ANNUAL REPORT

FISCAL YEAR 1988

Dworshak Fisheries Assistance Office

Ahsahka, Idaho

Organization Code: 14330

William H. Miller — 12/8/88

Project Leader — Date

Assistant Regional Director — Date

Regional Director — Date

Table of Contents

	Page
INTRODUCTION	1
STATION OPERATIONS	2
EQUIPMENT PURCHASED	5
FUTURE OUTLOOK	6
APPENDIX 1 - Forms Section	
Summary of Fish and Wildlife Management Areas Served	7
Operations/Management Cost Data	8
Report of Station Personnel	12
Public Relations	13
APPENDIX 2 - Report Prepared	
Adult Steelhead Returns to Dworshak NFH in 1987-88 and Prognosis for 1988-89	14
Adult Spring Chinook Salmon Returns to Dworshak NFH in 1988 and Prognosis for 1989	22

INTRODUCTION

The Dworshak Fisheries Assistance Office (DFAO) was established in 1981 and became fully operational in FY-82. DFAO is located on the grounds of Dworshak National Fish Hatchery, Ahsahka, Idaho. This facility is located approximately 40 miles upstream of the Snake- Clearwater River confluence at Lewiston, Idaho. The office is staffed by four full-time employees and two part-time employees.

The primary goal of DFAO is to assist in management and evaluation of fishery resources which relate to federal issues, i.e. fishery resources of national significance, fishery mitigation for federal projects, assistance of Indian tribes, fishery work on federal lands and other fishery projects as called for under federal law. Activities under these goals are primarily directed toward protection, restoration and enhancement of anadromous fish resources in the Lower Snake River Basin.

A primary area of work includes evaluation and fish management planning for the three federal hatcheries in Idaho; Dworshak National Fish Hatchery (DNFH), Hagerman National Fish Hatchery (HNFH), and Kooskia National Fish Hatchery (KNFH).

In the hatchery evaluation phase, we compile the information base to assess how each of the three hatchery facilities are meeting their established mitigation goals. Our office also helps set up and design studies to evaluate hatchery effectiveness and various management scenarios. We work quite closely with Idaho Fish and Game Department, Nez Perce Tribe, and Shoshone-Bannock Tribe in evaluation of various fish management programs in Idaho.

STATION OPERATIONS

We completed the summary report entitled "A Review of Dworshak National Fish Hatchery Mitigation Record". This report reviews the process and history of how Dworshak National Fish Hatchery (DNFH) was built and how mitigation goals were established. Corps of Engineers (COE) documents and congressional records were reviewed along with published and unpublished documents in COE and Idaho Fish and Game (IDFG) files. We concluded that the mitigation goal originally established for DNFH was 20,000 adults back to the Clearwater River and 30,000 adults back to the Columbia River. Smolt release goals were concluded to be 2.3 million per year. Adult mitigation goals to the Clearwater River have been met in 4 of 16 years (1973-1988) and in 3 of the last 6 years (1982-1988).

The 1987 Annual Report was completed and contained information on projects and work done in 1987 in the following area: steelhead broodstock study, DNFH; cryopreservation of steelhead male gametes from natural spawning fish; analysis of size of smolts at release to adult steelhead returns; study of fin erosion in steelhead at HNFH; summary of fish disease sampling carried out in Clearwater drainage; Lower Snake River Compensation Plan (LSRCP) hatchery evaluation planning; and summaries of steelhead and spring chinook runs and diseases for Dworshak, Kooskia and Hagerman NFH's.

During 1988, the fish disease background study was continued. Samples were collected and analyzed from the North Fork of the Clearwater River, tributaries of Dworshak Reservoir, and Fish Creek, an unstocked tributary stream of the Lochsa River. This is a continuation on a smaller scale of the 1987 survey when we sampled nine streams. The primary diseases of interest were IHN virus, and Myxobolus cerebralis. Neither of these diseases were documented in feral fish. Enteric red mouth (ERM) and bacterial kidney disease (BKD) were the only two pathogenetic bacteria isolated by the Dworshak Fish Health Center. Of 481 kokanee spawners sampled from tributaries of Dworshak Reservoir, we found only four which tested positive for IHN virus.

Subbasin planning for the Clearwater and Salmon River drainage was initiated in 1988. This work is part of the overall subbasin planning for the Columbia River drainage being funded by Bonneville Power Administration (BPA). DFAO personnel are active participants in this planning effort and are included on the technical committees for both drainages. Data on Clearwater "B" steelhead, Hagerman steelhead, and Clearwater spring chinook were provided to the lead agencies on subbasin planning.

DFAO personnel assisted IDFG and FWS Enhancement Division in collecting fish samples from the Clearwater and Salmon Rivers for contaminate survey work. Fish were collected near Lewiston and Riggins, Idaho using our boat electrofishing unit.

We assisted IDFG in a migration timing study of steelhead destined for DNFH. IDFG dart-tagged and radio-tagged adult steelhead at Lower Granite Dam. We assisted by recording when these tagged fish arrived at DNFH. Preliminary results suggest that in the spring DNFH steelhead travel quite fast from Lower Granite Dam to the North Fork Clearwater River. Some fish traveled the 80+ miles in as little as 3 days.

We continued survey work to determine if spawning steelhead returned to areas previously supplemented. Thus far, some areas such as the upper South Fork seem to be responding positively while other areas such as Eldorado Creek in the Lolo Creek drainage are not. We sampled spawning spring chinook salmon in upper Lochsa for genetic background work. Spawned out chinook were located and tissue samples sent to our FWS Seattle Lab for electrophoresis work. This work will help us determine what impact future stocking of hatchery chinook will have on a natural stock.

DFAO personnel assisted in an ongoing study of Dworshak Reservoir. We are planting two different strains of rainbow trout, Arlee and Shasta, from our HNFH. Studies by the Nez Perce Tribe and IDFG will document production and return to creel. In the past, (1987) we also planted kamloops rainbow trout strain into Dworshak Reservoir.

We determined the CWT retention for steelhead and chinook salmon smolts tagged at DNFH. Adipose clips (ad-clips) were also evaluated on steelhead smolts to determine percent smolts being missed. Ad-clips of returning adult fish have been recorded for the past 3 years. Percentages were 3.1 percent missed clips on smolts and 3.8 percent on adults that returned in 1987-88.

Steelhead and spring chinook salmon run summaries and run prediction information were prepared for DNFH and KNFH (see Appendix 2). This information in conjunction with IDFG and Nez Perce Tribe information is used to set fishing season and future hatchery production.

To assist in our steelhead run prediction and fishery contribution work, we initiated a data summary and analysis of adult steelhead "A" vs. "B" passage data at Bonneville Dam. We correlated age data recorded at Bonneville with age data we see in upper Snake River. From initial analysis, it looks like the Bonneville "B" count data has a lot of overlapping "A" steelhead numbers in it. Therefore, adjustments in the Bonneville "B" steelhead count data will be needed.

DFAO personnel continued snorkeling surveys to estimate number of yearling and sub-yearlings steelhead and spring chinook salmon in selected subbasin streams where outplanting has occurred. This data is compiled along with IDFG data and Forest Service data to provide a broad background of salmon and steelhead production for Idaho.

DFAO personnel participated on the Lower Snake River Compensation Plan (LSRCP) team. We evaluated LSRCP released fish (spring chinook salmon at DNFH and steelhead at HNFH) which included the following: zero-age release, age of return and percent return for spring chinook salmon to DNFH. We also coordinated with IDFG on estimating returns for HNFH steelhead releases.

DFAO has the responsibility for the fishery resource evaluation database (FRED) for all three federal hatcheries in Idaho and for Leavenworth NFH Complex in Washington. DFAO is gathering and computerizing distribution and return data as well as completing the quarterly FRED release and transfer summary files.

The major accomplishments on FRED for 1988 were:

1. 100% of desired data ascension for the Idaho federal hatcheries was completed.
2. 80% of the data ascension for the Leavenworth Complex was completed.
3. Most of the bugs are worked out of our file structures. There has been a concerted effort to resolve these and data discrepancies between release database and archive files or other databases. Our end products are now in high demand from other federal and state agencies.
4. We now have of the most comprehensive anadromous salmonid databases in Idaho.
5. We added a Bernoulli box for unlimited added storage capacity and a laser printer.

DFAO personnel have participated on the following technical committees and study teams in 1988:

1. Nez Perce Tribal study of development of low tech anadromous salmon hatchery.
2. Nez Perce Tribal study of production potential for the main stem Clearwater River.
3. BPA funded study of feasibility of barrier removal on Orofino Creek.
4. Outplanting subcommittee to establish priority, numbers and places for outplanting steelhead fingerling, smolts and adults and spring chinook fingerling from DNFH.
5. Idaho Habitat Evaluation Coordination Committee (IHECC) which reviews anadromous fish habitat improvement work going on in Idaho and makes recommendations to BPA and other agencies for funding and support.
6. Idaho fish tagging coordination. We assist in planning for upcoming tagging work at the various hatcheries particularly at the three federal hatcheries, DNFH, HNFH, and KNFH.
7. Subbasin Planning Technical Work Group. We are members of Salmon and Clearwater groups.

EQUIPMENT PURCHASED

Coded-wire tags were purchased to conduct a steelhead broodstock study. The study is being funded by the COE through DNFH. Prodgeny of fish from different river entry times (fall vs. spring) will be tagged and branded. This study is in the second and final stage with tagged fish programmed for release in 1990. The first release of fish in this study was the spring of 1988.

A jet outboard motor was purchased for our 16-foot Valco boat. Riverine work had previously been hampered because of the limited use of propeller driven boat in the Clearwater and Snake Rivers.

A Bernoulli box was purchased for increasing the memory storage of our FRED computer. With the amount of data entry our office performs increased memory storage was a necessity. In addition, a laser printer was purchased to enhance the quality of our output.

A backpack electrofishing unit was purchased for sampling water with low conductivity. The unit is used for collecting fish for disease samples and for doing fish population work on the upper Clearwater and Salmon Rivers.

FUTURE OUTLOOK

In the future, DFAO will continue to address the complex problems associated with anadromous salmonid production and management in the headwater reaches of the Columbia Basin.

DFAO is at present involved in an extensive literature review (published and unpublished) of salmonid supplementation in the Pacific Northwest. This is a BPA funded study which will assist in giving direction to supplementation research in the Columbia Basin.

The Dworshak steelhead broodstock study will continue. From early fish taken this past October and late fish taken at Lower Granite Dam next spring, we will rear smolts for tagging and branding. Tagged smolts from the study will be released in 1990.

We will continue to explore avenues for producing spring chinook salmon smolts in less than one year rather than the 16-18 months which would be most advantageous to the KNFH and may increase adult returns at DNFH.

In the spring of 1988, we plan to identify the food habits of spring chinook salmon at the first collector dam (Lower Granite) and attempt to determine if there is a correlation between food habits and smoltification.

We will also continue to evaluate cryopreservation of "wild" fish sperm as a means of maintaining genetic integrity of a stock, as well as broodstock management. This is especially important when we sometimes experience less than 25 percent males returning to the hatchery.

DFAO personnel will be more involved in determining fishery contribution and project area escapements of adults produced by FWS-operated facilities in the Columbia basin, especially the lower basin fisheries.

We will continue to be paramount in providing interagency coordination on hatchery operations and evaluations.

SUMMARY OF FISH AND WILDLIFE MANAGEMENT AREAS SERVED

Station Dworshak FAO

Fiscal Year 88

Check only one of the Following: Restoration/ Mitigation ☐ Management Assistance ☒ Federal Leadership ☐

Management Activities 1	Area Served 2	Number of Projects 3	Staff Years (FTE's) 4
Management Plan Development	Federal, State, Tribal	2	0.2
Population Analysis and Monitoring	NFH, Federal, State, Tribal	7	1.0
Coordination & Technical Assistance	NFH, Federal, State, Tribal	30	2.0
Stock Evaluations	NFH, State, Tribal	10	1.0
Fish Stocking	NFH, State, Tribal	5	0.2
Interagency Cooperative Management	NFH, Federal, State, Tribal	5	0.2
Habitat Restoration & Follow-up Evaluation	Federal, State, Tribal	3	0.4

Form 3-112 (Rev. 7/88)

Station Dworshak FAO - 14330

OPERATIONS/MAINTENANCE COST DATA

Fiscal Year 88

	Cost			
	Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
1. Salaries, Permanent (Including Benefits):	133,034			
2. Salaries, Temporary (Including Benefits):	7,302			
3. Operating Costs:				
A. Utilities				
1. Telephone	4,906			
2. Electricity 0 KWH				
3. Heating Oil 0 Gal				
4. Natural Gas 0 Cu Ft				
5. Other				
B. Vehicle Maintenance				
1. Distribution Vehicles # 0				
Total Mileage 0				

Form 3-110 (Rev. 4/88)

Station Dworshak FAO - 14330

OPERATIONS/MAINTENANCE COST DATA

Fiscal Year 88

		Cost			
		Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
3. B.(cont) Vehicle Maintenance					
2. Non-Distribution Vehicles #	2				
Total Mileage	11,350	926			
C. Fuel for Vehicles					
1. Fuel (Dist.)	--- Gal				
2. Fuel (Non-Dist)	697 Gal	700			
D. Supplies					
1. Fish Food		--			
2. Chemicals a. Fish Related		408			
b. Non-Fish Related					

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

Station Dworshak FAO - 14330

OPERATIONS/MAINTENANCE COST DATA

Fiscal Year 88

	Cost			
	Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
3. D.(cont) Supplies				
3. Fertilizer				
4. Tags and Tagging Supplies	4,580			
5. Office Supplies	1,350			
6. Custodial Maintenance Supplies	330			
7. Other Supplies				
E. Travel	7,950			
F. Moving Expenses	0			
G. Miscellaneous (List): Protective gear - $1690; Other - miscellaneous - $100	1,790			

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

Station Dworshak FAO - 14330

OPERATIONS/MAINTENANCE COST DATA

Fiscal Year 88

	Cost			
	Operations (Fisheries) 1	Cyclical Maintenance (Fisheries) 2	Quarters Maintenance 3	Other Funding 4
4. Total Operations (Total: Lines 1, 2, and 3 A-G)	162,970			
5. Vehicles Purchased (List) 0				
6. Total Vehicles Purchased (Total: Line 5)	0			
7. Equipment Purchased (over $500)(List) Bernoulli Box = $1236; Electro fisher = $2650; Outboard motor = $4000; Printer = $2100	11,000			
8. Total Equipment (Total: Line 7)	11,000			
9. Cyclical Maintenance (List)				
10. Total Cyclical Maintenance (Total: Line 9)				
11. Quarters Maintenance (List)				
12. Total Quarters Maintenance (Total: Line 11)				
13. Total Maintenance (Total: Lines 6, 8, 10, 12)	11,000			

14. Grand Total (Total: Lines 4 and 13) $ 173,970

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

Station Dworshak FAO

REPORT OF STATION PERSONNEL

Fiscal Year 88

Part I - Permanent Personnel (FTE's _____)				
Name Of Employee 1	Functional Title 2	Grade 3	Period Worked 4	Remarks 5
William H. Miller	Project Leader	GS-12	10/01/87-9/30/88	Full-time
Travis C. Coley	Assistant Project Leader	GS-11	10/01/87-9/30/88	Full-time
Ralph B. Roseberg	Fisheries Biologist	GS-9	10/01/87-9/30/88	Full-time
Diane E. Praest	Secretary (Typing)	GS-5	10/01/87-9/30/88	Full-time

Part II - Temporary Personnel (FTE's _____)				
Name Of Employee 1	Functional Title 2	Grade 3	Period Worked 4	Remarks 5
Tamara L. Maiolie	Biological Aid (Fisheries)	GS-4	4/19/88-6/22/88	Temporary
Michael K. Arnold	Fish Biologist (Mgmt)	GS-5	5/16/88-8/27/88	Temporary

Part III - Other Personnel (FTE's _____)				
Name Of Employee 1	Functional Title 2	Grade 3	Period Worked 4	Remarks 5

Form 3-114 (Rev. 4/88)

PUBLIC RELATIONS

Station Dworshak FAO

Fiscal Year 88

1. Presentations:	Number of Groups	Number of People
On Site	5	187
Off Site	2	140

2. Number of Visitors:	
Official	40
Public	25

3. Other Public Relation Activities:

Type of Activity	
Worked with Idaho Steelhead and Salmon	
Unlimited in a perceived problem of	
adipose fin clip quality.	

Remarks:

Available for presentation and briefings with service organizations and sportsman's clubs.

Form 3-172 (Rev. 4/88)

Adult Steelhead Returns to Dworshak NFH in 1987-88 and Prognosis for 1988-89

U.S. Fish and Wildlife Service
Dworshak Fisheries Assistance Office
Ahsahka, Idaho

Prepared by:
William H. Miller
Project Leader

Travis C. Coley
Assistant Project Leader

Ralph B. Roseberg
Fishery Biologist

Adult Steelhead Returns to Dworshak NFH
in 1987-88 and Prognosis for 1988-89

INTRODUCTION

Releases of steelhead smolts from Dworshak National Fish Hatchery (DNFH) began in 1970 with the first hatchery produced adults returning in 1972. The 1988 return marked the 17th year that artificially spawned and reared North Fork Clearwater ("B" run) steelhead have returned to DNFH. This report reviews the statistics of the 1988 run and the prognosis for 1989.

The 1987-88 return year was an atypical year. DNFH normally begins spawning operations February 1, however, in 1988 spawning did not begin until March 1. The returning adult steelhead were over one month late and resulted in the early closure of the sport fishery. Some of the delay is attributable to low flows and above normal water temperatures. However, Dworshak Fisheries Assistance Office (DFAO) speculates that most of the migration and timing delay resulted from destroying the early egg takes (takes 1-4) in Brood Year (BY) 1984 because of IHNV. These eggs represented spawn from early returning adults. DFAO data (unpublished) indicates that adult return time is a heritable trait. Therefore, by destroying the early segment of BY 84 progency, as part of our IHN program, we lost the early portion of the 1987-88 adult return.

Stock Description

Dworshak NFH maintains the North Fork Clearwater River steelhead stock, cut off in 1968 from its ancestral spawning grounds by Dworshak Dam. Size-wise, this stock ("B" run) of steelhead is unique. At maturity, males and females average about 36 and 33 inches in length, respectively. Spawning stock is comprised primarily of three age classes; I, II and III-"salt" fish. This nomenclature refers to the number of complete years fish have spent in salt water. Occasionally, a fish returns after having spent 4 years in the ocean. Chronologically, the fish are 1 year older than this system indicates as they are reared for 1 year in the fresh water hatchery environment.

The "B" run steelhead enter the Columbia River in August after entry of the smaller size "A" run fish. The "B" run reaches the Snake and Clearwater Rivers the same summer, then overwinter until their final spawning run into the hatchery.

Preseason Predictions

Predictions by the Dworshak Fisheries Assistance Office (DFAO) are based primarily on the strength of returns of younger year classes for a brood. For example, there is a strong linear correlation ($r=0.95$) for predicting the number of II-salt steelhead returning in a year based upon the number of I-salt fish that returned the previous year. A similar regression is used for predicting the III- salt return from the number of I and II-salt fish which

returned in the two previous brood years. We do not have a consistent and accurate prediction method for I-salts. Instead, an average percentage return for I-salt fish is applied to the number of smolts released for that brood year. These three estimates are then summed to predict the total hatchery return.

For the 1987-88 steelhead run, we predicted 6,200 steelhead back to Dworshak's rack and 21,600 hatchery fish back to the Clearwater River. The recorded returns were considerably less than our original prediction. Rack return was 3,764, only 60 percent of the predicted value while return to the Clearwater River was estimated to be 15,991 or 75 percent of the predicted value. Lower returns to the hatchery and to the Clearwater River, we believe, resulted from low flows and high water temperatures in the Columbia and Snake Rivers, which impacted adult passage. Also, we believe that the Zone 6 harvest was greater than in the previous years. The take of wild "B's" was higher in the fall of 1987 as compared to fall 1986. The 1986 Zone 6 harvest of wild "B" steelhead was estimated at 39.5 percent while the 1987 harvest of wild "B" steelhead was estimated at 43.6 percent. If hatchery "B's" are similar to wild "B's", then we could have expected a higher Zone 6 harvest rate on hatchery fish in 1987 than in 1986. Table 1 summarizes past DNFH steelhead runs to the Clearwater River.

Hatchery Operation

The hatchery ladder was open January 4 through May 10, 1988 with continuous ladder operation during this time.

A total of 9.8 million green eggs were collected over an eleven-week period. Table 2 shows spawning data.

Table 1. Number of steelhead trout returning to Dworshak National Fish Hatchery and estimates of hatchery fish harvested and total hatchery returns to the Clearwater River. (1972-73 to 1983-84 data based on report from Pettit, 1985, IDFG Federal Aid Report, Project F-73-R-6, January, 1985.)

Return[1]	Number Back To DNFH	Estimated Sport Fisherman Harvest Clearwater R.	Estimated Tribal Harvest Clearwater R.	Estimated Hatchery Fish Return Upriver of North Fork (unharvested)[7]	Total Hatchery Fish Returning to Clearwater R.
1972-73	9,938	2,068	-	0	12,006
1973-74	7,910	2,320	-	0	10,230
1974-75	1,698	N.S.[3]	290	0	1,988
1975-76	1,858	N.S.	430	0	2,288
1974-77	3,100	N.S.	410	0	3,510
1977-78	12,727	14,000	(1,000)[5]	0	27,727
1978-79	4,939	4,610	(500)	0	10,049
1979-80	2,519	N.S.	1,250	300	4,069
1980-81	1,968	4,510	(1,000)	500	7,978
1981-82	3,054	1,665	(1,000)	0	5,719
1982-83	7,672	13,967[4]	(1,500)	0	23,139
1983-84	3,284	6,500	(1,500)	100	11,384
1984-85	14,018	19,410	(1,500)	2,700	37,628
1985-86	4,462	7,240	1,500	1,800	15,002
1986-87	5,286[2]	15,800[8]	4,210[6]	3,000	28,296
1987-88	3,764	8,748[8]	1,479[9]	2,000	15,991

[1]Return year is from October through May.
[2]Actual number returned, ladder closed not a complete return figure.
[3]N.S., no sport fishing season.
[4]Pettit included an additional 2,000 fish in harvest from Snake River for a total of 15,967.
[5]( ) guesstimate on tribal harvest by author.
[6]Personal communication from Dave Statler, 9/24/87.
[7]Based on return percentage back to hatchery to calculate returning of II-salt from upstream releases.
[8]Preliminary estimate.
[9]Personal communication with James Mauney, 10/24/88.

Table 2. Dworshak NFH steelhead spawning data for 1988.

	Male	Female	Total
Total rack returned	940	2,824	3,764*
Total steelhead spawned	835	1,454	
Green eggs		9,830,648	
Eyed eggs		7,820,654	
Percent eye up		88.7	

*Ten Lyon's Ferry strays were deducted.

Spawning data (9/24/88) - Jim Rockowski, USFWS, Dworshak NFH, Pers. Commun.

Age Composition

The age composition entering DNFH was as follows: I-salt = 168, II- salt = 3,478 and III-salt = 119. The run was made up of 4.4 percent I-salts, 92.4 percent II-salts and 3.2 percent III-salts. Adults were comprised of 75.1 percent females and 24.9 percent males.

Coded-Wire Tags (CWT)

A total of 19 different CWT groups were recovered. Table 3 shows the tag codes and where they originated.

Survival

The return of DNFH fish to the rack was comprised of an estimated 92.4 percent II-salt fish. If this factor is applied to the estimated total to the Clearwater River, then 14,888 II-salt fish returned to the Clearwater. In 1985, DNFH released 1,601,695 steelhead smolts in the Clearwater River. Based on our prediction of adult return to the Clearwater River of 15,991, this equals a 1.00 percent smolt-to-adult return.

Table 3. Coded-wire tag recoveries from steelhead in 1988 at Dworshak NFH rack.

Tag Code	Release Year	Number of tags Recovered	Origin
*51025	1982	1	DNFH
*51352	1983	1	DNFH - Contribution
51729	1986	3	South Fork-Clearwater River
102516	1984	4	DNFH
102517	1984	2	DNFH
102854	1985	1	HNFH-East F. Salmon River (Pahsimeroi-B)
102856	1986	2	DNFH-IHN Survivors
231604	1982	1	NMFS-Homing Study (Clearwater River)
*231605	1982	1	NMFS-Homing Study (Columbia R.-Beacon Rock)
231651	1984	1	NMFS-Barge Index (Columbia R.-Beacon Rock)
231810	1985	3	NMFS-Barge Index
231811	1985	16	NMFS-Barge Index
231812	1985	6	NMFS-Barge Index
231813	1985	1	NMFS-Barge Index
621645	1985	1	WDW-Lyons Ferry
633214	1984	1	WDW-Lyons Ferry (Tucannon River)
633303	1986	1	WDW-Lyons Ferry
633304	1986	2	WDW-Lyons Ferry (Curl Lake)
633351	1986	1	WDW-Tucannon River

*Snouts may have inadvertently remained in freezer longer than one season or fish remained in fresh water 1 or more years after release.

1988-89 Run Prediction

The run prediction for the 1988-89 steelhead return to DNFH will be difficult because of two back-to-back drought-low flow years. The best steelhead run predictor that we have is the previous year's
I-salt returns. Using this predictor, we have been able to use regression to predict the run size of II-salts. This regression has over a 90 percent correlation. We have also used a smolt survival estimate based on the number of smolts released and a survival percentage based on CWT returns. We observed 168 I-salts back to DNFH this year. Using this information our run predictions are made.

The following is the 1988-89 Dworshak "B" steelhead run prediction. Estimates are based on previous years' returns and smolts released.

Back to the Hatchery

I-salts based on a 0.00028* I-salt return from smolts	=	338
II-salts based on correlation with I-salts 1980-85	=	2,680
III-salts based on correlation with II-salts	=	250
TOTAL PREDICTION		3,268
Rounded off	=	3,250

*Average from 1980-86

The 1987 release year, which will be producing the I-salts of the 1988-89 season, was about average. Including outplants, we released 2,105,748 smolts.

The 1986 release from which the II-salt fish will be returning was a good production year for DNFH. We released 1,726,336 fish off station that year. Therefore, if we expect a similar return rate for these fish and calculate a 20 percent straying rate to DNFH, we could expect 2,350 II-salt fish returning upstream from Dworshak. An additional I- and III-salt return upstream of 400 could be expected to survive. For a total escapement (unharvested) upstream of North Fork of 2,750.

These estimates reflect fish that will not be harvested. Total hatchery fish back to the Clearwater River would need to include the harvest which may be equal to those that escape to spawn. Harvest would include sport fishing and Nez Perce tribal harvest at the DNFH ladder and Clear Creek.

Prediction of Total Hatchery Fish Back to Clearwater 1988-89

3,250	rack return
3,250	harvest of fish destined for DNFH in Idaho*
2,750	return upstream of North Fork not harvested
2,750	harvest of fish destined for upstream of North Fork*
1,500	Nez Perce Tribal harvest
13,500	total predicted back to Clearwater River

*(harvest based on a 50% harvest rate - in the 1987-88 the harvest rate was close to 55%)

Using the above calculation, the 1988-89 steelhead run into the Clearwater River is predicted to be about 80 percent of last year's run which was considered low. Although water conditions in the Columbia and Snake Rivers have remained low this year, passage for adult steelhead seems to have been fairly good. Ice Harbor Dam counts of steelhead through October 25 are almost 30 percent greater than last year's, while counts at McNary Dam are quite similar to last year's. Also, Lower Granite Dam counts this year are about 35 percent above those of last year, up through October 25. Although we can not separate "A's" and "B's"

completely at Lower Granite, we suspect that the number of "B's" are equal to last year's or even above those of last year, at least for fall movement. Another factor that may reflect more "B's" returning to the Clearwater than correlation of ages predicts is that the Zone 6 fishery harvested fewer "B's" this year (36 percent vs. about 44 percent last year). Therefore, we may have more "B's" overwintering in the Clearwater River this year (88-89) because of an increased escapement past the fishery. Based on the above, we believe that the calculated prediction for Clearwater "B's" of 13,500 is probably a minimal number and the actual number will be somewhat greater than this, maybe equal to last year's run of approximately 16,000 fish into the Clearwater.

SUMMARY REPORT

Adult Spring Chinook Salmon Returns to Dworshak NFH in 1988 and Prognosis for 1989

U.S. Fish and Wildlife Service
Dworshak Fisheries Assistance Office
Ahsahka, Idaho

Prepared by:

William H. Miller
Project Leader

Travis C. Coley
Assistant Project Leader

Ralph B. Roseberg
Fishery Biologist

Adult Spring Chinook Salmon Returns to Dworshak-Kooskia NFH Complex in 1988 and Prognosis for 1989

Introduction

Dworshak National Fish Hatchery (DNFH) began large scale production of spring chinook salmon (SCS) in 1982. In 1981 Lower Snake River Compensation Plan (LSRCP) authorized and funded the construction of 30 raceways for the production of 1.05 million SCS smolts. Construction was completed by June 1982. Brood Year 1988 is the sixth year of production.

Kooskia National Fish Hatchery (KNFH) has been in the SCS business since 1972. KNFH is approximately 30 miles upstream from DNFH and is located 1.5 miles southeast of Kooskia, Idaho, near the confluence of Clear Creek and the Middle Fork of the Clearwater River. KNFH is responsible for rearing and releasing SCS into the Middle Fork of the Clearwater River. KNFH is funded by the Fish and Wildlife Service.

Run Size

The 1988 adult SCS return to the Dworshak-Kooskia NFH Complex was very successful. DNFH had a return of 1,972 adults. This return was 97.8 percent of the record 1987 return (Table 1). The adult SCS return to KNFH was the fifth highest for this facility (Table 2).

In 1988, 2,567 adults were spawned at DNFH and 4.891 million eggs were taken (Table 3). This is the combined take for the Dworshak- Kooskia NFH Complex since all spawning occurred at DNFH.

Table 1. Hatchery returns and age composition of spring chinook salmon to Dworshak NFH.

Year	I-salt	II-salt	III-salt	Unmeasured	Total Return
1984	14	52	16	0	82
1985	13	281	35	5	334
1986	78	346	91	0	516
1987	25	1604	376	12	2017
1988	163	569	1240	0	1972

Table 2. Hatchery returns and age composition of spring chinook salmon to Kooskia NFH.

Year	I-salt	II-salt	III-salt	Unmeasured	Total Return
1972	5	0	0	0	5
1973	5	45	0	0	50
1974	16	35	2	0	53
1975	15	284	27	0	326
1976	409	286	106	0	801
1977	333	2539	154	0	3026
1978	23	1676	336	0	2035
1979	11	100	264	0	375
1980	9	55	3	0	67
1981	1	168	78	0	247
1982	3	116	139	0	258
1983	1	231	141	0	373
1984	55	80	206	0	341
1985	26	449	54	0	529
1986	21	159	103	0	283
1987	16	607	64	0	687
1988	39	363	193	0	595

Table 3. Spring chinook salmon spawning data for 1988.

	Males	Females	Total
Total Return	1,218	1,349	2,567
Adults Spawned	955	1,065	2,020
% Mortality	12.8	12.2	--
Green Eggs	--	--	4,890,970
Eyed Eggs	--	--	4,693,953
Percent Eye-up	--	--	96.0
IHN Positive (% of eyed eggs)	4.75	4.14	4.43

From Brood Year 1988 Spring Chinook Salmon Spawning Report, October 31, 1988 - Dworshak NFH.

Stock Description

At DNFH we have complete rack returns for the 1985 release year. We realized a 0.26 percent return with the genetic makeup 67.8 percent Little White Salmon stock, and 32.2 percent Leavenworth stock (see Table 4 for stock definitions). The 1987 release year returned 163 jacks to DNFH. This stock is 100 percent Rapid River. The 1988 release year was comprised of 100 percent Rapid River stock (For a complete stock breakdown see Table 5).

We also have complete rack returns for 1985 release year at KNFH. We had a smolt to adult return of 0.23 percent with a 100 percent Kooskia stock. The 1986 release year returned 363 II-salts and the 1987 release year returned 39 jacks in 1988 (For a complete stock breakdown on KNFH see Table 6.)

Table 4. Spring chinook salmon stocks used in the devlopment of Dworshak-Kooskia NFH Complex spring chinook salmon program.

KOOSKIA	Our present definition for any adult returning to Kooskia, regardless of its parentage, is "Kooskia stock".
RAPID RIVER	Developed from wild spring chinook, captured at Snake River dams, after their construction. Destined for Snake River tributaries in Idaho and Oregon.
CARSON	From Carson NFH on the Wind River, Washington, tributary to the Columbia in Bonneville pool. Originally developed from spring chinook collected at Bonneville Dam from 1955-63. A heterogeneous collection of spring chinook destined to upriver areas.
SOUTH SANTIAM	From ODFW's South Santiam hatchery, a Willamette River tributary, which maintained two spring chinook stocks; one of Santiam River origin; the other from Carson NFH stock. Kooskia's fish came from the Carson stock.
LITTLE WHITE SALMON	From Little White Salmon NFH on the Little White Salmon River, Washington, tributary to the Columbia River in Bonneville pool. Developed from Carson stock.
LEAVENWORTH	From Leavenworth NFH on Icicle Creek, Washington, tributary to the Wenatchee River. Originally, from upriver spring chinook captured at Rock Island Dam in the early 1940's. Leavenworth went out of spring chinook production in the mid-1960's. In the 1970's, the hatchery stock was rebuilt primarily with Carson stock. The run is now self-perpetuating.

Table 5. Genetic make-up of Dworshak NFH spring chinook salmon releases at the hatchery as smolts.

Release Year	Brood Year	Genetic Make-up*	% Rack Return
1981	1979	54.8% KK 45.2% RR	
1982	1980	100% CA	
1983	1981	75.1% LW/RR 12.3% LW 12.6% LE	
1984	1982	100% LE	0.283
1985	1983	67.8% LW - 32.2% LE	0.257
1986	1984	100% LE	
1987	1985	100% RR	
1988	1986	100% RR	

*KK - Kooskia
RR - Rapid River
CA - Carson
LW - Little White Salmon
LE - Leavenworth

Table 6. Genetic make-up of Kooskia NFH spring chinook salmon released in Clear Creek as smolts.

Release Year	Brood Year	Genetic Make-up*	% Rack Return
1971	1969	100% RR	0.07
1972	1970	38.7% RR - 61.3% CA	0.07
1973	1971	100% CA	0.13
1974	1972	100% CA	0.30
1975	1973	58% RR - 42% CA	0.19
1976	1974	71% SS - 5% LW	0.02
1977	1975	91% CA - 19% CA - 5% KK	0.01
1978	1976	75% RR - 25% CA	0.03
1979	1977	69% KK - 31% CA	0.02
1980	1978	31% KK - 69% CA	0.05
1981	1979	75.3% CA - 12.8% KK 11.9% RR	0.04
1982	1980	83% CA - 17% KK	0.03
1983	1981	53% KK - 47% LW	0.10
1984	1982	85% KK - 15% LW 9.9% RR	0.02
1985	1983	100% KK	0.04
1986	1984	100% KK	0.23
1987	1985	100% KK	
1988	1986	100% KK	

*Rapid River - RR
Carson - CA
South Santiam - SS
Little White Salmon - LW
Kooskia - KK
Leavenworth - LE

Age Composition

Age composition of the run is based on length categories. These length categories have been verified using known age/length/sex data from CWT returns. Jacks are <= to 56 cm, II-salt are 57 to 81 cm and III-salt are => to 82 cm.

The age composition is displayed in Table 7.

Table 7. Age composition for 1988 of spring chinook salmon returning to Dworshak-Kooskia NFH Complex.

Dworshak NFH			Kooskia NFH		
Age	Number	Percent	Age	Number	Percent
I-salt	163	8.3	I-salt	39	6.6
II-salt	569	28.8	II-salt	363	61.0
III-salt	1240	62.9	III-salt	193	32.4
TOTAL	1972	100	TOTAL	595	100

Survival

The return of III-salts in 1988 completes the returns from the 1,137,139 smolts released at DNFH and the 355,176 smolts released at KNFH in 1985. Total returns to DNFH from this release were 78 I-salts, 1,604 II-salts and 376 III-salts for a hatchery return survival rate of 0.257 percent (Table 8). Total returns to the KNFH from this release were 21 I-salts, 607 II-salts and 193 III-salts for a hatchery return survival rate of 0.231 percent (Table 9). This is not the total survival rate to the Clearwater River because the Nez Perce snag fishery harvest is unknown.

Table 8. Return vs. release numbers for the 1987 adult spring chinook salmon return to Dworshak National Fish Hatchery.

Release Year	Smolts Released at Hatchery*	Jacks	II-salt	III-salt	% Return
1984	259,589	13[85] (0.005)	346[86] (0.133)	376[87] (0.145)	0.283
1985	1,137,139	78[86] (0.007)	1604[87] (0.141)	1240[88] (0.109)	0.257
1986	506,320	25[87] (0.005)	569[88] (0.112)	--	--

*Includes only smolt releases at hatchery, i.e. does not include off-site releases or fry/fingerling releases.

Table 9. Return vs. release numbers for the 1987 adult spring chinook salmon return to Kooskia NFH.

Release Year	Smolts Released at Hatchery*	Jacks	II-salt	III-salt	% Return
1984	520,677	26[85] (0.005)	159[86] (0.031)	64[87] (0.012)	0.048
1985	355,176	21[86] (0.006)	607[87] (0.171)	193[88] (0.054)	0.231
1986	351,405	16[87] (0.005)	363[88] (0.103)		

*Includes only smolts released at hatchery, i.e. does not include off-site releases or fry/fingerling releases.

Coded-wire Tag Recoveries (CWT)

At this time, the CWT's have not been processed from the 1988 spring chinook salmon rack. Last year (1987 rack), we had a total of 24 CWT recoveries at DNFH and 1 at KNFH. However, the 1988 rack we have over 100 CWT recoveries.

Preseason 1987 Predictions

The DNFH 1988 run prediction was right on the money, except for age classes. However, rumor has it that rot-gut, i.e. Buckhorn, libation still traded hands. The KNFH prediction was a slight over estimation with a weaker than expected II-salt component. The I- salt predictor for return of II-salts to KNFH is still weak.

Kooskia NFH-1987 I-salt Returns = 16

1988 Prediction		1988 Actual Return	
I-salt =	56	I-salt =	39
II-salt =	637	II-salt =	363
III-salt =	195	III-salt =	193
Total Prediction =	888	Total Run =	595

Dworshak NFH-1987 I-salt Returns = 25

1988 Prediction		1988 Actual Return	
I-salt =	110	I-salt =	163
II-salt =	532	II-salt =	569
III-salt =	1330	III-salt =	1240
Total Prediction =	1972	Total Run =	1972

SCS Run Predictions - 1989

Following is our prediction for the 1989 SCS run. Our estimate for Dworshak suggests that 1989 may be the best year yet.

Dworshak NFH		Kooskia NFH	
I-salts	91	I-salts	47
II-salts	3300	II-salts	403
III-salts	434	III-salts	111
TOTAL	3825	TOTAL	561
Prediction	3800 + 200	Prediction	550 + 200

Total predicted to return to both hatcheries in 1989 is 4350 + 400.

The total hatchery spring chinook salmon predicted to return to Dworshak and Kooskia NFH's in 1989 will exceed the needs for hatchery egg taking. The number needed for supplying eggs to fill both hatcheries is estimated at 2500. Actual number will vary depending on number of eggs per female (size and age of fish returning) and sex ratio. As things look now, an estimated 1850 adult spring chinook salmon could be available for: (1) supplying supplementation eggs or fry, (2) adult outplanting, or (3) harvest.

Management Activities--Form 3-112

This form is to provide a summary for the various types of fish and wildlife management assistance activities provided in the various areas served. Activities in the various project areas will be reported on this form for three categories defined in the Statement of Responsibilities and Role for Fisheries: Restoration/Mitigation; Management Assistance, and; Federal Leadership. A separate form should be used for each of these three activities.

Management Activities (column 1). Select the appropriate activity from one of the following nine categories.

1. Management Plan Development - Work on or completion of a fishery or wildlife management plan for a particular "Area Served" (explained below). For example, if three management plans were completed for fisheries on National Wildlife Refuges for the year, they would all be reported on one line under this category with "3" under "Number of Projects" and a total expenditure of effort reported in column 4.

2. Habitat Restoration and Follow-Up Evaluations - Report activities associated with field habitat restoration or studies designed to follow-up on analyzing the success of restoration efforts.

3. Habitat Surveys - Projects using specific habitat analysis techniques such as IFG, HEP, HQI, etc. or other techniques used in the process of analyzing habitat condition and status. These activities are usually conducted in pre-project impact analyses and Coordination Act environmental assessments.

4. Population Analysis and Monitoring - Population census with electroshocking, netting, trapping and marking of fish or wildlife for various purposes such as disease sampling, or for baseline data collection prior to development of management plans or special studies and reports.

5. Endangered Species Work - Any work conducted relative to population analyses and/or recovery programs for threatened or endangered species.

6. Coordination & Technical Assistance - Generic fish and wildlife assistance work that does not fit neatly under any other category. For example advice and assistance provided to a tribal cooperator on constructing fish rearing ponds or meetings held with Fish and Wildlife Enhancement where fishery technical advice is given, or assistance to hatcheries during spawning or assisting with special studies.

7. Stock Evaluations - Work conducted analyzing mitigation and restoration programs. This would include fish and wildlife marking and recovery efforts, development of data and models for run size predictions, harvest allocations, analysis of survival of hatchery fish stockings. This applies to both hatchery and wild populations.

8. Fish/Wildlife Stocking - Activities associated with planning and conducting fish or wildlife stocking activities.

9. Interagency Cooperative Management - Projects, planning, participation in activities associated with interstate, international or other commissions, councils, committees, etc. River Coordinator offices will use this category for a majority of their activities.

Area Served (column 2). Select the appropriate area served from one of the following ten categories: Fish and Wildlife Management Assistance (FWMA), National Fish Hatcheries (NFH), National Wildlife Refuges (NWR), Fish and Wildlife Enhancement (FWE), Fish and Wildlife Service Research (FWSR), Tribal, Military, Other Federal, State, and Private. Make only one entry per line for area served.

Number of Projects (column 3). List the number of projects for each management activity in each area served. For the "Habitat Restoration" and "Habitat Surveys" activities also add in parentheses the number of stream miles (flowing systems) or acres (impounded systems) of habitat dealt with.

Staff Years (column 4). The total effort for the management activity (administrative and technical) expressed as full-time-equivalents (FTEs). Report to one decimal place.