was confirmed in two control tanks and one ozone tank in June. Mortality was significant in controls and minimal in the test tank. Movement to Burrows ponds occurred in July; experimental groups were segregated as much as possible and parameters such as total mortality and IHN incidence will be monitored throughout the remainder of the production cycle. Results were insignificant by the end of the fiscal year.

Nitrogen Gas Supersaturation Study

The need for column degassers on individual raceways and nursery tanks was questioned after installing packed columns in the main aeration chamber. From November 1986 until mid-May 1987, nitrogen gas saturation levels were followed at several locations on the hatchery in an attempt to justify removal of the individual columns. A summary of the comparison of nitrogen gas saturation levels (percent) is presented below:

<u>Month</u>	<u>River</u>	<u>Aeration Chamber</u>	<u>Nursery Tanks</u>	
			<u>with*</u>	<u>without*</u>
Nov	100.14	99.93	100.07	100.16
Dec	97.54	100.64	100.73	100.69
Jan	102.05	101.92	100.66	101.62
Feb	107.36	102.72	100.93	101.87
Mar	108.13	102.65	100.55	102.55
Apr	111.20	103.10	101.20	102.80
May	114.50	103.90	100.80	103.10
May 08#	113.90	104.70	99.70	102.70
May 14#	115.30	104.60	101.40	103.00
May 18#	114.60	102.50	101.30	104.70

*Indicates the presence or absence of packed columns.

#Measurements taken during periods of increased spill from Dworshak Dam.

Based upon results of this analysis in which there was no significant difference between rearing units with and without packed columns, the columns were removed from all raceways and 96 nursery tanks during summer 1987.

Movement of Steelhead Fingerlings from Kooskia NFH to Ozone and Control Tanks

On June 15, 120,000 steelhead fingerlings (415 to 430 fish per pound) derived from Dworshak egg take 10 were transported from Kooskia NFH and placed in four nursery tanks. Two tanks, 21 and 27, were supplied with ozone disinfected water; two additional tanks, 3 and 4, received untreated river water. The question being asked was whether or not these fish would succumb to IHN regardless of ozone. These steelhead were kept in the nursery until July 10 when they were placed in System II ponds. No IHN was observed in any group by the end of the fiscal year.

- Spring Chinook Salmon -

Delayed Expression of Bacterial Kidney Disease (BKD)

In recent years, the Fisheries Cooperative Unit at the University of Idaho has transported small numbers of spring chinook salmon smolts to their Marrowstone (Washington) Field Station. The purpose has been to assess the delayed expression of bacterial kidney disease and the potential to prevent losses using Erythromycin. In general, the Unit has observed kidney disease and resultant high mortality in nearly every group of salmon resident at Marrowstone; that mortality was not evident in groups fed Erythromycin.

A decision was made, based upon the Marrowstone study, to hold 2,700 smolts in two nursery tanks, at Dworshak, for an extended period to evaluate the delayed expression of BKD.

On March 30, 2,703 smolts (Brood Year 1985) were removed from raceway 30, selected at random, and transported to nursery tanks 110 and 111. The fish received the same care as other production fish and were held until June 23. Fish health and quality remained excellent throughout the period; BKD was not evident. The primary cause of mortality was fish jumping from the tanks which was somewhat reduced by covering the entire top of each tank with screens in late April. A summary is given below:

Tank	Number		At Release June 23		
	Start	Ending	Weight(lb.)	Mortality	Size (#/lb.)
110	1,550	1,482	119.3	68	12.4
111	<u>1,153</u>	<u>1,104</u>	<u>97.7</u>	<u>49</u>	<u>11.3</u>
TOTAL	2,703	2,586	217.0	117	11.9

For this lot of salmon, it appears that extended rearing of at least 12 weeks did not result in substantial losses to bacterial kidney disease. By the end of the experiment, there had also been few losses to BKD in groups held at Marrowstone.

Incubation of Spring Chinook Salmon Eggs in Hatching Jars

In 1985, more than 90 percent of 550,000 SCS eggs incubated in Dworshak hatching jars located on A-Bank nursery tanks died while in or shortly after exiting the jar. We were unable to determine the cause, but hypothesized that: (1) SCS were less tolerant of the rolling action of the jars, (2) unchilled incubation water caused developmental problems, and/or (3) that association with the nursery tank bottom rather than the jar caused the mortality.

In the fall of 1986, we placed 60,000 green SCS eggs received from the Rapid River SFH (as in 1985) in four hatching jars (15K per jar) located in two locations and supplied with two different incubation water temperatures. Two jars were located on nursery tanks supplied

with ambient temperature water (50 to 54°F) and two located in the incubator room and supplied with 42°F chilled river water. We were primarily interested in the effect of temperature on the subsequent mortality of the salmon. Mortality through December 1986 was:

Ambient temperature jars	83.11%
Chilled water jars	0.24%

We were unsure of actual cause and effect, that is, whether temperature alone was the cause of the mortality. Further studies can be expected in the future.

Erythromycin

For the past three brood years, we have fed the Oregon Moist Pellet (OMP) containing 4.5 percent Erythromycin phosphate to SCS in late summer of early fall. Feeding of the antibiotic was generally prophylactic or indicated whenever the Fish Health Center reported increased levels of BKD or when daily mortality was compromised of individuals with gross macroscopic BKD lesions.

The practice of feeding the antibiotic provided questionable, though untested, benefits. During July 1987, the Fish Health Center reported slightly increased levels of BKD in one raceway of salmon, and a decision was made to begin feeding the antibiotic on or before August 1. This time, however, the salmon in 12 raceways were designated as controls and did not receive the drug.

Mortality for the individual raceways was compared to evaluate trends or differences. For the entire period, there was no demonstrable difference for mortality between test and control populations.

<u>Month</u>	<u>Percent Mortality Fed Erythromycin</u>	<u>Controls</u>
Jun	0.22	0.22
Jul	0.24	0.18
Aug	0.18	0.16
Sep	0.06	0.04

The slight increase in mortality observed for both groups during July was attributable to additional handling due to the splitting of pond populations, not disease.

Based on the results of this study and a smaller scale study done in 1986, we will discontinue the practice of feeding Erythromycin prophylactically.

HATCHERY PRODUCTION SUMMARY

Station

Dworshak NFH

Period covered

10-01-86 through 9-30-87

Density Index				Flow Index				Total Flow							
0.124				0.516				63,448							
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 lock	T. U. to Date	Length Increase 30 day month Inches
	Number	Weight	Length	Number	Weight	Pounds	Cost	Per Lb.	Per 1000						
1	2	3	4	5	6	7	8	9	10	11	12	13	14		
SCS 5-UID(RR)-3	0	0	0	1,718,633	55,640	84,465	31,241	1.52	0.56	18.70	25.18	0	0		
STT Dw(H)-8601	0	0	0	632,127	90,056	133,258	28,760	1.48	0.32	46.1	19.43	0	0		
STT Dw(H)-8602	0	0	0	708,495	107,375	153,782	33,058	1.43	0.31	48.69	17.59	0	0		
STT Dw(H)-8603	0	0	0	771,172	119,112	173,885	37,383	1.46	0.31	47.77	18.79	0	0		
SCS 6-UID(RR)-4	1,338.6	32,318	3.9	444,578	36,402	55,917	26,143	1.54	0.72	16.83	23.78	72.86	0.099		
SCS 6-Dw-Kk-1	195.9	6,701	4.4	0	6,518	11,056	5,296	1.70	0.81	27.03	22.62	67.65	0.18		
STT Dw(H)-8701	743.7	35,571	4.9	0	31,936	50,269	14,444	1.57	0.45	20.04	19.40	54.13	0.84		
STT Dw(H)-8702	1,019.6	22,778	3.9	0	14,809	23,759	8,368	1.29	0.56	8.20	21.27	23.4	0.60		
STT Dw(H)-8703	1,274.4	44,339	4.53	0	37,190	60,010	18,964	1.44	0.51	15.86	22.09	46.91	0.57		
TOTALS	4,572.2	141,707		4,275,004	499,038	746,401	203,657								
AVERAGES			4.326					1.50	0.41	23.02	21.13	52.99	0.46		

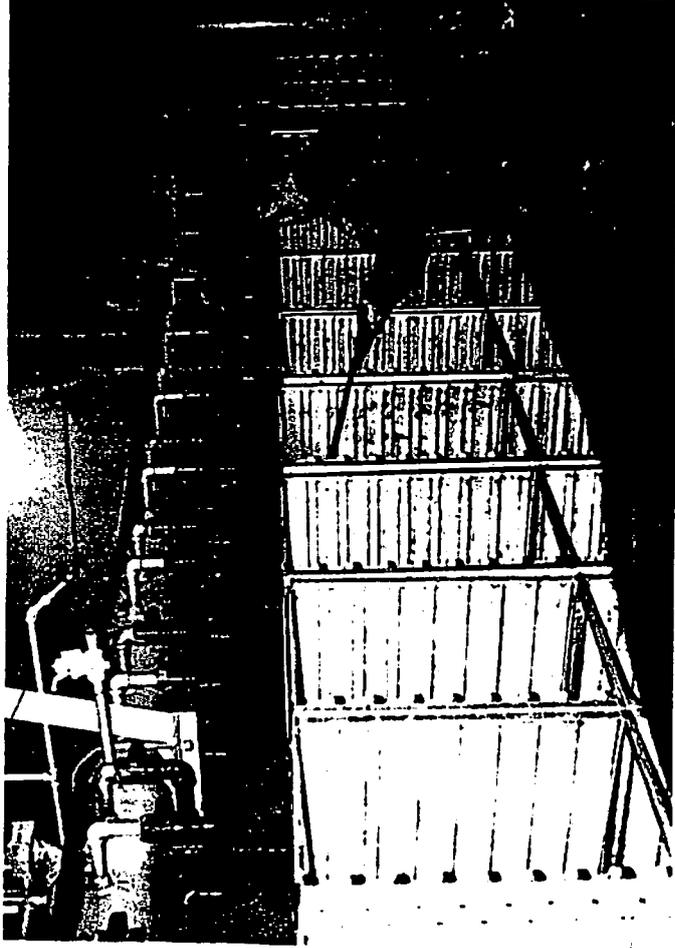
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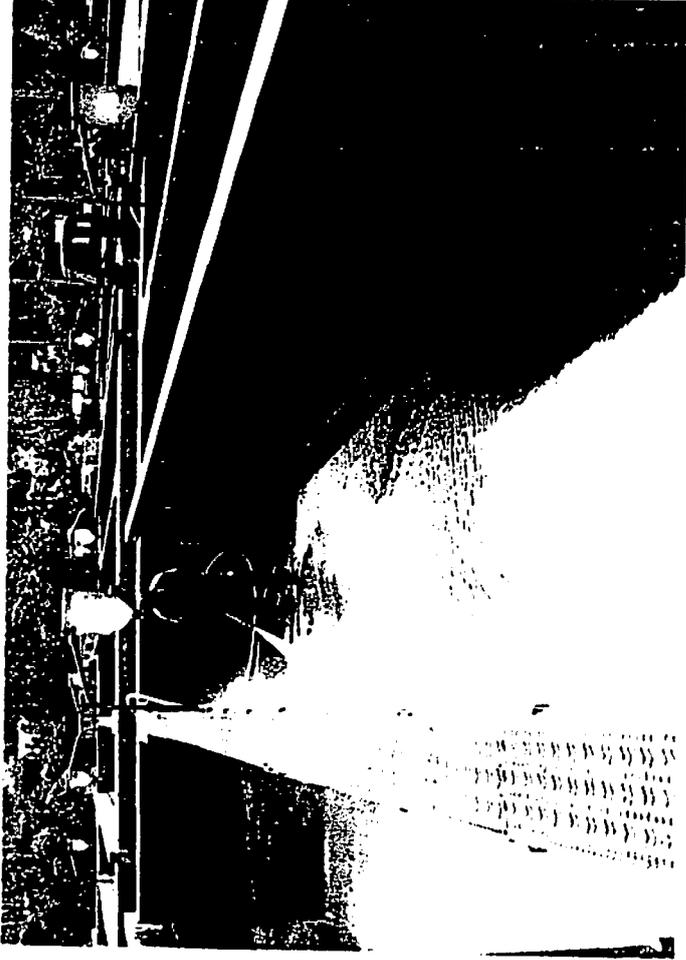
Pumping steelhead smolts into transport trucks.



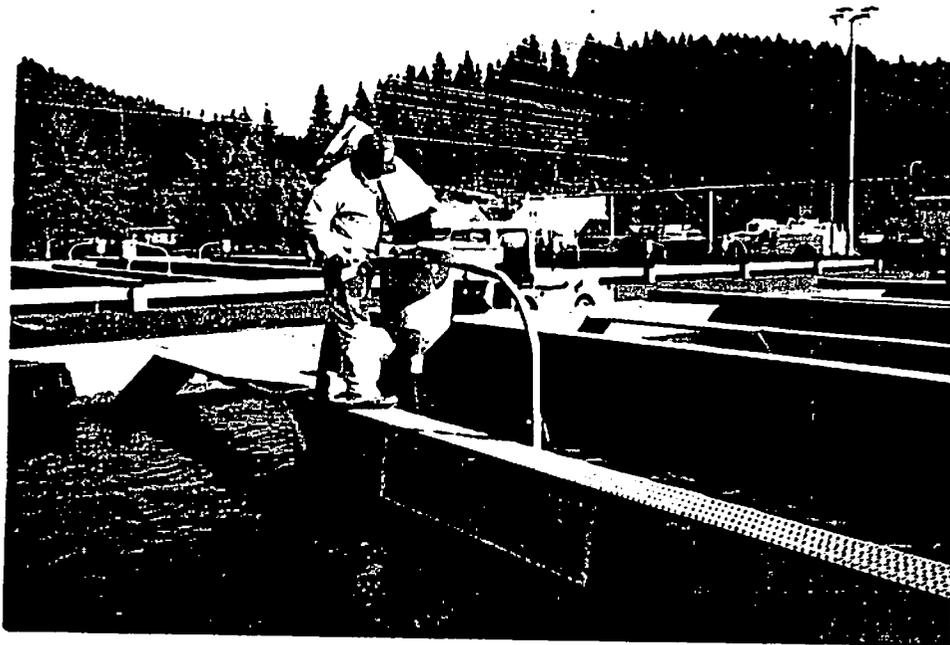
Loading steelhead smolts for transport to off-site locations.



Steam cleaning Heath incubators between production programs of steelhead and spring chinook.



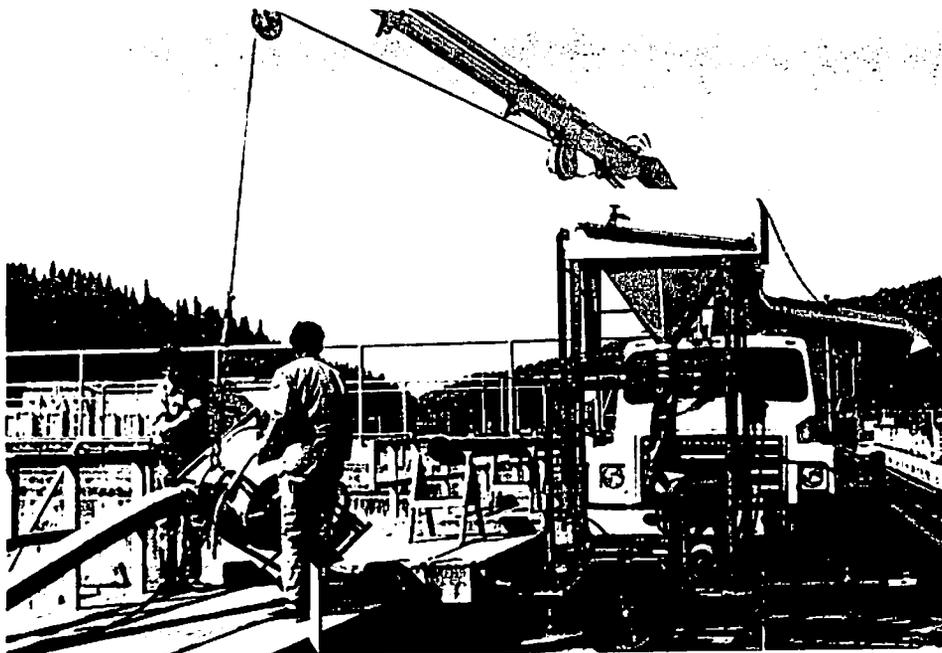
Washing down ponds for Brood Year 1987 steelhead production.



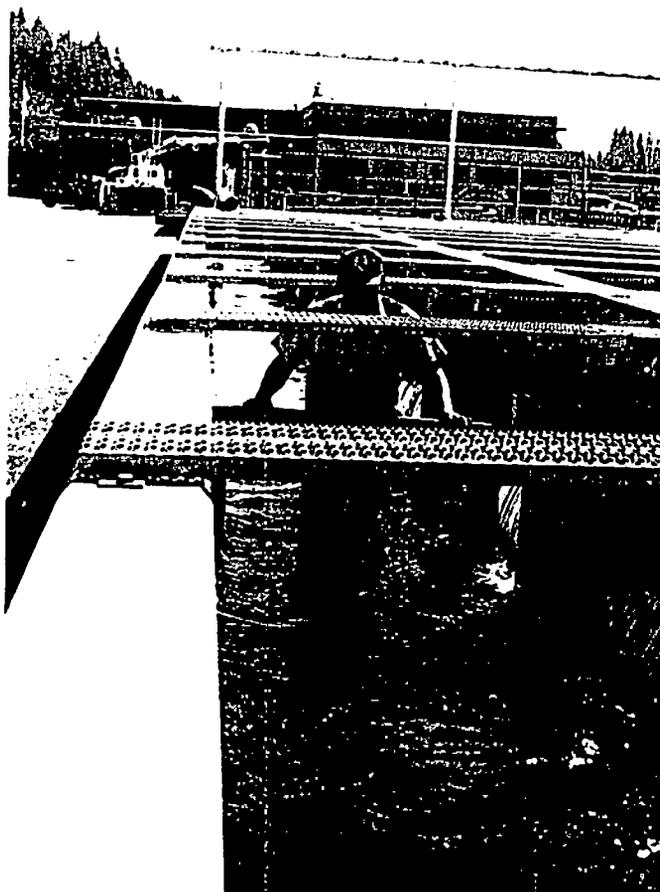
Filling demand feeders on steelhead ponds.



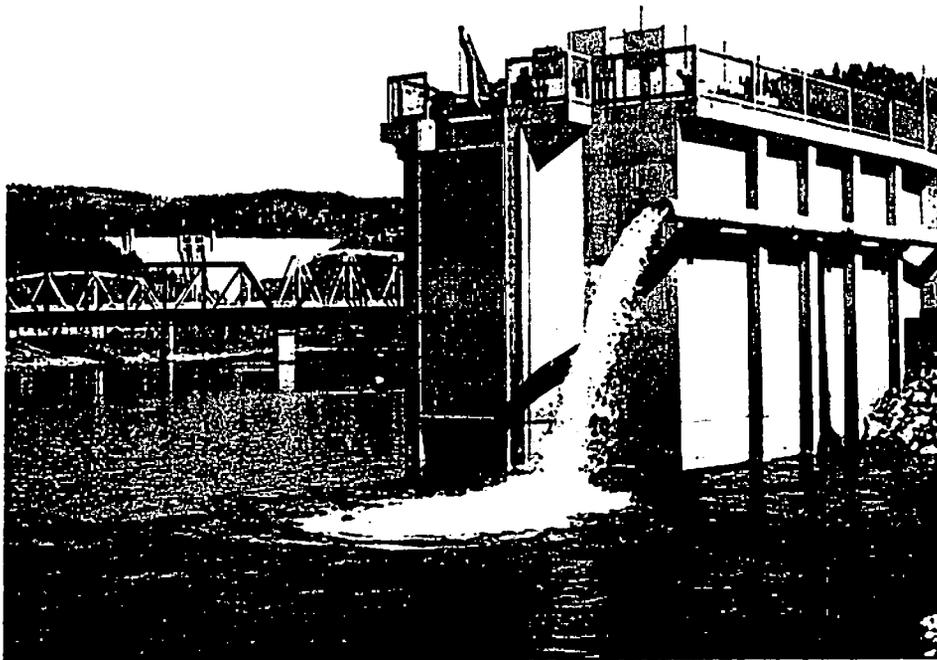
Inventory of steelhead production.



Placing pump in pond for transferring spring chinook to release channel.



Crowding spring chinook for a direct release into the North Fork Clearwater River.



Releasing spring chinook smolts via the planting pipe on the fish ladder.



Sorting spring chinook salmon at spawning time.



Counting steelhead eggs at eye up time.

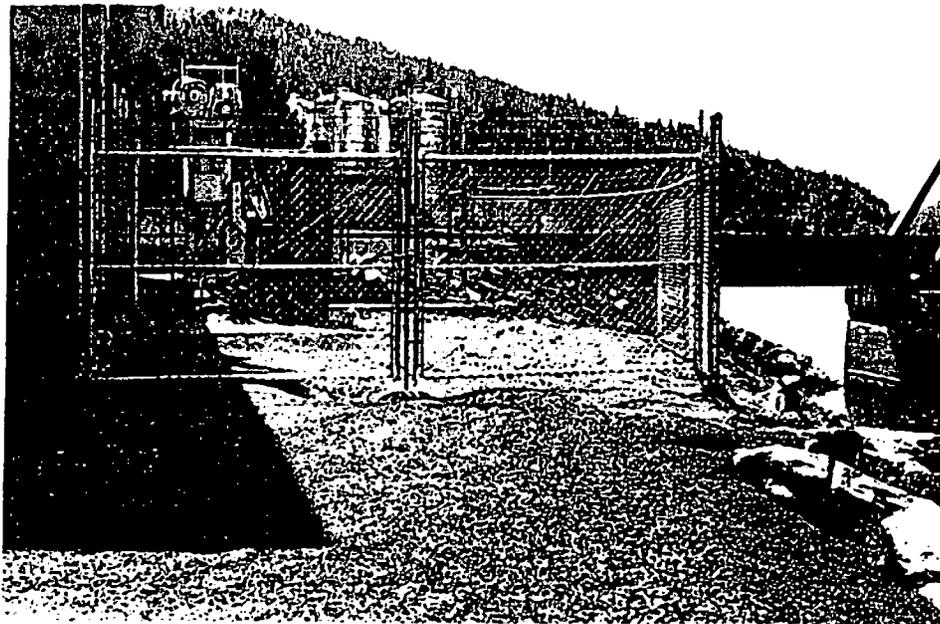


IHNV vaccination study - Seattle NFRC.

REPAIRS/IMPROVEMENTS/NEW EQUIPMENT

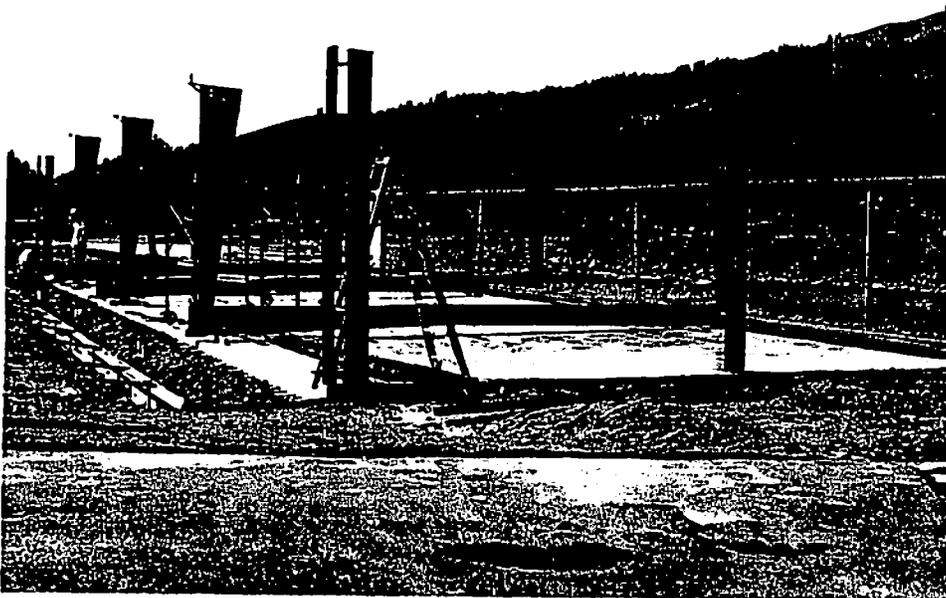
A number of major projects were completed during the year with FY 1987 funding. In addition, some work was carried over from contracts awarded the previous year. This latter work included metal roofing of four hatchery residences (\$9900), in November; a 30' x 100' (3-sided) metal storage building (\$40,280), in March; and an asphalt overlay of road area in vicinity of hatchery building entrance (20,285), in October. Special projects completed or awarded with this year's funding totaled \$100,425 and included the following:

Resident improvements	\$ 14,391
Exterior doors	
Garage doors	
Window replacement	
Exterior painting, Quarters 4	
Patio cover replacement, Quarters 1	
Wood stove, Quarters 4	
Paving - vicinity of new storage building . . .	15,470
(to be completed in early FY 1988)	
Laboratory	
Room modifications, new furniture	14,731
(Complete in FY 1988)	
Fencing and retaining wall	10,900
Vicinity of fish ladder to new storage bldg.	
Purchase and installation of sludge collection	
chain for Systems II and III	19,125
Production room modifications	2,286
Cabinets and countertops	
Labor and miscellaneous costs to install pumps	
Nos. 4 and 5	10,200
Fencing at main water intake	1,422
Window shades for office area	2,300
Hardware, shades, installation	
Electrical breaker rehab	9,600

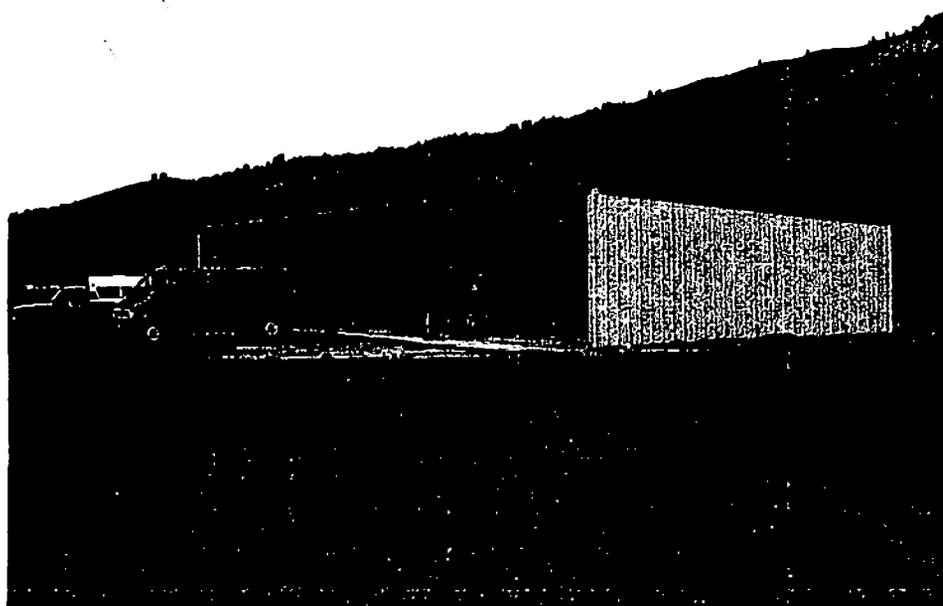


Fencing at water intake near main pump station for added security - \$1422.

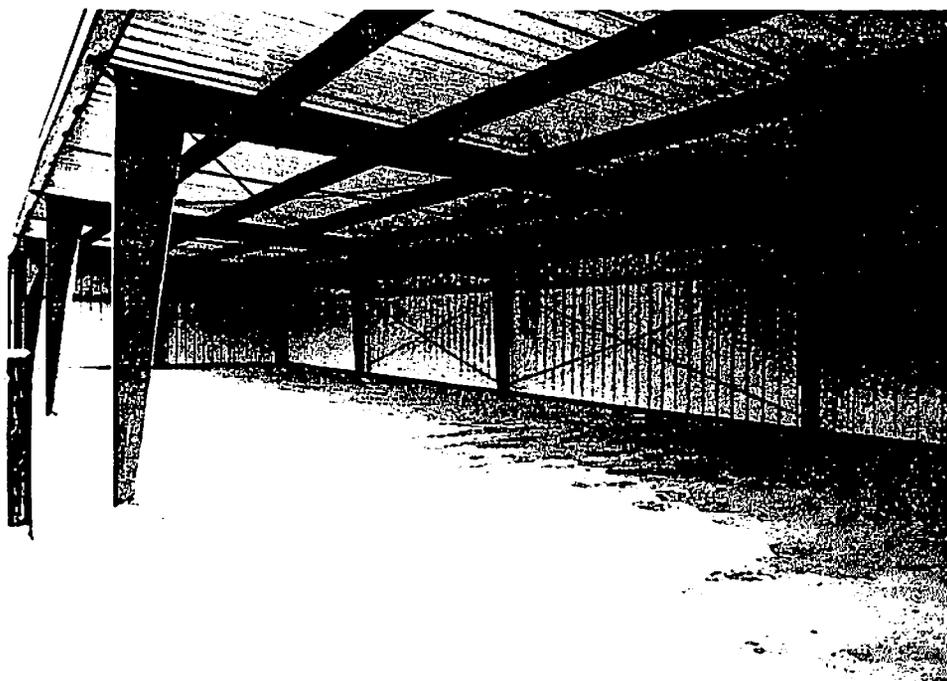
A metal storage building (30' x 100') was completed in the spring after weather delays postponed scheduled construction in fall 1986. This building has adequate space to accommodate eight large trucks or equivalent equipment. Sarber Construction of Coeur d'Alene, Idaho completed the work. Paving of the area in vicinity of the building was awarded to Poe Asphalt, Clarkston, Washington with work to be completed in October 1987. Plans are to completely enclose this area with fencing (purchased in FY 1987) to provide security for a general storage area.



Construction of a 30' x 100' metal storage building.

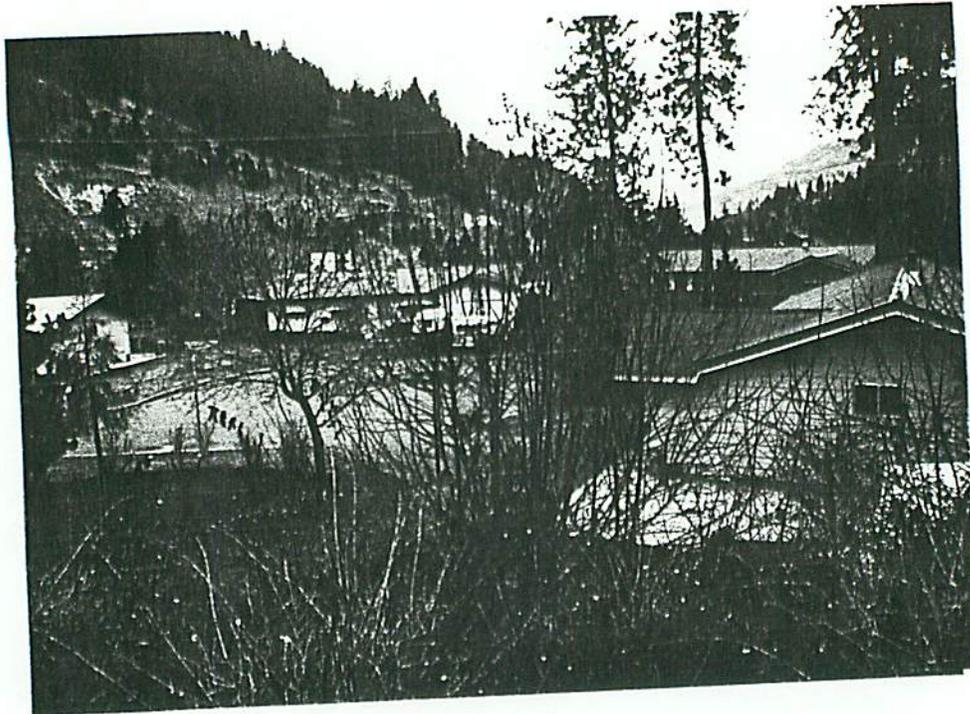


New metal storage building located at west end of hatchery.



Metal building with 3000 sq. ft. of storage area.

Major improvements to the four hatchery residences included new combination storm and screen windows to replace 20-year old units which were less energy efficient, difficult to maintain and costly to repair. New garage doors and exterior combination storm and screen doors were installed. The 20-year old homes, 1968 constructed, appear in very good condition. Many needed repairs and improvements have been completed over the past five years, including new color-coded metal roofs installed earlier in the year.



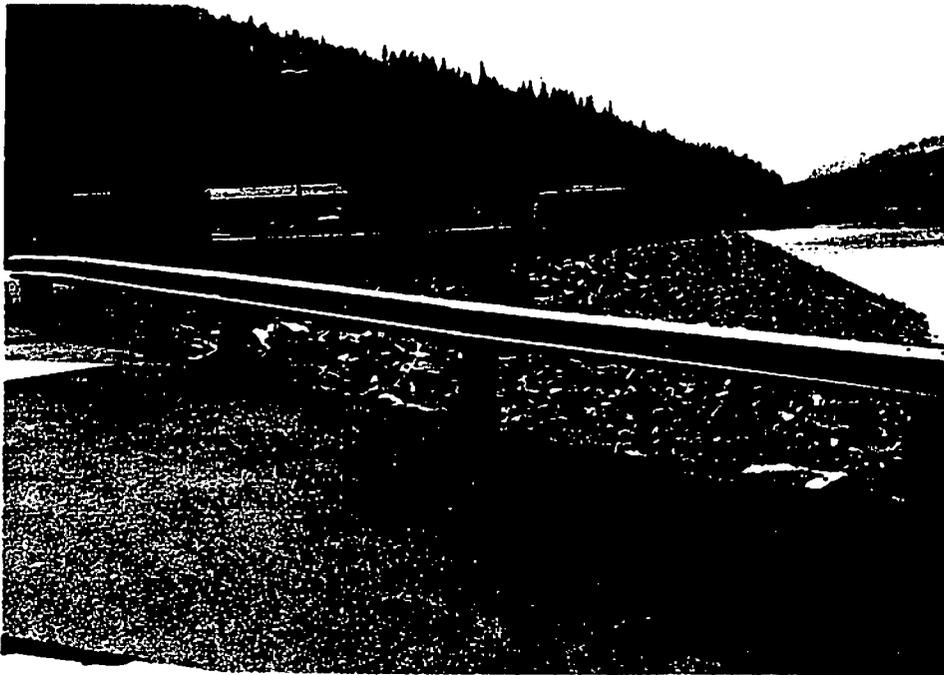
New metal roofs on four hatchery residences.

Resurfacing of existing asphalt roadways over the past two years nears completion. An estimated \$25,000 additional work remains to complete this work.

Work was begun in the fish health laboratory in preparation of utilizing additional space to accommodate expanded lab activities. The wet lab area was divided into two large rooms with concrete block walls constructed. New furniture was ordered for delivery in FY 1988, at which time a room will be finished (drop ceiling, flooring and wall paneling) and furniture installed to expand on space of existing water quality room.

Work was started and nearing completion at the end of FY 1987 to provide a walkway over the fish ladder. New fencing, with retaining wall along the perimeter of the hatchery between Mechanical I and west to the vicinity of the new metal storage building, was also

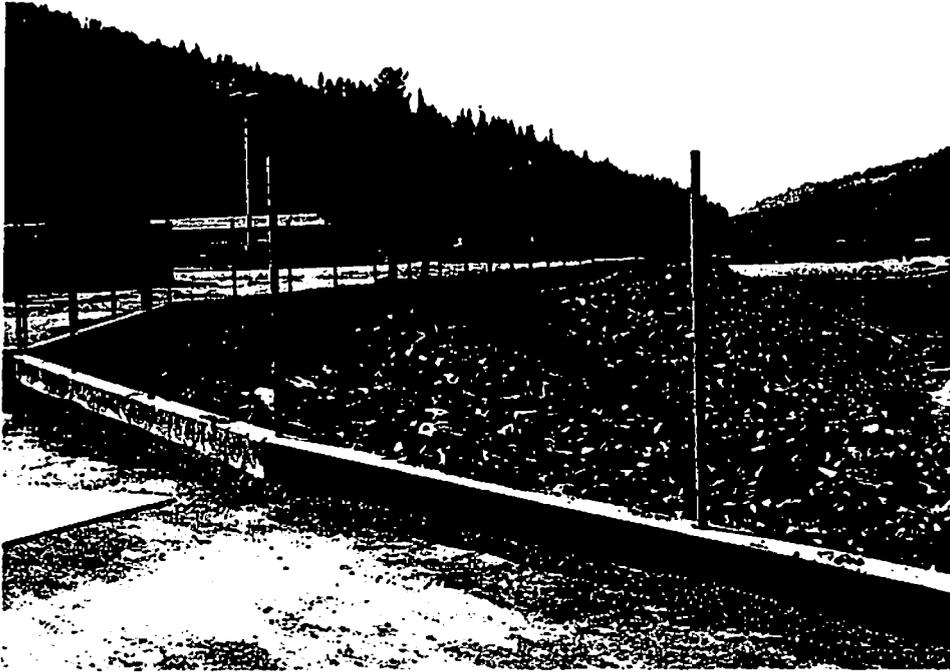
included in this project. Upon completion, the hatchery can be assured of added security in an area where people traffic was often a concern. It also provides the Nez Perce Indian Tribe access to their fishing areas without restriction of closed gates.



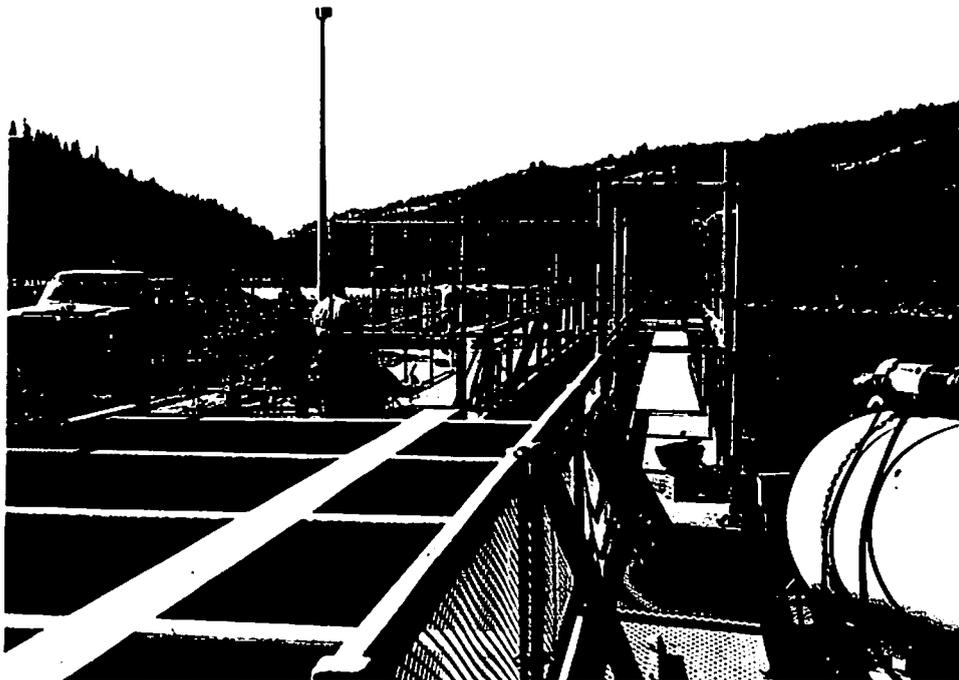
View of area prior to major fencing project showing guardrail barrier, unstable bank conditions and absence of security.



Form setting for concrete retaining wall in vicinity of fish ladder.



Construction of retaining wall and fencing near fish ladder - \$10,900.

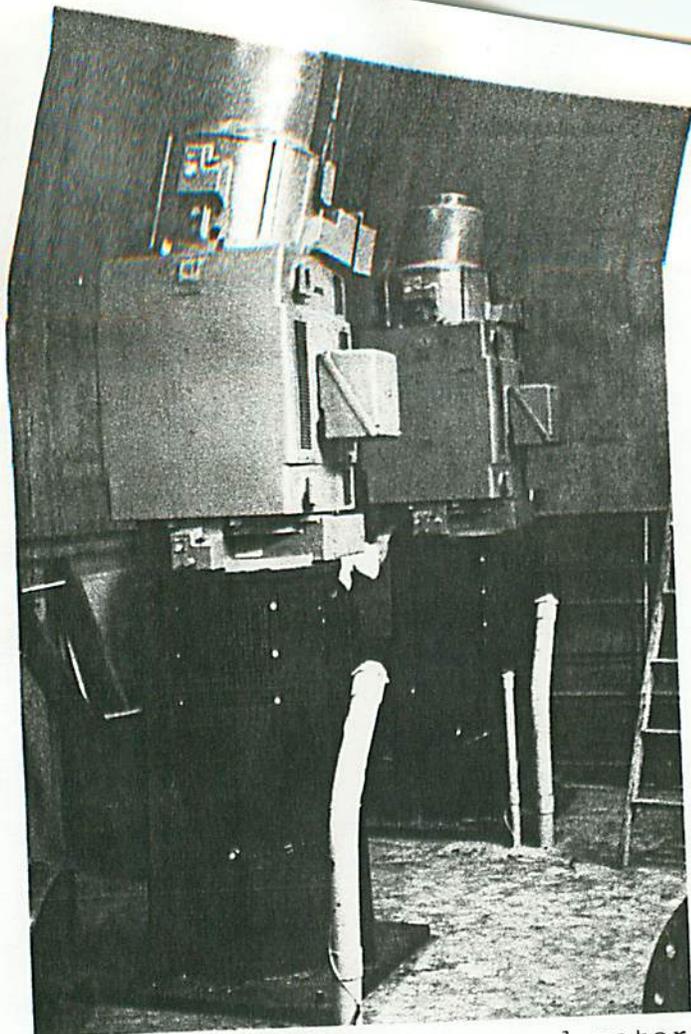


Fencing walkway to provide access route over fish ladder.

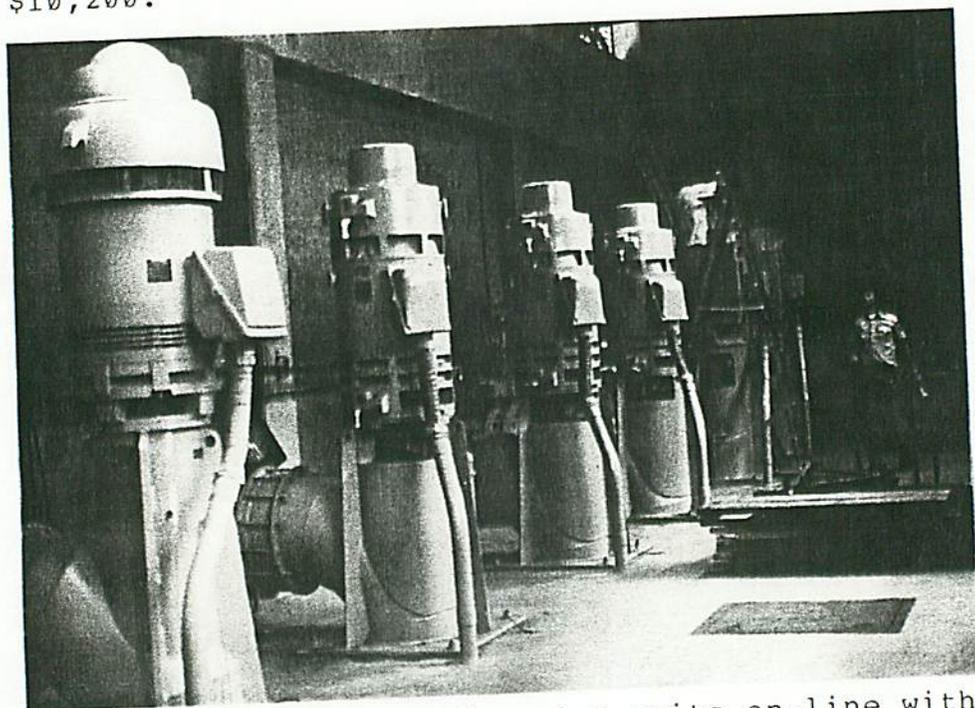
Major efforts were contributed by station labor to install new pumps (Nos. 4 and 5) in the main pump station. Placing the pumps, electrical upgrading, and hookup were all a part of these efforts. For this work, a savings of \$142,700 to the government from original cost estimates, seven station employees shared in a \$2100 group award.



Station employees Jenks, Greene, and Moffett threading conduit pipe for installing new electrical wiring in main pump building.



New pumps Nos. 4 and 5 installed--labor and materials (force account) \$10,200.

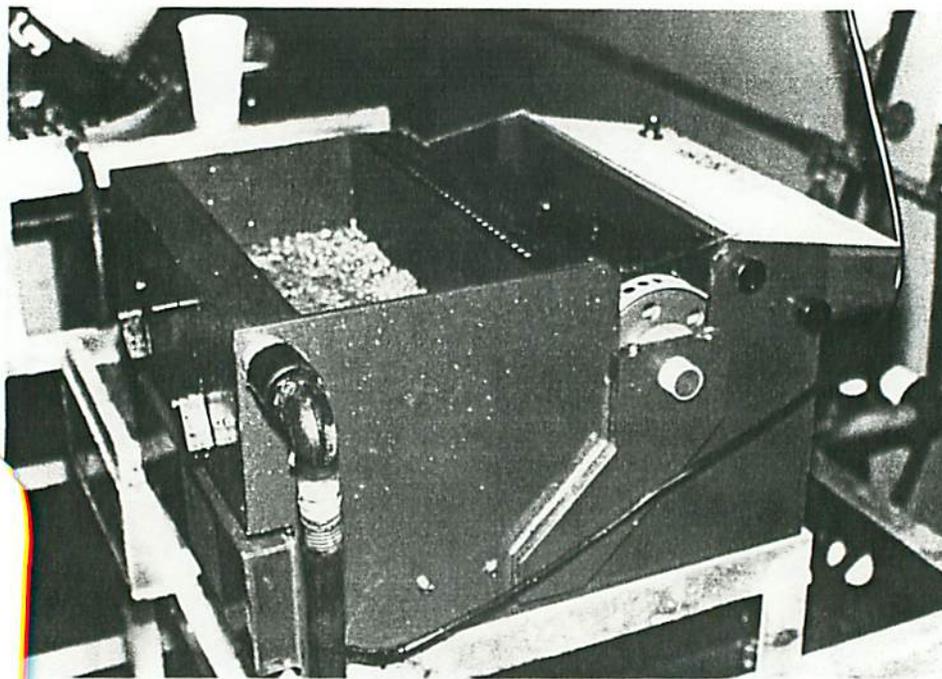


Main pump station showing all six major units on-line with a pumping capacity of 81,000 cfs.

Rehabilitation, at a cost of \$9600, continued in an effort to upgrade and maintain the station's complex electrical breaker circuitry. This assures that these systems are maintained in top operating condition. Further maintenance of other breakers has been scheduled into future years.

Other FY 1987 costs, \$97,303, included the purchase of several major items as shown:

Truck - 1 ton cab/chassis	\$ 9,500 est
To be used with portable fish tank and also for general service use - delivery in FY 1988	
Electrical carts (2)	7,626
Sustaf egg picker	10,070
Electric boiler	36,880
Delivery in FY 1988	
Heath egg tray replacements	3,671
Automatic gate valve operators (2)	5,700
Tangential flow concentrator	5,082
For use in monitoring water supply for IHN virus	
Desk computer and printer	5,630
Plasmarc welder and cutter	2,495
Aluminum bio-rings	4,481
Replaces plastic "Koch" rings in column degassers	
Chlorine analyzer (Lab)	1,817
Coded-wire tags	4,351

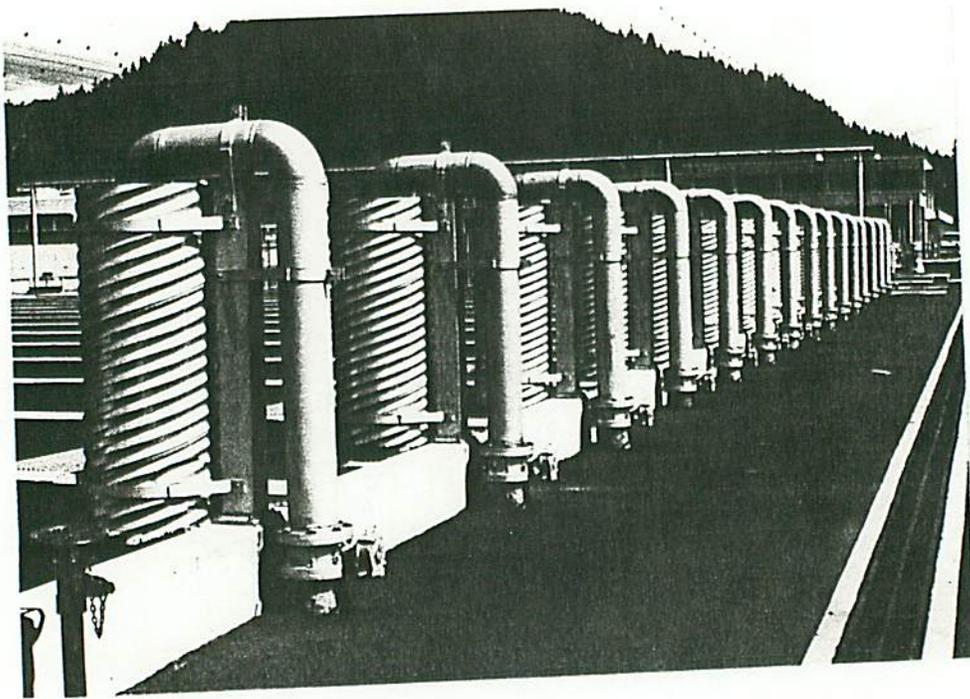


Sustaf 10 egg picker - \$10,070.

computer and software were received and setup for the station's maintenance management system. The program will include entries for all equipment, etc., with service records and maintenance requirements noted. This system, once in operation, will be a valuable asset in Dworshak's complex maintenance inventory.

Purchase of an electrical boiler, at \$36,880, replaces an existing oil-fired unit in Mechanical I. The station had been heating the buildings and water systems (System I and nursery) with oil until 1985 when one of two boilers was replaced by a COE energy contract. The second unit will be delivered in FY 1988 and scheduled for installation. Oil heat will soon be a fuel of the past at Dworshak.

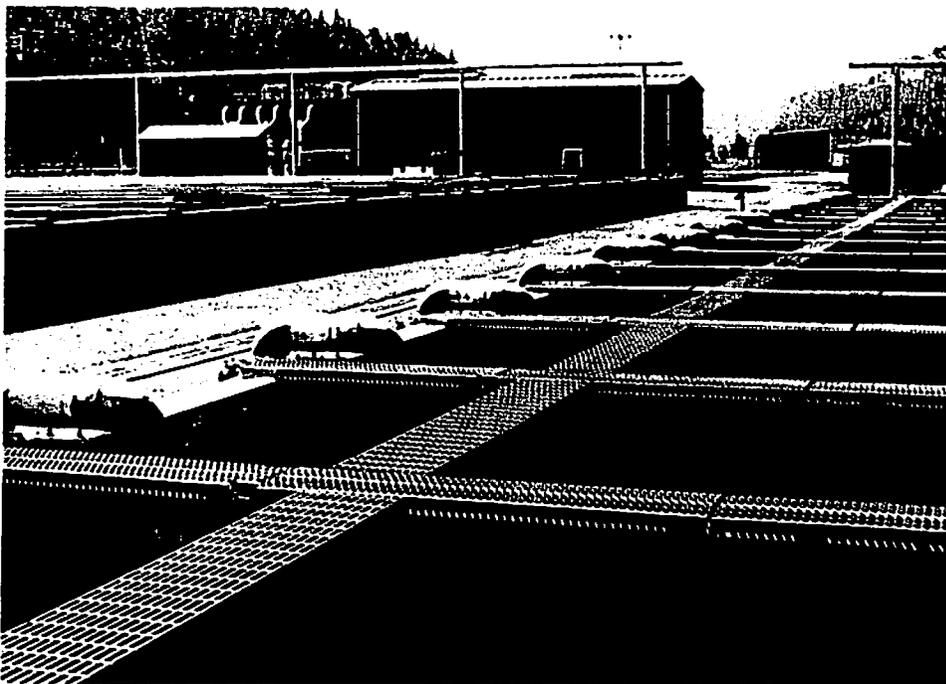
Thirty column degassers were removed from the LSRCP raceways after studies indicated that nitrogen gas was being efficiently reduced through the larger column degassers at the main aeration chamber. It was also shown that degassing at each of the 128 nursery tanks was no longer required with correction taking place at the water intake. The larger degassing units (30) were excess to the station and transferred to Ennis NFH. The units, a value of \$18,000, were immediately placed in operation to correct a serious nitrogen gas problem at Ennis.



Column degassers in place on spring chinook raceways prior to correction at main water intake.



Removing column degassers from raceways and modifying supply pipes.



Aeration modifications at main water intake replaces column degassers on 30 raceways.

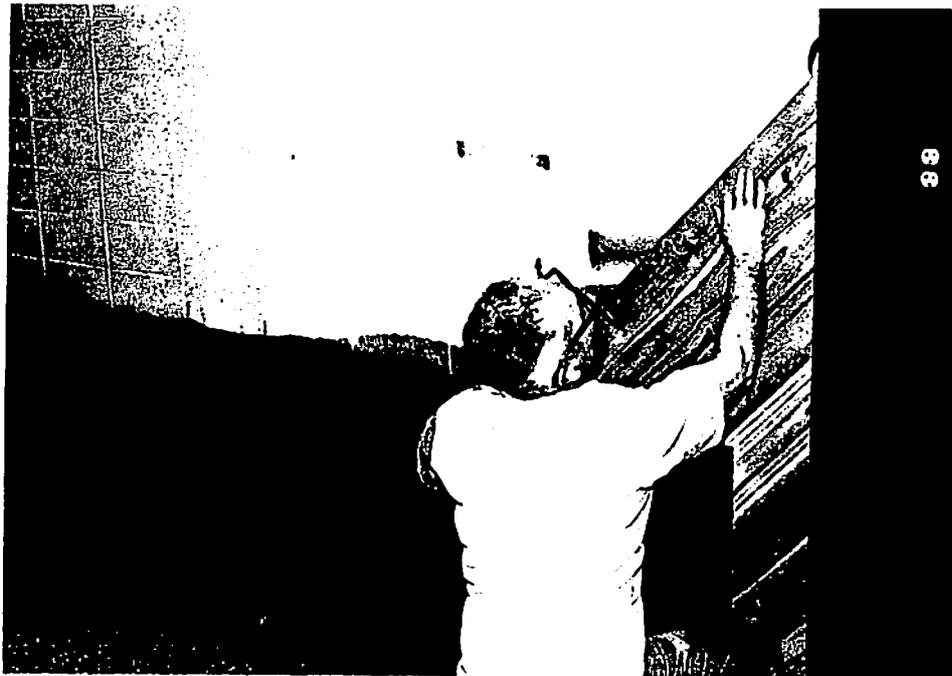
All 128 nursery tanks had individual automated trough feeders for use in early rearing programs. These feeders, never having been used, were removed and excessed to Region 6. Value of the feeders and controls was \$49,000.

Materials were on hand to cover 12 holding pond raceways with netting and wire to prevent bird predation on spring chinook. The LSRCP raceways, though covered, will need additional netting on the sides to reduce problems.

Cedar paneling of the tiled walls in the main hatchery building continued with plans to complete the office spaces in FY 1988. The visitor area and conference room were finished; adding to the attractiveness of the building interior.



Employee Tom Taggart cedar paneling walls in visitor area of hatchery building.



Paneling tiled walls in main hatchery building.

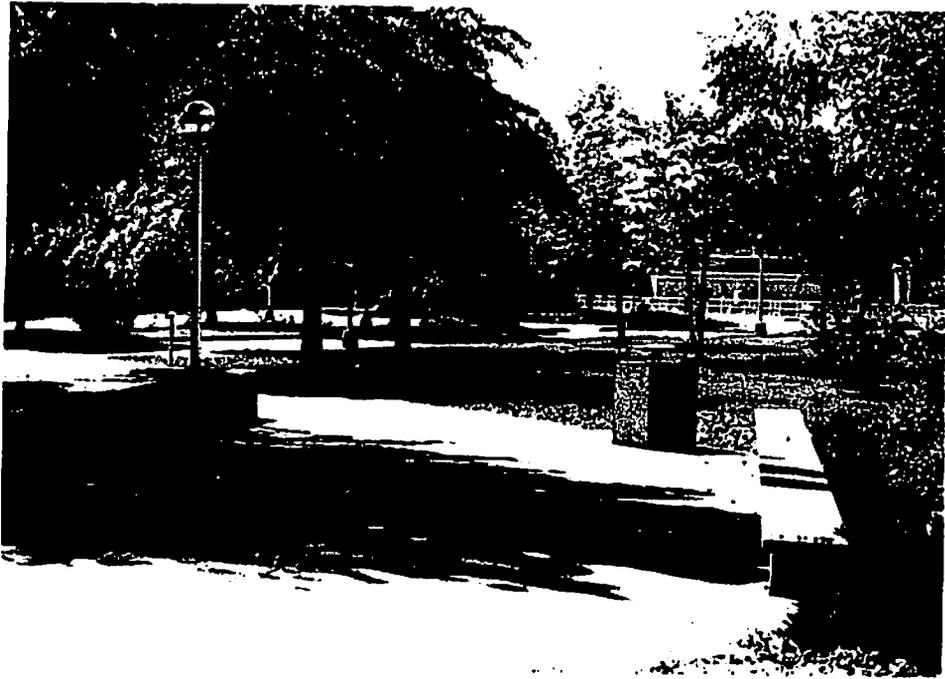
The hatchery continued to benefit from assistance of the summer YCC program in their many hours of work given towards beautifying the station grounds. General appearance of the facility has always been favorable to the visiting public. Many comments as to the positive impression Dworshak portrays are noted in the visitor register. This year was no exception in the hours the young enrollees worked on station cleanup and improvements which will carry over to another summer season.



Grounds maintenance with assistance from summer YCC enrollees provided an excellent station appearance.



Station landscaping.



Station landscaping.

MEETINGS/TRAVEL/TRAINING

Semi-annual coordination meetings were held on November 20 and March 26 to review the Clearwater fisheries program; major emphasis placed on the fish culture activities of Dworshak-Kooskia Complex. Representatives from FWS, COE, IDF&G, Nez Perce Tribe and National Marine Fisheries Service were in attendance.

The 37th Annual Northwest Fish Culture Conference was held in Springfield, Oregon, December 2-4. In attendance from the complex were Wayne Olson, Greg Pratschner, Dave Owsley and Bruce McLeod.

Engineer Dave Owsley traveled to Michigan in November for an on-site review of the aeration and degassing systems in place at several state hatcheries. Manager Olson accompanied several government and tribal agency personnel to Michigan in May for a first hand look at their oxygenation systems.

A number of meetings were held at the station for the purpose of reviewing Dworshak's IHNV disease problem. Formal meetings, in which Manager Olson represented the hatchery, were held on January 21 and August 18 with committee members John Miller, R.O. Portland; Jim Winton, NFRS Seattle; Jim Warren, Vancouver; Bill Miller, Dworshak FAO and Joe Lientz, Dworshak FHC attending.

Greg Pratschner attended the Idaho Chapter AFS meeting in Boise, held March 12-14 and presented a paper "IHN Virus Incidence in Steelhead Adults at Dworshak".

Olson remained active with a local (5 county) "Steelhead Impact Committee" group, meeting regularly to review Clearwater River user needs and problems.

A regional FWS fisheries meeting, held in Reno, Nevada, August 4-6, was attended by Olson, Pratschner, Owsley and McLeod.

Several meetings were attended by hatchery staff with COE officials, in Walla Walla, to discuss hatchery water requirements as they relate to the new Clearwater Hatchery design.

Other travel by Olson and Owsley included site visits of Little White and Spring Creek NFH's with a visit to the Portland Regional Office in March and a trip to Montana, in May, to visit the Bozeman Technology Center and Ennis NFH.

Manager Olson met with other members of a group panel in Vancouver, Washington, July 28, to prepare a format for discussing the topic "Field Perspectives of the Regional Office" for presentation at the August fisheries meeting in Reno.

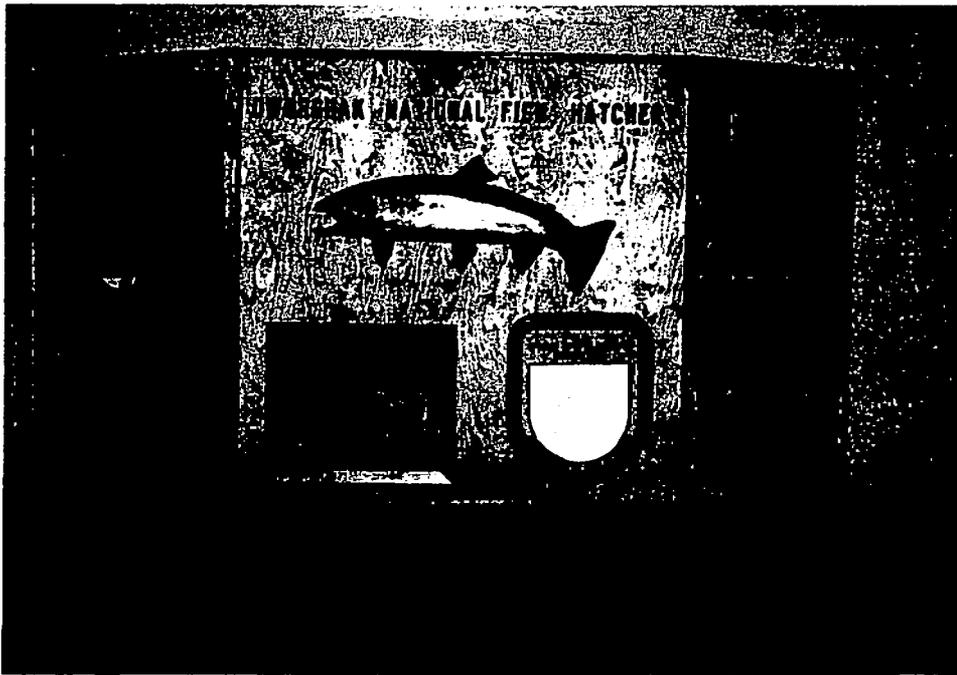
A number of employees participated in formal training courses including:

- "Managing People" - 8 hour session, Spokane, Washington, November 6 - Wayne Olson, Bruce McLeod, Greg Pratschner, Bob Austin and Sharon Russell.
- "Public Awareness" - 40 hour session, San Francisco NWR, January 12-16 - Wayne Olson.
- "Proofreading with Precision" - 16 hour session, Portland, Oregon, March 19-20 - Diane Praest and Mary Lou Galloway.
- "Time and Attendance/Pay Processing" - 8 hour session, Boise, Idaho, April 10 - Diane Praest and Mary Lou Galloway.
- "Coldwater Fish Culture" - 80 hour session, Sacramento, California, December 1-12 - John Parks.
- "Math Refresher" - 48 EC - NISC correspondence course (32 hours) - Mary Lou Galloway.
- "Programmed English Usage 2600" - NISC correspondence course (48 hours) - Diane Praest.
- "Programmed English Usage 3200" - NISC correspondence course (48 hours) - Diane Praest.

PROGRAM INFORMATION/VISITORS

A Dworshak "Interpretive Development Prospectus" was prepared by the FWS and reviewed for comment by the COE, IDF&G and hatchery. The interpretive outline was finalized and made ready for contract review in FY 1988. It is anticipated that award could be made in 1988 and work to commence soon after. Outdoor and indoor, attractive and highly visible, exhibits are part of the planning which also includes revamping Dworshak's Visitor Center. This will be the first major effort by the COE and FWS to provide the hatchery with professional input into design and completion of the displays; most work having been done by station staff since operation of the hatchery began in 1968.

A fold-out 4' x 8' panel with photos, fish mount, brochure rack etc., was designed and constructed for use as a traveling exhibit. First use of the display was made at a "Steelhead Clinic" in Lewiston, Idaho on October 30.



A fold-out traveling exhibit for use in off-station presentations.

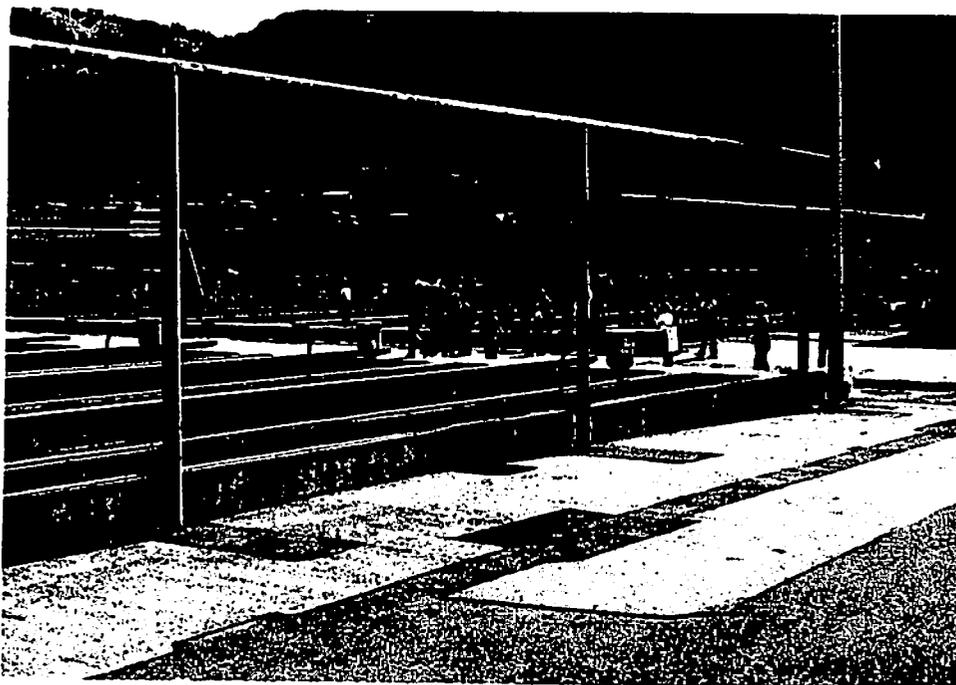
Several off-station programs were presented by station staff including:

- Orofino Rotary Club
- Clearwater Realty Association
- Dent Acres (COE) campground sessions
- Orofino High School
- Orofino Junior High
- Orofino Elementary
- Orofino Kiwanis Club

Local news media regularly provided coverage of hatchery operations including spawning activities of steelhead and spring chinook, and fish health problems caused by IHN virus.

Manager Olson was interviewed for a 30-minute tape by 4-K radio (Lewiston, Grangeville and Orofino area) broadcasted August 1. The program, "KOZE Wants You to Know" highlighted the history of Dworshak, reviewed disease problems and production programs and provided general comments on fishery activities.

Numerous on-station tours were provided to area school groups and others during the steelhead spawning operations. Along with formal tours given by station employees, two volunteer workers assisted in answering questions from visitors viewing spawning operations in the balcony area.



One of many school groups on a guided tour of the hatchery.



Visitors in viewing balcony overlooking spawning operations.

Several charter bus tours were escorted through the hatchery facility with formal guided tours provided by station staff. Included also in tours, of note, were a 6th grade forestry group of 75 students, several Corps of Engineers groups (new engineers, offices, etc.) both from the District and Division.

Among official station visitors were several Regional Office staff, Walla Walla District engineers and University people (WSU and U of I). Other visitors, to note a few were:

Jerry Bouck, BPA, Portland
Tom Pruett, Creston NFH, Kalispell
Joann Leong, OSU, Corvallis
Emil Slatick, NMFS, Pasco
Stefan, Stippl, Germany
Roland Damann, Germany
Franz-Joseph Damann, Germany
Dick Kuehner, FWS, Portland
Rich Haire, FWS, Portland
Col. Valentine, COE, Washington D.C.
Jim Winton, SNFRC, Seattle
John Wilbrecht, Jackson NWR, Wyoming
Larry Wubbles, Jordan River NFH, Michigan
Charlie Smith, Bozeman FCDC, Montana
Bill Godby, FWS, Denver
Larry Visscher, FWS, Denver
John Nickum, FWS, Washington D.C.

Estimated number of public visitors to the hatchery, during FY 1987, was 31,000.



Engineer Dave Owsley with visitors Roland Damann, Franz-Joseph Damann, and Stefan Stippl from Germany.

STAFFING

The position of Electrical Equipment Repairer, WG-10, was vacant at the start of FY 1987. Ben Greene was selected to fill this position starting November 24. Later in the year, two Fishery Biologist positions became vacant with action effective April 12 promoting Jim Rockowski to fill Bob Austin's GS-9 position; Mr. Austin transferred with promotion as Assistant Manager, Eagle Creek NFH, and selection of Kip Bottomley, GS-5, to fill Mr. Rockowski's vacancy effective September 28, 1987. Sharon Russell, Budget Assistant, GS-6, was transferred with promotion to the Denver Finance Center effective August 30. This position remained unfilled at the close of FY 1987. No other permanent staffing changes were made during the year.

Personnel actions resulted in promotions to the following employees:

- Hamilton McCleary, Animal Caretaker, WG-4 to WG-5
- Alfred Jenks, Animal Caretaker, WG-3 to WG-4
- Richard Parks, Animal Caretaker, WG-3 to WG-4
- Hubert Sims, Maintenance Mechanic, WG-8 to WG-10

Personnel actions for temporary appointments included:

- Bernice Kaemmerling, Clerk-Typist, GS-2, 11/05/86 to 3/14/87
- Billy Arnsberg, Biological Aid, GS-4, 12/07/86 to 3/31/87
- Kimberly Smathers, Clerk-Typist, GS-2, 3/15 to 8/14/87
- Gary Jefferson, Laborer, WG-2, 4/12 to 8/28/87
- Rocky Greenland, Laborer, WG-2, 5/26 to NTE 5/31/88
- Dawna Nichols, Clerk-Typist, GS-2, 8/16/87 to NTE 1 year

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).

- Melissa Spencer, Student Aid, YW-00, 12/15/86 to 8/16/87
- Silas Gilliam, Student Aid, YW-00, 12/15/86 to 5/20/87

The hatchery, again, initiated a summer hiring program employing university enrolled fishery students. Hired this year for a summer "hands on" experience were:

- Ronald Ross (University of Idaho), Biological Aid, GS-4, 5/8 to 8/21/87
- Michael Arnold (Humbolt State), Biological Aid, GS-4, 5/11 to 8/28/87
- Andy Hamilton (Oregon State University), Biological Aid, GS-4, 6/7 to 12/23/87. Mr. Hamilton was extended NTE 5/31/88.

A YCC program began on June 8, ending July 31. Ten enrollees with Crew Leader Chad Easterbrook, YCC Social Services Assistant, GS-5, participated in the program.

The Dworshak hatchery is a participant in Region 1's "Employee Development Training Program" with recruitment action initiated during the year for a GS-5/7 fishery biologist. This action is one of several in the region to hire and train young professional biologists for advancement within the fisheries field. "Kip" Bottomley, from Kilauea Point NWR, Kilauea, Kauai (Hawaii) was our selection for this training program.



Administrative staff Mary Lou Galloway, Clerk-Typist; Sharon Russell, Budget Assistant; and Diane Praest, Clerk-Typist.

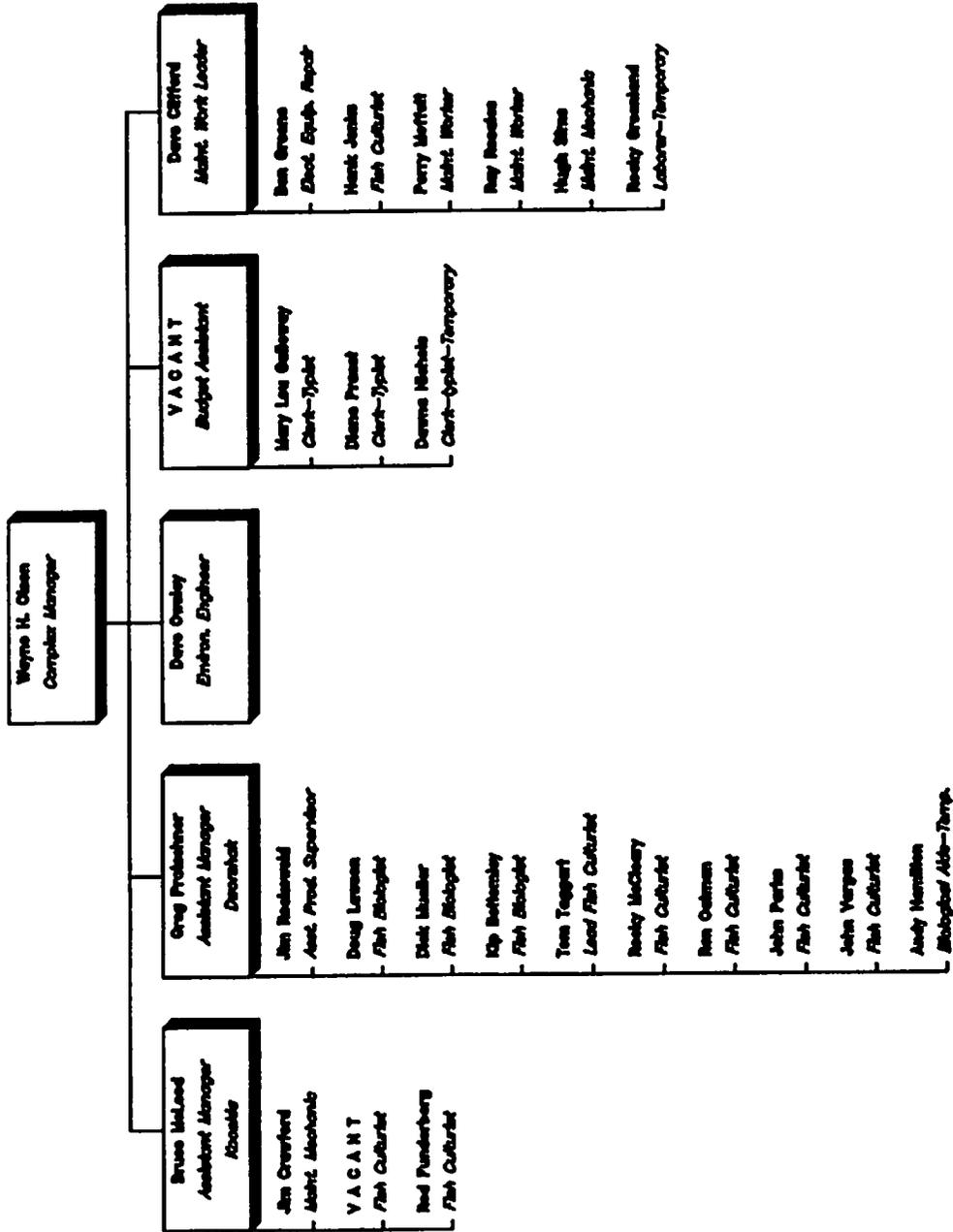
Dworshak Employees
- FY-87 -

<u>Name</u>	<u>Position Title</u>	<u>Period of Employment</u>	<u>Status</u>
Arnold, Michael K.	Biological Aid	5/03/87 - 8/30/87	Temporary
Austin, Robert J.	Fishery Biologist	10/01/86 - 2/28/87	Permanent
Bodily, Lissa M.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Bottomley, Richard J.	Fishery Biologist	9/27/87 - 9/30/87	Permanent
Bryant, Michelle	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Burke, Kelly G.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Clifford, David E.	Maintenance Work Leader	10/01/86 - 9/30/87	Permanent
Easterbrook Chad	Crew Leader (YCC)	6/08/87 - 7/31/87	YCC Program
Eaves, William L.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Galloway, Mary Lou	Clerk-Typist	10/01/86 - 9/30/87	Permanent
Gilliam, Silas K.	Student Aid	12/15/86 - 5/20/87	Temporary
Greene, Benny C.	Electrical Equipment Repairer	11/23/86 - 9/30/87	Permanent
Greenland, Rocky E.	Laborer	5/26/87 - 9/30/87	Temporary
Hamilton, Andy S.	Biological Aid	6/07/87 - 9/30/87	Temporary
Hanna, Amber Lee Ann	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Isaacks, Crystal M.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Jefferson, Gary E.	Laborer	4/12/87 - 8/30/87	Temporary
Jenks, Alfred H.	Animal Caretaker	10/01/86 - 9/30/87	Permanent
Kaemmerling, Bernice	Clerk-Typist	10/01/86 - 3/14/87	Temporary
Lawson, Douglas L.	Fishery Biologist	10/01/86 - 9/30/87	Permanent
McCann, Teresa A.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
McCleary, Hamilton R.	Animal Caretaker	10/01/86 - 9/30/87	Permanent
Mechling, Jason L.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Moffett, Clarence P.	Maintenance Worker	10/01/86 - 9/30/87	Permanent

<u>Name</u>	<u>Position Title</u>	<u>Period of Employment</u>	<u>Status</u>
Mueller, Richard A.	Fishery Biologist	10/01/86 - 9/30/87	Permanent
Nichols, Dawna M.	Clerk-Typist	8/16/87 - 9/30/87	Temporary
Oatman, Ronald W.	Animal Caretaker	10/01/86 - 9/30/87	Permanent
Olson, Wayne H.	Hatchery Manager	10/01/86 - 9/30/87	Permanent
Owsley, David E.	Environmental Engineer	10/01/86 - 9/30/87	Permanent
Parks, Richard J.	Animal Caretaker	10/01/86 - 9/30/87	Permanent
Praest, Diane E.	Clerk-Typist	10/01/86 - 9/30/87	Permanent
Pratschner, Gregory A.	Assist. Hatchery Manager	10/01/86 - 9/30/87	Permanent
Richardson, Thomas W.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program
Rockowski, James J.	Fishery Biologist	10/01/86 - 9/30/87	Permanent
Rosales, Raymundo A.	Maintenance Worker	10/01/86 - 9/30/87	Permanent
Ross, Ronald L.	Biological Aid	5/04/87 - 8/23/87	Temporary
Russell, Sharon H.	Budget Assistant	10/01/86 - 8/30/87	Permanent
Sims, Hubert M.	Maintenance Worker	10/01/86 - 9/30/87	Permanent
Smathers, Kimberly A.	Clerk-Typist	3/15/87 - 8/16/87	Temporary
Spencer, Melissa M.	Student Aid	12/15/86 - 8/16/87	Temporary
Taggart, Thomas M.	Animal Caretaker Leader	10/01/86 - 9/30/87	Permanent
Vargas, John J.	Animal Caretaker	10/01/86 - 9/30/87	Permanent
Vargovich, James C.	YCC Enrollee	6/08/87 - 7/31/87	YCC Program

Dworshak-Kooskia Complex NFH

September 30, 1987



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

Dworshak Fish Health Center and Dworshak Fisheries Assistance Office 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 brood stock to the Lyons Ferry State Hatchery, in Washington, from the Ice Harbor Dam collecting site.

Steelhead carcasses, received by a local processor on spawning days processed and frozen, were made available to several commodity programs administered under the Idaho Department of Education. The hatchery provided cold storage space for 40,000 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.

In cooperation with Leetown Fisheries Academy, employees Greg Pratschner and Bob Austin instructed at the Coldwater Fish Culture Course in Sacramento, California, December 1-12, 1986. Instructing sessions in "Hatchery Techniques", Santa Fe, New Mexico June 15-19 were Greg Pratschner (hatchery experimental design) and Dave Owsley (water quality).

Assistant Manager Greg Pratschner assisted the lower river hatcheries of Spring Creek and Little White NFH's with computer programming for hatchery storage base.

Information was compiled on Dworshak's bird control system (wire and netting over ponds) and specifications, designs, etc. distributed to all Region 1 hatcheries.

The hatchery is participating in an employee rehabilitation program administered from Spokane, Washington. Pat Bailey, Orofino, Idaho, began part-time employment on April 8 working 2-8 hours each week. Mr. Bailey is strictly under a volunteer program with no salary involved. Work was limited in the beginning weeks increasing gradually as the employee's endurance allowed. The program is expected to place Mr. Bailey back into an employable situation.

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