Annual Report

FISCAL YEAR 1979

DWORSHAK NATIONAL FISH HATCHERY
(Hatchery)

Submitted By: Wayne H. Olson Title Manager Date [illegible]

Date Received Regional Office _____ Reviewed By: _____ Date _____

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Form 3-100

DIVISION OF FISH HATCHERIES

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I N T R O D U C T I O N

Dworshak National Fish Hatchery was constructed and is funded by the Corps of Engineers (CE) to produce steelhead trout to mitigate for the loss of spawning area resulting from the construction of Dworshak Dam on the North Fork Clearwater River, and to produce rainbow and cutthroat trout and kokanee salmon for stocking in the Dworshak impoundment.

To meet a mitigation obligation to maintain an average annual run of 12,000 adult steelhead to the North Fork Clearwater River, the hatchery was designed to rear the progeny from 6,000 steelhead adults to a size of eight per pound (an estimated 400,000 pounds), and to rear 100,000 pounds of resident species. However, since the start of fish rearing operations in 1969, the hatchery has been plagued with design and production problems. Consequently, the hatchery has not been able to meet its design production. Extremely soft North Fork Clearwater River rearing conditions, (low mineral content in the water) are believed to be the root of the production problems.

In consort with the State of Idaho, steelhead production goals have been revised downward from design levels. Current production goals include 300,000 pounds of steelhead, and 100,000 pounds of resident species annually.

Nevertheless, even with the reduced production, the hatchery has met its mitigation goals on several occasions, and has always maintained sufficiently large runs to provide ample eggs for hatchery operations. Still, during some years, steelhead sport fisheries have been either closed or curtailed to ensure adequate hatchery brood fish.

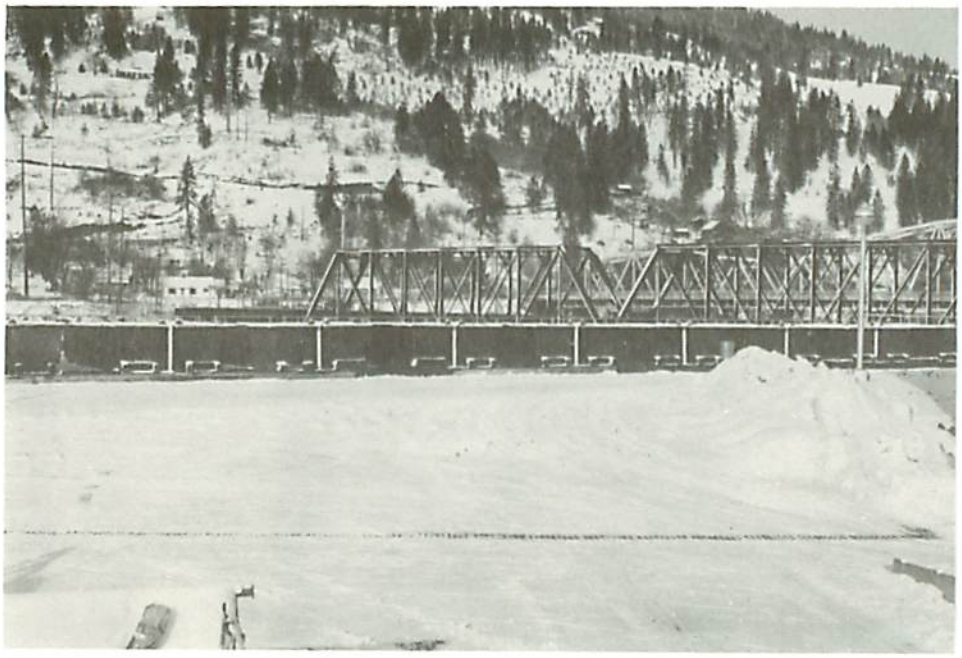
The hatchery also provides adult holding facilities for Kooskia spring chinook salmon, and provides rearing space for a limited number of chinook fingerling for the Kooskia hatchery. The salmon production is funded by the Fish and Wildlife Service.

GENERAL

Due to concerns over a number of earlier production losses, the hatchery was assigned by the Boise Area Office to provide a comprehensive production proposal for the 1979-80 program. This proposal or study outline would "determine the most efficient production program that will achieve mitigation requirements with minimum risk to fish health." Planning documents describing the hatchery's production program were submitted to the Area Office on July 9 as a guide to follow for this year's production.

The hatchery has closely followed the production plan with some changes over last year, i.e. cooler water temperatures, to have an excellent Broodyear 1979 steelhead program to date. We are cautious, however, to say that production will continue to do as well when presmolting conditions become apparent. Anticipated steelhead smolt release for spring 1980, as shown at the end of this fiscal year, is 2¼ million fish at 300,000 pounds.

Continual construction of the hatchery has resulted in a number of unexpected production changes. This last year was no different as construction was begun in March on the new 18,000 square foot nursery tank building. In preparation to site clearance, all 128 nursery tanks had to be relocated outside wherever water connections were made available. This gave us little control over nitrogen gas problems, water temperature and adverse weather conditions. We look forward to the time when construction is complete and the hatchery can begin rearing fish under more ideal conditions.



Nursery tanks installed along service road during interim period of nursery building construction

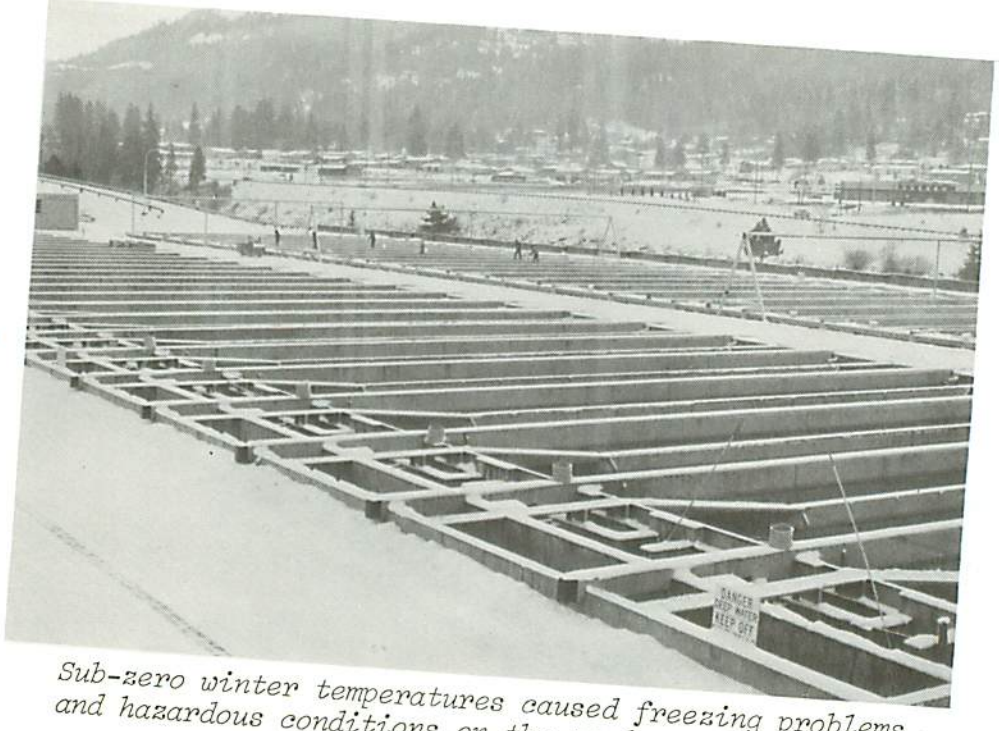
Nitrogen gas has been identified as a problem at levels down to 103 percent. This problem in early production, together with white-spot disease, has caused some very high losses. The hatchery is confident that nitrogen gas can be reduced to acceptable levels for next year's production. Installation of column degassers on piping furnishing water to the smaller fish is underway and should be completed in time for Broodyear 1980 steelhead. The reduction of nitrogen gas may also give a lower incidence of white-spot disease.

Bird predation on fish reduced inventory numbers during the year. Overhead wires installed in time for next year's production should reduce this problem.

The rising cost of oil to operate the oil-fired boilers of Mechanical Building I is a real concern. From 45 cents per gallon estimated for the year, the hatchery at the end of FY 1979 was paying 80 cents. Despite efforts to limit the use of oil, we can expect annual costs to be $60,000 under minimal use. The hatchery has been using the two electric-fired boilers in Mechanical Building II for heating water and turning on the oil boilers only when needed. In February, for example, one of the electrical boilers was shut down for repair. The station had to divert heated water from the oil boiler at an additional cost of $1,000 per day until repairs were made 10 days later.

A number of incidents occurred involving trespassing and illegal taking of steelhead broodstock. Increased efforts were made to protect the facilities from intrusion.

Extreme cold weather, snow and freezing conditions, caused a number of problems. Pipelines and valves were frozen requiring additional man-hours to repair.



Sub-zero winter temperatures caused freezing problems and hazardous conditions on the ponds

A small ceremony at Dworshak on November 15 marked the occasion of the first three enrollees completing 12 months in the Dworshak/Kooskia YACC program. A plaque showing those enrollees working the full 12 months is on display and new names added as they complete the program. Reduced funding and enrollee ceilings brought the YACC program to a near shutdown by the end of the year.

Some 2,500 salmon carcasses were moved to the hatchery in September from Spring Creek NFH for freezer storage until disposition can be made to the Nez Perce Indian Tribe. These fish are in exchange for lost fishing rights occurring earlier in the year when salmon runs were at an all-time low in Idaho.

Unloading and bagging salmon carcasses for Indian distribution

Moving salmon carcasses into freezer storage

FISH CULTURAL OPERATIONS

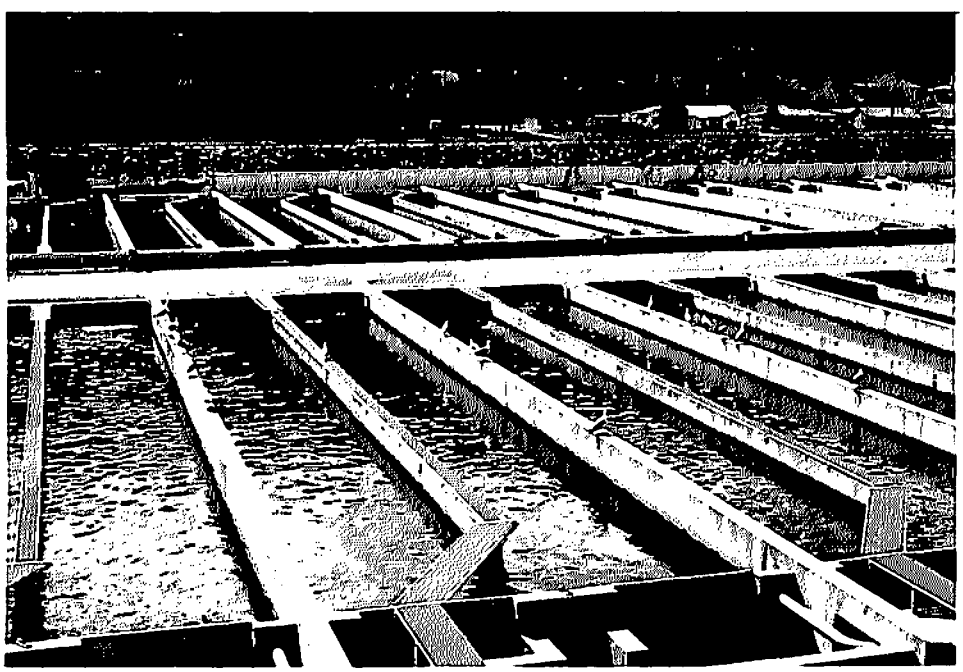
STEELHEAD PRODUCTION

Fiscal Year 1979 started out with some 3.2 million steelhead fingerling to meet an anticipated spring release of 1.8 million. Systems II and III operated on reuse for 1-year rearing; System I on raw water carried fish for a 2-year period.

Conditions in System II began to deteriorate by late fall. By the end of December some 400,000 fish at 8,500 pounds had been lost to causes not clearly defined. Suspected reasons were low mineral content of the water, poor pond environment, high temperatures, inefficient bio-filter operation and a presmolting condition causing an additional stress.

Poor conditions in System III also resulted in higher losses beginning in January. A marking program by IDFG was stopped when fish handled poorly.

Sea gulls, mergansers and mallard ducks added to the winter rearing problems. Inventory shortages increased as the seriousness of this problem became more apparent.



Sea gulls at mealtime

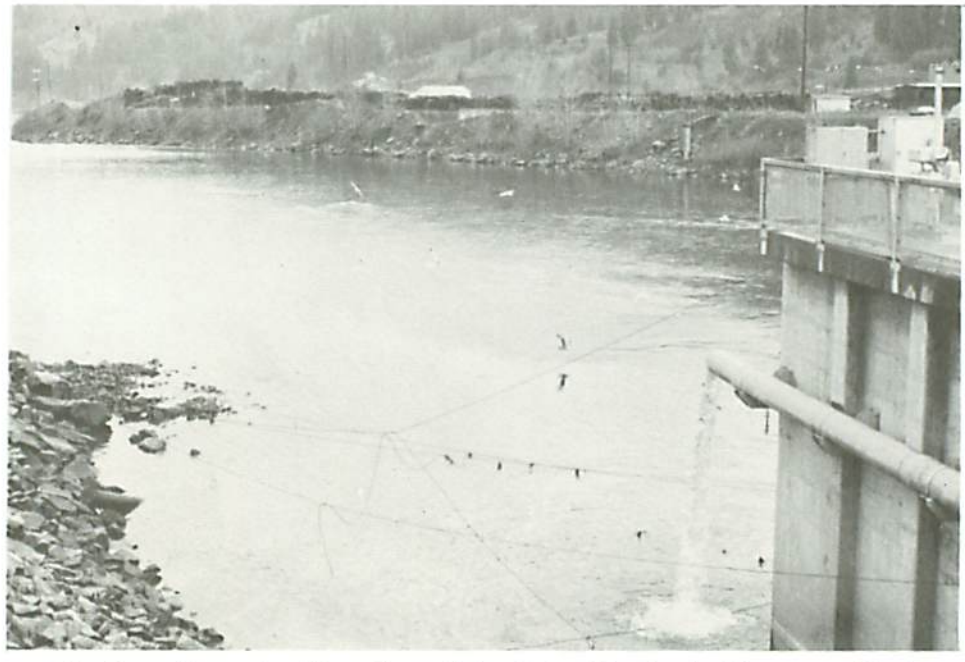
Fish-eating merganser

Fish-eating mallard ducks

Fish condition improved near release time but quality production had been affected by the poor rearing conditions experienced earlier in the reuse systems. Releases for the year were as follows:

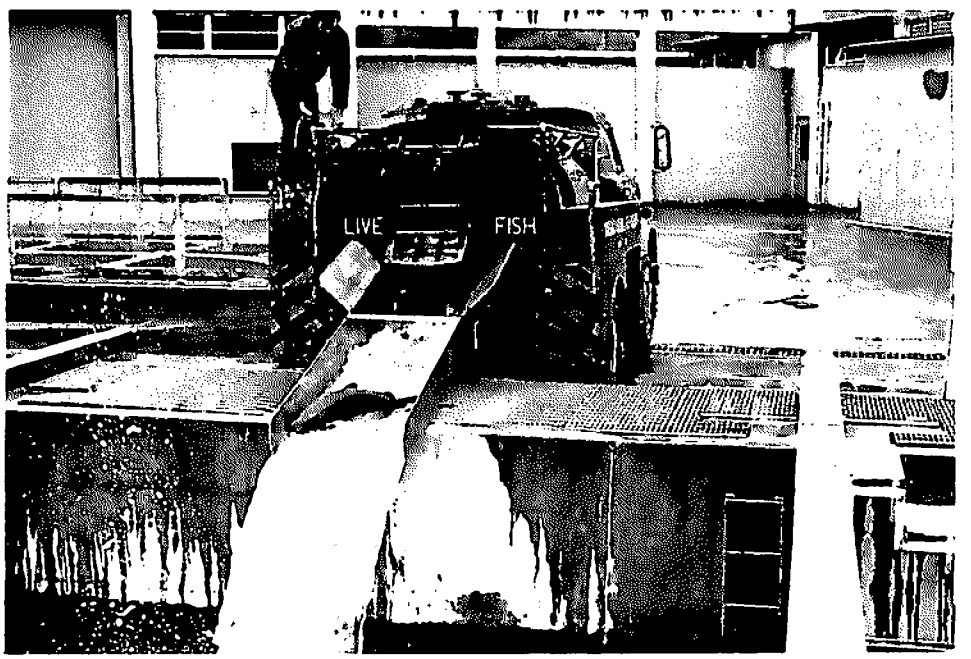
	No.	Wt. (lbs)		Size (mm)
Holding Pond #5 2-year fish Released 4/6/79	45,636	5,927	7.7/lb	184
System II 1-year fish Released 4/9-10/79	390,381	37,901	10.3/lb	168
System III 1-year fish Released 4/4-6/79	791,295	64,860	12.2/lb	158
*System I 1-year fish Voluntary Release	444,288	17,770	25/lb	125
Experimental Raceways 1-year fish Escapement	37,000	1,800	20.5/lb	133
TOTAL	1,708,600	128,258		

*This voluntary release study conducted under the supervision of Dr. Bjornn was undertaken to determine what percentage of the steelhead being held under a 2-year rearing program were smolts after the first year. The difference between the April 18 inventory and the June 13 inventory, taking into account the mortality for that period, showed a release of 444,288 fish (17,770 lbs).



Discharging steelhead smolts into N. Fork River. (Note: low water and sea gulls)

The ladder at Dworshak was opened on January 5 and by the end of the month 30 adult steelhead were collected. Extreme cold weather conditions appeared to delay the run. Idaho Fish and Game Department opened the fishing on January 20 when information showed a larger than anticipated run of hatchery fish. The season was later extended by 15 days, to end April 30, when greater numbers of fish returned to Dworshak than was anticipated.



Steelhead adults collected at trap below dam transferred to holding ponds for spawning

Steelhead Spawning Operations

Began:	February 20 (Take 1)
Ended:	May 15 (Take 13)
Ladder Closed:	May 16

Total fish in Run:	4,939	
To Hatchery:	4,580	
Trapped at Dam:	359	(1/8 to 4/4/79)

Males Spawned:	1,153
Females Spawned:	2,165
Mortality:	96
Held for Dr. Bjornn:	100
U of I Graduate Student:	10
Unspawned Adults trucked to higher river tributaries:	1,415 @ 21,225 pounds

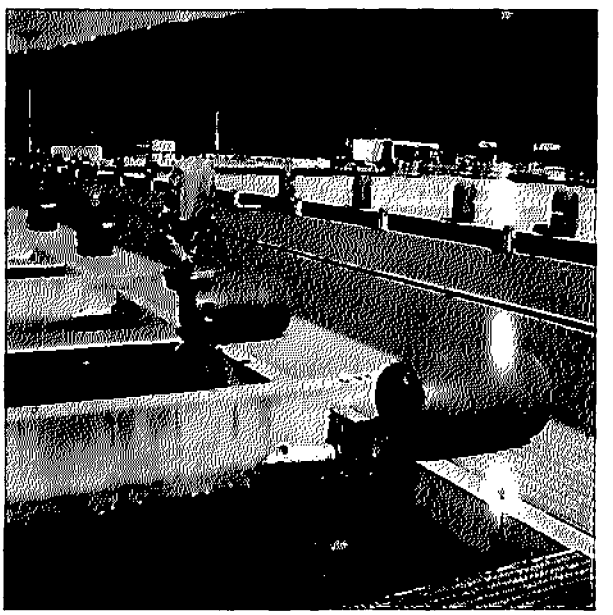
The 1979 steelhead egg taking operation was concluded on May 15 and the ladder closed May 16. A total of 4,939 adults returned to the facility. From 13 takes, 2,165 females provided 13 million green eggs allowing sizeable numbers of excess eyed eggs and fry to the State.

Egg and Fry Distribution

Green Eggs	13,000,000
Eyed Eggs	11,000,000

Idaho Fish & Game	2.700,000 eggs
Idaho Fish & Game	2,100,000 fry
Hagerman NFH	650,000 eggs
University of Idaho	680,000 eggs
University of Rhode Island	10,000 eggs
Dworshak NFH	4,800,000 eggs (production fish)

Systems II and III were set up with 1.8 and 1.9 million fry respectively from Broodyear 1979 takes 5-9. Discussion with Area Office personnel resulted in the decision to maintain System III as a control to evaluate the benefits of mineral addition. Therefore, System II began with an addition of 30 mg/l Na and 40 mg/l Ca to maintain a hardness of 100 mg/l. The pH control with $NaHCO_3$ will be maintained at 7.5-7.8.



Chlorinating System III prior to startup

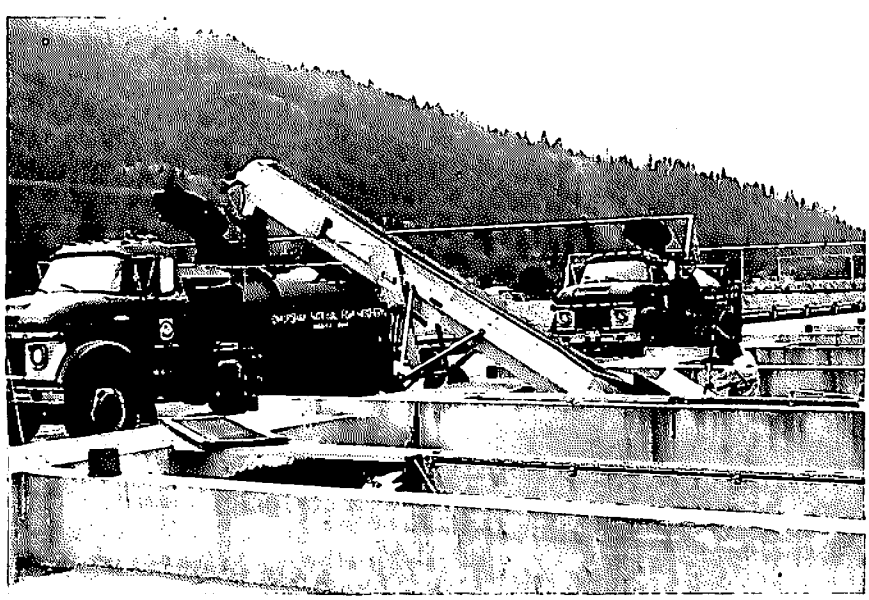
White-spot disease in combination with supersaturated nitrogen gas conditions again caused some high losses in early feeding fish. An interesting observation was noted in regard to the white-spot problem plaguing Dworshak. Take 7 which supplied about 20 percent of System II also supplied 150,000 eyed eggs for Hagerman NFH. These eggs were shipped to Hagerman about 3 days prior to hatching. From that point until put-out, white-spot developed here at Dworshak but no sign of the problem was noted at Hagerman. Reasons for this difference are not clear but the only procedural difference was that at Hagerman the eyed eggs were put in Heath incubator trays at 5,000/tray in 59° water whereas at Dworshak 10,000 eyed eggs were hatched per tray in 52° water. Whether this density alone was the reason for our white-spot problem cannot be stated conclusively. It is significant enough, however, that some changes will be made in next year's production plan to accommodate lighter tray loadings.

Production during the summer was the best in recent years. Despite earlier problems associated with white-spot disease and N_2 gas, fish outgrew them and conditions improved steadily as fish size increased. Systems II and III steelhead on water reuse outperformed other years' production. No *Ich* or other parasites were found in the two systems. Daily mortalities were held to less than 0.02% in a group of 2.4 million fish. The hatchery ended the year with 3.4 million steelhead on hand; well ahead of recent years. Mortalities continued to remain low, few parasites were found and fish health remained excellent.

Of interest is the production figures for Broodyear 1979 steelhead compared to the previous year. These latter fish had been on the station for the entire year and had experienced high losses during winter rearing months to various stress conditions and also inventory shortages to birds. Total gain for this group was 104,408 pounds at a conversion of 3.18. By comparison, Broodyear 1979 steelhead on the station since feeding was begun in June had a 53,144 pound gain and 1.40 food conversion by the end of September! Excellent growth can be maintained if fish health is not impaired.

RAINBOW PRODUCTION

A number of rainbow from a March 1978 egg shipment was carried over into the year for release at a larger size in Dworshak Reservoir. In addition, eggs were received from Hot Creek, California and White Sulphur, West Virginia in October for a spring fingerling plant. The hatchery made use of the Corps barges on the reservoir to assist in the summer planting program. The total rainbow fingerling and catchable distribution for the year was 1,313,724 fish at 92,746 pounds. This was Dworshak's largest rainbow release since 1972.



Hauling rainbow to Dworshak Reservoir (47,000 pounds in a 4-day period)

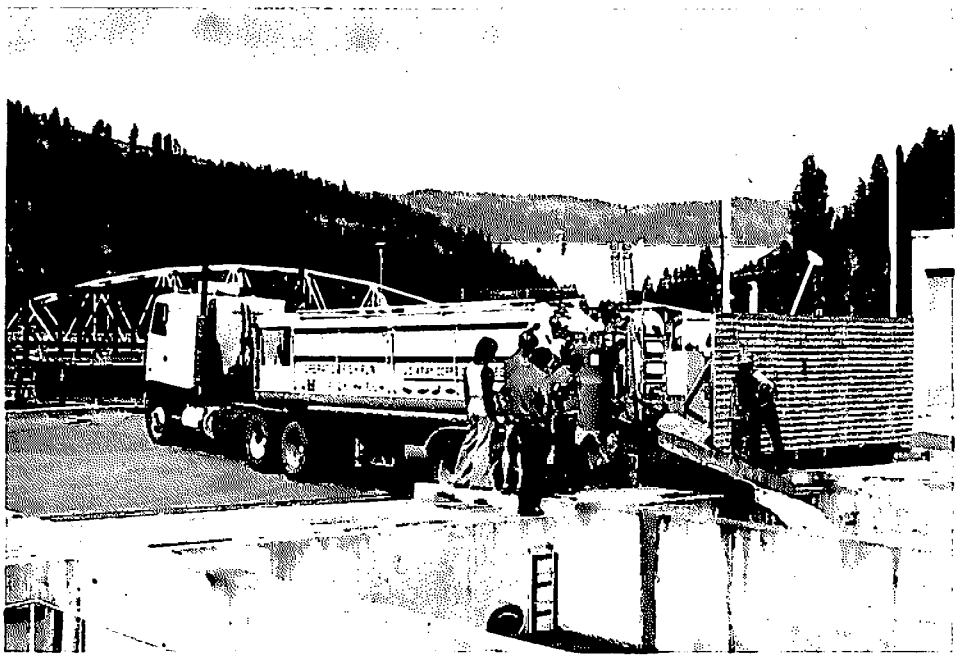
Barging rainbow to planting site in Dworshak Reservoir

OTHER PRODUCTION

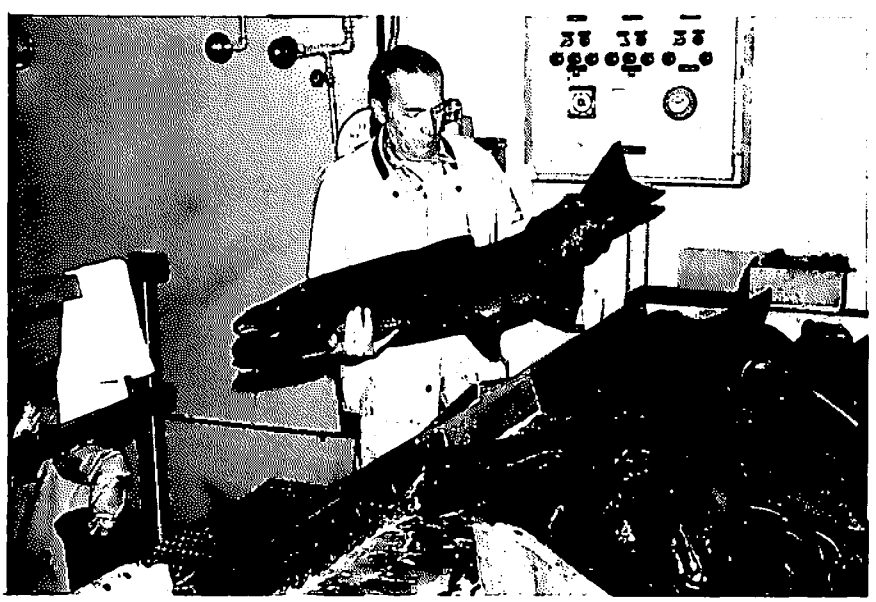
A shipment of 1.5 million kokanee eggs from Lake Whatcom, Washington provided 1,117,464 fingerling fish at 985 pounds to Dworshak Reservoir in the spring.

A shipment of 100,000 small mouth bass fry from New London, Minnesota was released in the reservoir in June.

A total of 276 adult summer chinook was transported from Lower Granite Dam to holding facilities at Dworshak. The fish were held to maturation, spawned and 440,000 eyed eggs were transferred to the new State Hatchery at McCall.



Receiving summer chinook adults from Lower Granite Dam



Sorting summer chinook salmon

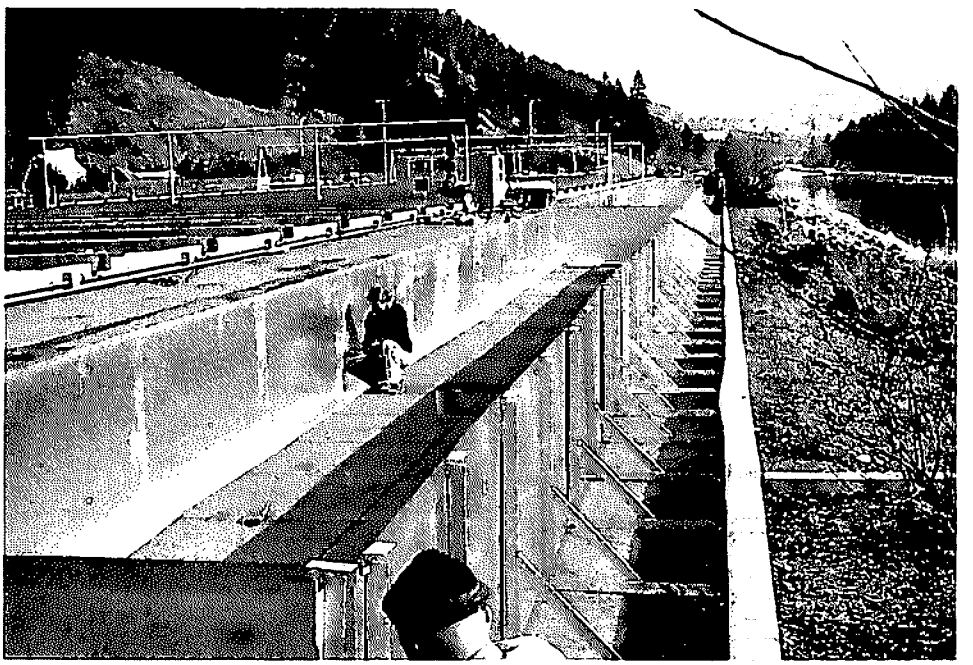
Spring chinook fingerling were again reared to assist the Kooskia program during times of low water and high temperatures. These fish reared well at Dworshak with few problems noted. Rearing costs were charged to the Kooskia hatchery and production figures remain as a part of their program. A total of 376 adults was collected at the Kooskia facility and transported to Dworshak for spawning and later incubation of the eggs. A total of 528,000 green eggs was collected in September. The production from these eggs will be held at Dworshak until next spring when fish will be transported to Kooskia and released one year later.

Spring chinook spawning at Dworshak. Eggs collected for Kooskia NFH program.

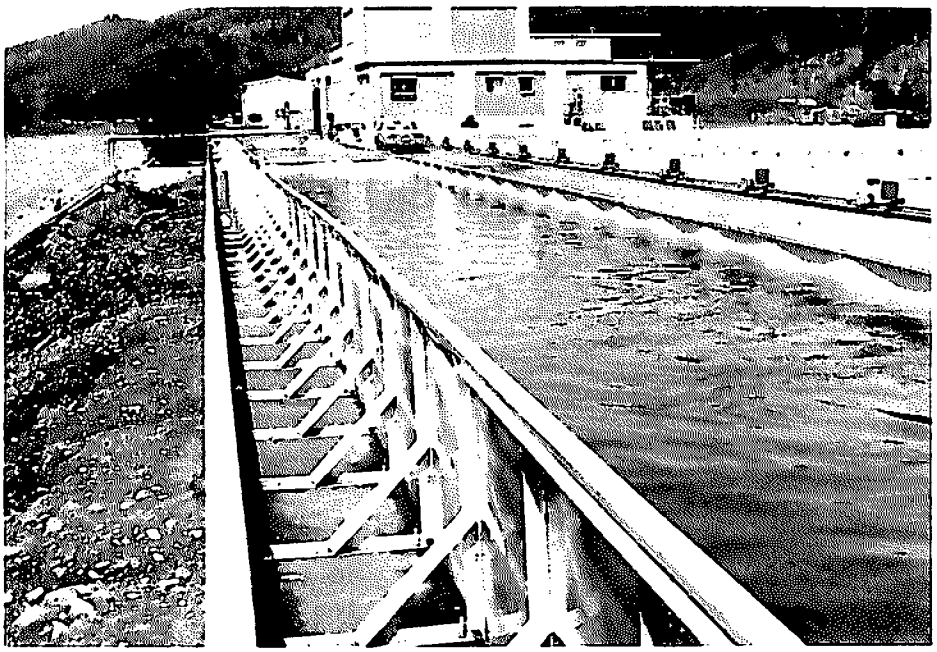
IMPROVEMENTS

The hatchery expected to have the channel drain pumps in operation on Systems II and III in time for the Broodyear 1978 production. However, because of unforeseen problems between the Corps and contractor, the pumps were not placed in operation. Pond cleaning continued to be a problem and a poor rearing environment was the result. The channel pumps are in use for the 1979-80 program and pond cleaning has improved through better drainage to the waste channels.

Four portable 8' x 80' metal raceways were purchased by the Corps for evaluating their use in steelhead rearing. Three of the raceways are under study by Dr. Ted Bjornn and the Corps as part of the Lower Snake River Compensation Planning. One raceway has been installed on System II reuse for comparing design performance with the Burrows' pond.

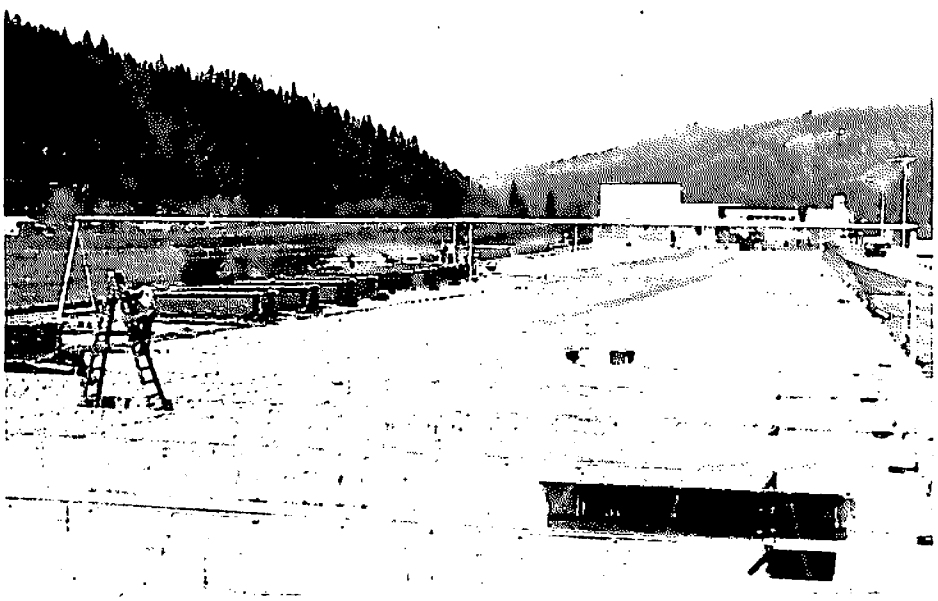


Installing metal raceways for use in COE design evaluation tests for Lower Snake River Compensation Plan

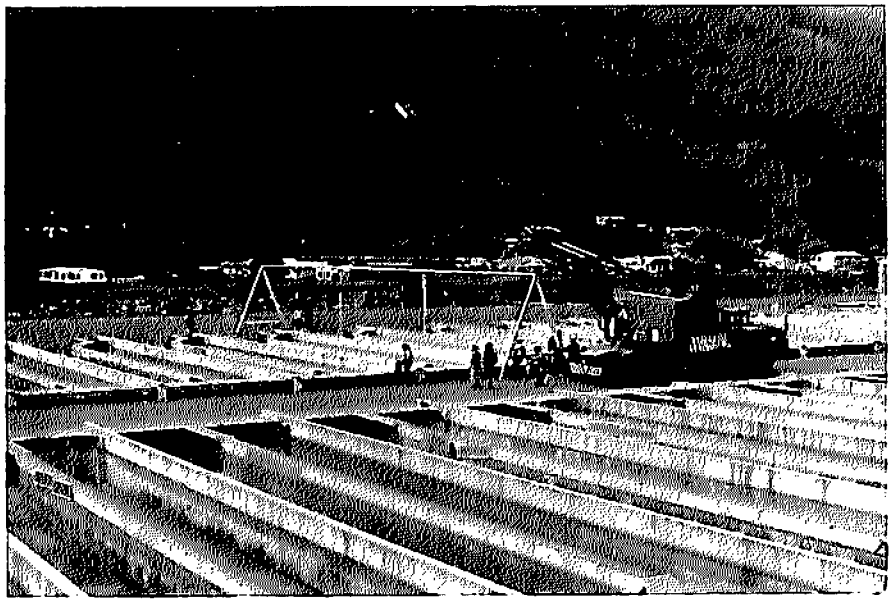


Experimental 'above the ground' 8 x 80 raceways. COE study for LSRCP.

Supports for the bird wire over Systems I and III were constructed and installed by station force account. Wires will be in place prior to the major production season next year. All outside rearing ponds are now covered. The wires should afford good protection from mallard ducks and sea gulls as evident from earlier use over System II.



Installing bird netting over System II 25 ponds



Adding bird wire support frames over System III ponds

Chain link fencing of the northeast boundary of the property was completed by the Corps at a cost of $5,500. The fencing was a security measure taken to prevent unauthorized persons from entering the facility at night.

The four display aquariums, located in the visitors' entrance to the main hatchery building, were replumbed and placed on recycled water. The aquariums had not been used for the past 2 years because of problems on single pass raw water.

Work was begun near the end of the year to install degasser columns on all water supplies furnishing water to early rearing production. Assisted by the Corps, installation of the degassers for N_2 gas removal should be completed in time for next year's steelhead program.

PERSONNEL

A total of 24.1 man-years was employed during the year or 1.3 man-years less than annual work planned. The following personnel actions were completed:

Jerry R. McClain, Fishery Biologist, GS-09, promotion and transfer from Kooskia NFH, effective 03-11-79.

Douglas L. Lawson, Fishery Biologist, transferred from Dworshak NFH to Warm Springs NFH, Oregon, effective 04-22-79.

Merle S. Heathco, Biological Technician, retirement effective 04-21-79.

Gene A. Forest, Facility Manager, transfer to Denver Engineering Center, effective 06-17-79.

Robert S. Turner, Fishery Biologist, GS-05, transfer from Eagle Creek NFH, Oregon, Effective 07-01-79.

Robert S. Turner, Fishery Biologist, promotion to GS-07, effective 08-12-79.

Richard D. Keith, Maintenance Worker, promotion to Utility Systems Operator, WG-5406-09, effective 09-23-79.

Formal training was provided to the following employees:

Charles Musiel, Gardener, attended a 'Plant Protection Seminar' at the University of Idaho, Moscow, January 3 to 5.

Mary Schaack, Clerk-Typist, attended a 3-day Civil Service course, 'Secretarial Techniques', in Seattle 3/7-9.

Merle Heathco, Bio-Technician, participated in a 2-day session in Portland on 'Pre-retirement'.

A 16-hour training session on "Pumps and Pumping" was held at Lewis-Clark State College, Lewiston, and attended by Dick Wurth, Maintenance Mechanic; Perry Moffett, Maintenance Helper; and Gene Forest, Facility Manager. The session was sponsored by Idaho State University.

Considerable time was spent during the year interviewing Nez Perce Indian Tribal members regarding hatchery employment. Commuting distance from Lapwai and Lewiston area appears to limit hiring possibilities. Jack McCormack, from Lewiston, worked one week and resigned due to the high travel costs of commuting. Ken Williams was hired on 8-13-79 for a 130-day appointment. Mr. Williams continues to be employed at Dworshak and will be considered for permanent employment at the end of his appointment.

Mary Schaack and Jeanette Herbert were presented "Citations for Outstanding Performance" for the period 11/1/77 to 10/31/78.

Mary Schaack, Clerk-Typist, with Manager Olson

Manager Olson presenting outstanding citation to Jeanette Herbert, Administrative Clerk

A 10-year Service pin was presented to Laverne W. Reynolds.

Rick Nelson, Biologist, travelled to Washington, D.C. on May 6 to spend 2 weeks on detail to the Division of Fish Hatcheries. Mr. Nelson assisted with review and compiling the Biologist's Quarterly Reports.

MEETINGS

Two meetings were held at Dworshak in late November. A meeting with Dr. Meade, U of Rhode Island on the 28th, reviewed his current contract study regarding water reuse and its effect on fish health. A coordination meeting between the hatchery complex, IDFG and Corps of Engineers was held on the 29th. Some 20 people attended both sessions. Area Manager Mehrhoff was on station together with Colonel Allaire, USCE, and others.

Wayne Olson, Joe Lientz and Dave Owsley attended the Annual Northwest Fish Cultural Conference held in Vancouver, Washington December 5-7. Dave presented a paper, "Nitrogen Gas Removal Using Packed Columns." Olson and Lientz chaired two sessions.

Manager Olson travelled with Ted Bjornn of Moscow to Walla Walla on December 20 to meet with COE officials. Discussions concerned the 2-year rearing program and the Dworshak operation in general.

A meeting at Dworshak on January 12 with Drs. Bjornn, Klontz and Stojeck of the U of I in attendance, was held to discuss fish nutrition problems; another effort to provide answers to steelhead losses at Dworshak.

A meeting was held at Dworshak on April 17 with 22 people in attendance. "Water Quality and its Relationship to Fish Health" was the subject for discussion. The meeting centered around the work on contract with Dr. Tom Meade, University of Rhode Island. A number of the group stayed for the following day to continue discussions with staff members.

A coordination meeting was held in Lewiston on May 23 at the IDFG office. The purpose of the meeting was to discuss and review Dworshak's and Kooskia's 1978-79 production year and the current 1979-80 program.

Manager Olson attended a 2-day session at Deer Flat NWR on Public Use Planning, May 8-9. Olson travelled to Boise on May 25 to meet with A/O fisheries staff regarding production plans for 1979-80 season.

A Boise Area project leaders meeting was held in Vancouver, Washington on March 6-8. Olson, Lientz and McLeod attended. A Fishery Resource meeting in Portland on March 13-15 was attended by Olson, Lientz and Nelson. Dave Owsley travelled to Albuquerque Regional Office the week of March 12 to assist on a review of the San Marcos development plan. Owsley attended a 1-day session of the Fishery Resource meeting on his return from Albuquerque and completed the week with a visit to Warm Springs NFH to assist on a N_2 gas problem.

Rick Nelson, Hatchery Biologist, attended the Western Fish Disease Conference held in Nanaimo, British Columbia the week of June 17.

PROGRAM INFORMATION

Hatchery highlights were reported monthly to the 4-K radio stations of Lewiston, Grangeville and Orofino. The manager was interviewed a number of times live on 'Open Line' - KLER regarding various fishery activities. News releases were prepared when appropriate for the Lewiston Morning Tribune and Clearwater Tribune.

Programs were presented during the year to local service organizations. These were especially popular during time of spawning activities.

The hatchery employed three tour guides during the summer months for assisting visitors through the facility. This assistance was very helpful to the visitor as construction activity restricted public access.

Many school groups viewed spawning operations in the spring. Twenty-one groups (489 visitors) were given formal guided tours in April. Five hundred sixty-five (565) school students visited the hatchery in May.

In March, 12 women from "Women in Transition" (WIT) visited the hatchery and were given a tour which concluded with a discussion on Federal Service job possibilities. WIT is a CETA funded program.

In April, Dr. Jim Hall, Oregon State University, with 12 fishery students, camped overnight at Dworshak and spent an evening and day with the staff in various sessions on hatchery operations. Dr. Bill Klontz, University of Idaho, and 20 fishery students toured the hatchery and met with different personnel on a number of subjects pertaining to Dworshak's program. A group of Australian businessmen on tour of this country through an exchange program visited Dworshak. Also, 32 members of the Spokane Chamber of Commerce were guests of the hatchery.

In June, Dworshak hosted a group of 16 engineers of the COE who were completing a 1-year training program in Virginia. Six groups, totaling 210 people and representing: U of I students, YACC and YCC enrollees, N. Idaho Children's Home, and Lewis and Clark College students, were given formal tours.

In July, Major General Brooks, head of the Idaho National Guard, along with other top Guard officials visited the hatchery.

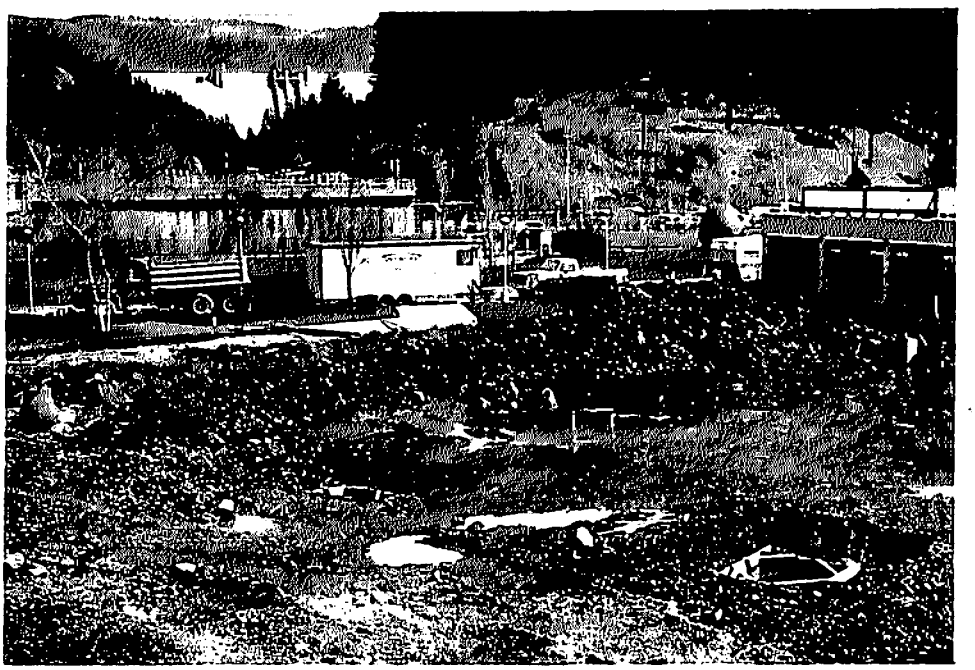
Dworshak played host for 10 days to two fishery biologists (Araceli Orbe and Gilda Velazquez) from Mexico City. Other foreign visitors were at the hatchery representing their respective countries to acquaint themselves with water reuse systems and pre-treatment functions. Assistance was also given by station personnel to State and private individuals regarding different operational phases of the hatchery.

Frank Cushing, Legislative Assistant for Agriculture and Wildlife Resources, and Faith Haywood, Special Assistant, both representing Senator James McClure's office, visited Dworshak on August 20.

A Public Affairs/Public Involvement Plan was prepared for the Area Office. This plan lists those people, organizations and news media sources to be contacted regarding station activities.

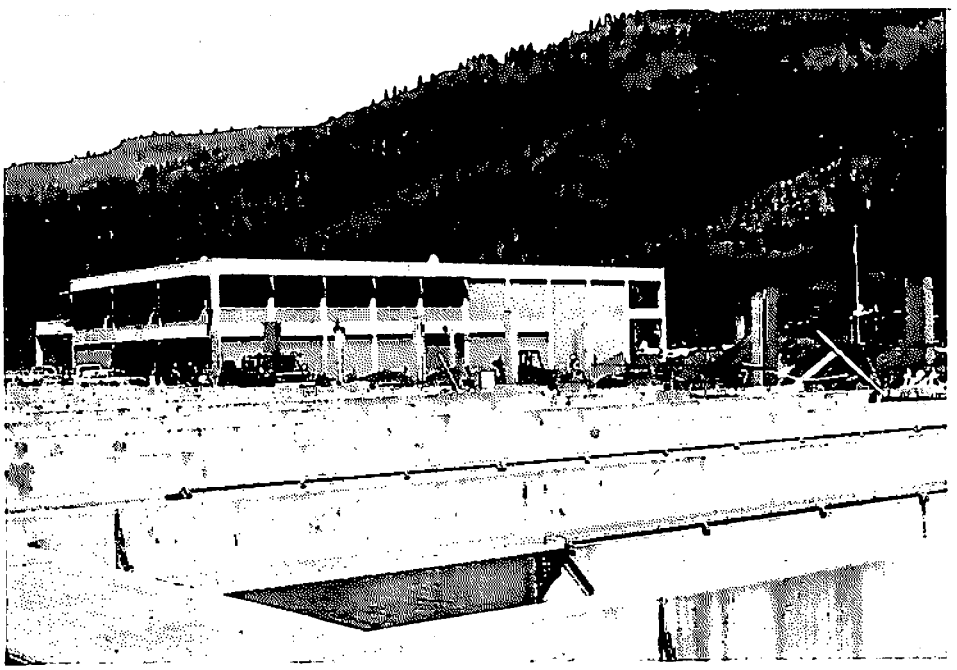
CONSTRUCTION

Space Builders, of Lewiston, Idaho, began work on March 12 to clear a site for an 18,000 square foot single floor nursery tank building. Initial award of the contract by the Corps of Engineers was $819,000. The building should be completed by March 1980. Work progressed on schedule through the year with 128 tanks in place and operating soon after the start of FY 1980. For 2 years prior to moving the tanks into the building, the hatchery operated the tanks on temporary installations wherever water could be supplied outside. The new building will be an added asset to the hatchery's early rearing program and should greatly improve the start of Dworshak's initial production.

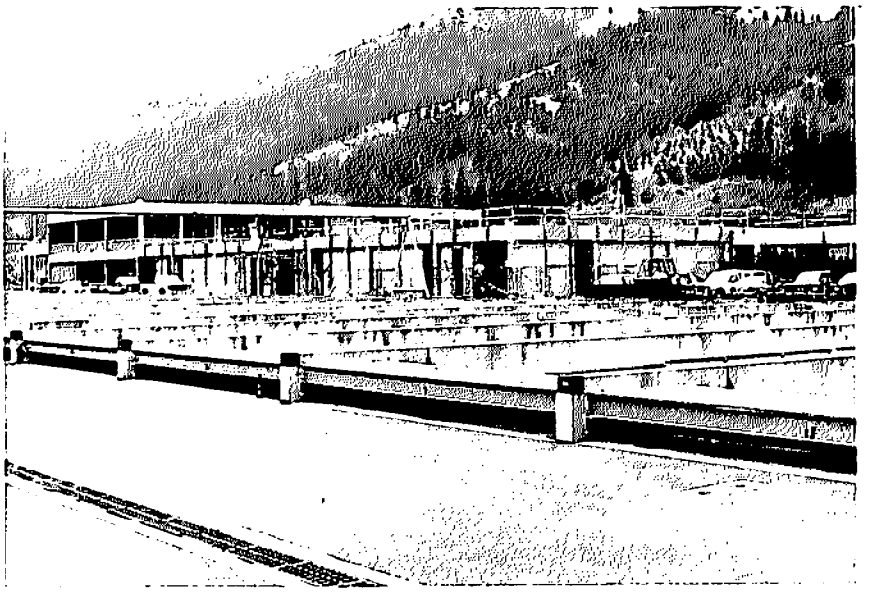


Site preparation for new nursery tank building

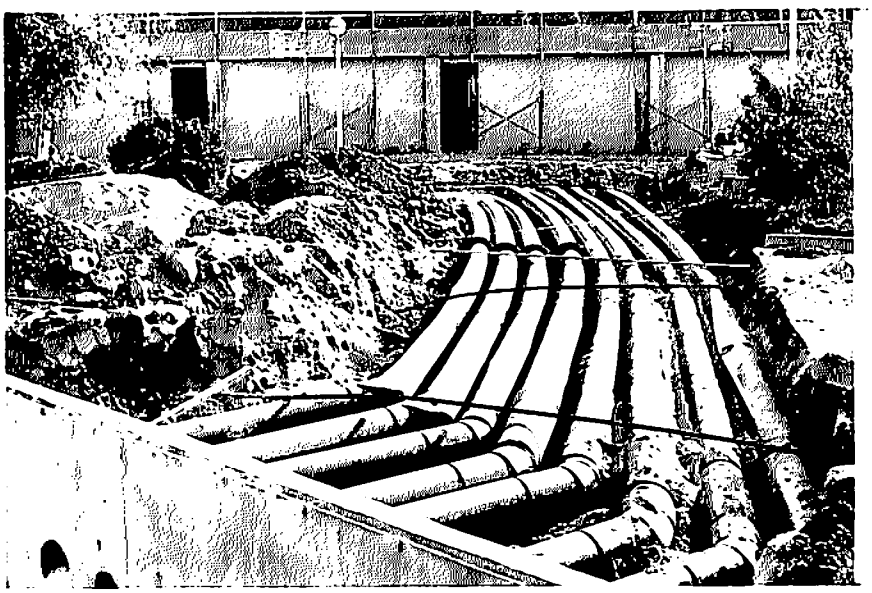
Preparing site for new nursery building



View showing early construction of new building



Construction progress of new nursery building as of September 1979



New piping to nursery tank building

A contract was awarded by the Corps to repair the overhead bridge and redeck the surface. Work was completed in February 1979.

A design memo was prepared by the Corps and planning directed toward the future water supply for System I ponds and the new nursery building. Scheduling shows completion by May 1981.

HATCHERY BIOLOGIST ACTIVITIES

COOPERATIVE STUDIES

Monitoring of the Dworshak steelhead fish health and smoltification physiological parameters was the priority responsibility this year. Cooperative monitoring and studies were intensified and additional base line data obtained.

University of Rhode Island

Through cooperative study and formal contract, Dr. Meade and Terry Bradley provided a very comprehensive study of the Dworshak steelhead. Physiological investigations were conducted using Dworshak steelhead reared at other locations using different water qualities. The locations monitored were Dworshak NFH, Hagerman NFH and Lower Granite Dam. Fish were also obtained from the Salmon River drainage and at the dam. The base line data has been helpful in gaining an understanding of the Dworshak steelhead and how it may apply toward producing quality smolt production. Mr. Bradley completed his Masters degree work monitoring physiological changes of Dworshak steelhead from January 1979 to June 1979. Mr. Bradley will return to Dworshak in October to continue his work.

University of Idaho

Dr. Bjornn - continued marking Dworshak steelhead and monitoring released smolts recovered at Lower Granite Dam. Dr. Bjornn participated in discussions held at Dworshak. Analysis of mark return data and downstream migration is continuing.

Dr. Klontz - participated in workshops, continued the bio-filter studies under contract by the Army Corps of Engineers and offered support in matters concerning fish health.

Dr. Jim Chaco - offered support concerning fish parasites and in setting up the photography section of the laboratory.

Dr. Charles Knowles and Joe Keely - water samples and mineral samples were analyzed for heavy metals and toxic elements.

Idaho Fish and Game Department

The Idaho State fish marking trailer was used in marking fish at Dworshak, Kooskia and Hagerman NFH. Magnetic nose tags were recovered by Rodney Duke of the IDFG. A complete report of past marking activities was submitted by Mr. Duke.

Continual contact was maintained with IDFG personnel concerning the Dworshak steelhead.

National Marine Fisheries Service

Cooperative monitoring and studies of returning adults and downstream smolts continued. Transportation studies and fish marking services were offered.

U.S. Fish and Wildlife Service

Abernathy FCDC - Cooperative studies were implemented at Dworshak using substrate when incubating steelhead eggs to control coagulated yolk disease. Support was also extended for steelhead diet trials and nutritional questions.

Fort Morgan Fish Disease Control Center - Continued cooperation in implementing the National Fish Disease Inspection policy.

Bozeman Fish Cultural Development Center - Mr. Charlie Smith supported Dworshak studies through histological examination, consultation and attendance at workshops. Support was given to Mr. Bradley's physiological monitoring and to other pilot studies at Dworshak and fish health problems at other locations.

Dr. Wedemeyer and Mr. Johnson of the National Fisheries Research Center, Seattle, Washington, monitored steelhead blood parameters for the physiological examinations.

Other Support Service

Columbia Fish Pesticide Laboratory, Columbia, Missouri, analyzed new plastic bead media used at Dworshak in the bio-filters.

U.S. Army Corps of Engineers - Pilot tests were conducted using various medias for bio-filters; ultra-violet light was tested for full flow disinfection of reuse water; and support was given for design problems, testing and questions.

The Rangen Research Laboratory at Hagerman, Idaho, offered support service concerning fish health problems. A contract was written for studies of the Dworshak steelhead being reared at Hagerman NFH.

Extension Service

Reuse information and fish health information were offered to visitors and fisheries people from throughout the United States and other countries.

Diagnostic Services

Fish health exams and inspections were conducted at three federal fish hatcheries. Diagnostic services and inspections were extended to the Idaho Fish and Game Department and to National Marine Fisheries Service.

Cooperation with Other Agencies

The Dworshak laboratory facilities were made available to the Army Corps of Engineers, U. S. Forest Service, graduate student programs, and other federal personnel.

Meetings

Laboratory personnel participated in seminars, workshops, study team meetings, coordination meetings, training sessions, group discussions and scheduled American Fisheries Society meetings.

Training Sessions

Four Warm Springs Indian trainees (female) were at Dworshak for 2 weeks as part of the Columbia River Tribal Fishery Commission training program. The trainees received orientation regarding the hatchery program and were given some laboratory assignments.

Two Mexican women from the Mexico National Department of Fisheries visited and were trained in all aspects of fish culture, disease examination, water chemistry and fish health monitoring from September 10-19.

MAJOR RESPONSIBILITIES

Water Quality Monitoring

Dworshak's water systems were continually checked for several water quality parameters. EPA monitoring of the Dworshak and Kooskia effluents were routinely monitored. Additional samples were taken for analysis of heavy metals and minerals.

Fish Health Monitoring

General fish health exams were conducted weekly. A close working relationship has proven to be a necessity for successful rearing in reuse systems. Support was given to production by specific monitoring and fish quality checks.

Spawning Activities

Steelhead, spring chinook and summer chinook returning adults were checked for marks, sex, length and disease.

MAJOR CONTRIBUTIONS

1. Inoculation program for returning spring chinook salmon adults to the Kooskia NFH for protection against holding losses and kidney disease.

2. Fish health and physiological monitoring of Dworshak steelhead reared at the Hagerman NFH to obtain base line data.

3. Pilot studies by the Army Corps of Engineers and an on-site graduate student.

   a. Testing a new fluidized bed filter system.

   b. Testing of various medias for efficiency in bio-filters.

   c. Full-flow ultra-violet sterilization pilot testing.

4. Sanitary Engineer, Dave Owsley, offered considerable help and insight into the operation and management of reuse systems and Burrows ponds.

   a. Additional testing and full scale operation of packed column degassers.

   b. Pond drain screen changes in the Burrows ponds.

   c. Control of fungus on incubating eggs using in-line iodinator.

   d. Testing of header changes in Burrows ponds.

   e. Suspended solids testing in the reuse systems and other holding units.

   Nitrogen gas levels have been reduced in the incubator system and in the System II reuse supply.

5. Fish health monitoring and testing of new methods and procedures for base line fish quality data.

   a. White-spot (coagulated yolk) disease. Cooperative testing at Dworshak with support from Abernathy FCDC. Substrate was used in Heath trays and in hatchery jars. Improvement was observed in fry size and incidence of white-spot. A survey was conducted and a report submitted by Rick Nelson of the incidence at other fish rearing stations.

   b. Monitoring of portable raceways in single pass and reuse rearing to obtain loading, density and fish health data on steelhead.

c. Testing of a low protein, high fat diet to reduce stress during the steelhead smolting period.

d. Monitoring of fish health as related to stress and disease in a mineral enriched reuse water supply system. New plastic bead media was used in the biological filters and minerals were added to increase hardness, pH and alkalinity. Sodium and chloride were added to provide protection from nitrite toxicity and reduce stress. Fish health and physiological parameters were monitored very closely to obtain base line data regarding fish health changes during smoltification.

Bureau of Sport Fisheries and Wildlife
Division of Fish Hatcheries

Station
DWORSHAK NATIONAL FISH HATCHERY

HATCHERY PRODUCTION SUMMARY

Period covered
October 1, 1978 through September 30, 1979

Density Index: 0.106 | Flow Index: 0.676 | Total Flow: 35,000

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 7-DS-X-71X	0	0	7.340	45.6	2,820	8,340	2,605.94	2.96	0.92	63.00	35.06	219.30	0.000
STT 8-DS-4	445.6	41,787	6.506	481.3	36,267	81,469	23,831.64	2.25	0.66	48.24	22.89	59.40	0.332
STT 8-DS-5	0	0	6.345	1,244.8	68,141	250,390	77,042.80	3.68	1.13	85.74	24.67	129.30	0.000
STT 9-DS-I	588.7	3,905	2.691	180.4	3,696	5,845	1,915.43	1.58	0.52	3.18	20.66	32.10	0.452
STT 9-DS-II	1,127.4	27,052	4.131	111.9	30,408	40,920	12,916.59	1.35	0.43	9.98	19.04	57.00	0.813
STT 9-DS-III	1,195.4	20,143	3.671	172.2	19,040	27,845	8,874.84	1.46	0.47	7.62	19.25	48.80	0.684
KOE 9-UWA-1	0	0	1.479	1,117.5	712	1,060	402.46	1.49	0.57	0.37	48.94	26.30	0.000
RBT 8-EW-7	0	0	2.450	41.1	225	537	171.41	2.39	0.76	4.35	25.11	40.00	0.000
RBT 8-UCA-8	0	0	2.441	386.3	1,465	4,051	1,277.81	2.77	0.87	4.65	28.90	38.30	0.000
TOTALS													
AVERAGES													

Form 3-229

Bureau of Sport Fisheries and Wildlife
Division of Fish Hatcheries

Station: DWORSHAK NATIONAL FISH HATCHERY

HATCHERY PRODUCTION SUMMARY

Period covered: October 1, 1978 through September 30, 1979

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	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
RBT 8-UOR-X-6	0	0	9.955	420.3	77,625	114,824	31,019.36	1.48	0.40	151.67	16.53	150.50	0.751
RBT 8-WS-9	0	0	2.078	466.2	1,289	3,625	1,157.89	2.81	0.90	2.97	30.84	35.20	0.000
RBT 9-SH-I	87.5	2,451	4.103	0	2,494	3,546	1,160.95	1.42	0.47	12.90	14.91	47.80	0.530
TOTALS	3,444.5	95,338		4,667.4	244,182	542,452	162,377.12						
AVERAGES			4.032					2.22	0.67	20.02	25.57	73.67	0.594

Form 3-229
(Sept. 1971)