

APPENDIX B

ADULT STEELHEAD RETURNS TO DWORSHAK NFH IN 2002-2003 AND PROGNOSIS FOR 2003-2004

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Introduction

Dworshak National Fish Hatchery (NFH) is located at the confluence of the North Fork and the main stem of the Clearwater River near Ahsahka, Idaho. Construction of the hatchery was included in the authorization for Dworshak Dam and Reservoir (Public Law 87-847, October 23, 1962) to mitigate for losses of steelhead (*Oncorhynchus mykiss*) caused by the dam and reservoir.

The hatchery was designed and constructed by the U.S. Army Corps of Engineers and has been administered and operated by the U.S. Fish and Wildlife Service since the first phase of construction was completed in 1969. At that time, the hatchery had 25 Burrows ponds on a single reuse system and 59 other Burrows ponds on single-pass water. In 1972, a second phase of construction placed all these ponds on three reuse systems with the option of operating on either reuse or single-pass. In 1986, the oldest system (25 ponds) was taken off reuse and put on single-pass. In 2004, a rehabilitation project was completed that will again allow reuse in this system.

The North Fork Clearwater River steelhead stock maintained by Dworshak NFH is unique. At maturity, males and females of this particular stock of "B" run steelhead average about 91 cm (36 inches) and 82 cm (33 inches) in length, respectively. Spawning stock is comprised 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. Fish are actually two years older than this system indicates, as they are reared for one year in the hatchery and spend another year migrating to and from the ocean.

Most "B" run steelhead enter the Columbia River in August through September, usually later than the smaller "A" run fish. The Clearwater "B" run steelhead may reach the Snake and Clearwater rivers in the fall, then over-winter until their final run into the hatchery. Some of the fish actually arrive at Dworshak NFH in the fall. The Dworshak NFH trap is operated during the fall to insure inclusion of sufficient early arriving steelhead (~500 adults) into the hatchery gene pool. The trap is then reopened from February through April to capture brood stock from the mid and late portions of the run.

Releases of steelhead smolts from Dworshak NFH began in 1970 with the first hatchery produced adults returning in 1972. The 2002-2003 return marked the 31st year that artificially spawned North Fork Clearwater River steelhead have returned to Dworshak NFH. **Table 1** summarizes the Dworshak NFH steelhead returns to the Clearwater River from 1972-2003. This report reviews the 2002-2003 run and lists projections for 2003-2004.

2002-2003 Adult Returns

The Dworshak NFH ladder was opened October 2 and remained open until October 29, 2002 with some intermittent openings after that for coho salmon (*Oncorhynchus kisutch*) collection. A total of 501 early run steelhead were trapped during that period. The fish ladder was re-opened for steelhead collection on February 21 for only two hours and was closed for the final time on May 6, 2003. Ladder operation was intermittent during the spring season so that the hatchery was not

swamped with excess fish. A total of 4,696 adult steelhead entered the ladder during the spring of 2003. We trapped 10 adult steelhead that were not adipose fin clipped and had no dorsal fin erosion. These fish were immediately transported and released upstream in the main stem Clearwater just above Dworshak NFH, in accordance with the Biological Opinion on wild steelhead. In addition to the hatchery rack return, an estimated 30,164 steelhead were harvested in the sport fishery (IDFG). The estimated number harvested by Nez Perce Tribal subsistence fishermen for the last three complete seasons were unavailable for this report. We will use the same numbers as reported last year last year with the exception of the spring 2003 harvest of 1,118 fish provided by Joe Oatman, Nez Perce Tribal Fisheries Department, (personal communication).

Table 1. Number of steelhead returning to Dworshak NFH, estimates of hatchery fish harvested, and total hatchery returns to the Clearwater River, Idaho, 1972-2003 (1972-73 to 1983-84 data based on report from Pettit, 1985, IDFG Federal Aid Report, Project F-73-6, January, 1985).

Return ¹	Number Back to Dworshak NFH	Estimated Clearwater Sport Harvest ²	Estimated North Fork Tribal Harvest ³	Unharvested Dworshak Hatchery Fish ⁴	Total Dworshak Fish Returning to Clearwater River
1972-73	9,938	2,068	-	0	12,006
1973-74	7,910	2,320	-	0	10,230
1974-75	1,698	N.S. ⁵	290	0	1,988
1975-76	1,858	N.S.	430	0	2,288
1976-77	3,100	N.S.	410	0	3,510
1977-78	12,272	14,000	(1000) ⁶	0	27,272
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	(1000)	500	7,978
1981-82	3,054	1,665	(1000)	0	5,719
1982-83	7,672	13,967 ⁷	(1,500)	0	23,139
1983-84	3,284	6,500	(500)	100	11,384
1984-85	14,018	19,410	(1,500)	2,700	37,628
1985-86	4,462	7,240	1,471	1,800	15,002
1986-87	5,286 ⁸	15,679	4,210	3,000	28,175
1987-88	3,764	8,766	1,478	2,000	16,008
1988-89	6,041	11,332	1,242	3,700	22,315
1989-90	10,630	27,952	1,710	3,650	43,943 ⁹
1990-91	7,876	12,973	1,211	2,250	24,147
1991-92	3,700	10,416	1,326	1,650	17,092
1992-93	7,900	19,351	1,184	3,368	31,803
1993-94	3,757	14,063	675	1,457	17,096
1994-95	1,394	5,953	730	1,307	9,384
1995-96	4,480	2,139	992	1,315	9,106
1996-97	2,980	4,926	513	779	9,198
1997-98	3,601	7,611	145	479	11,836
1998-99	5,419	8,773	1,007	1,137	16,335
1999-00	2,882	7,177	1,000	720	11,775
2000-01	6,411	12,181	(1,000) ⁶	513	20,105
2001-02	7,733 ⁸	25,196	(1,000)	774	34,703
2002-03	17,696 ⁸	30,164	1,118	830	49,808

See next page for footnotes

Table 1. Footnotes.

¹Return year is from October through May.

²Unless otherwise noted, estimates of sport harvest in the Clearwater River taken from Idaho Department of Fish and Game annual reports.

³Unless otherwise noted, estimates of tribal harvest in the Clearwater River were taken from Nez Perce Tribe Department of Fishery Resource Management annual reports.

⁴Based on return percentage back to hatchery to calculate returning II-salts from upstream releases.

⁵N.S., no sport fishing season.

⁶() guesstimate on tribal harvest by authors.

⁷Pettit, IDFG, Lewiston, Idaho (personal communication) included an additional 2,000 fish in harvest from Snake River for a total of 15,967.

⁸Ladder was operated intermittently due to high number of returns; not a total hatchery return figure.

⁹We believe the sport estimate of 27,953 is about 8,000 too high and the total number of Dworshak steelhead to the Clearwater River was in the range of 32,000 to 35,000.

Age Composition

Age class of adult steelhead is determined by fork length measurements and based on data from previous coded-wire tag returns from Dworshak NFH. The total returns by sex, age, and time of return is listed in **Table 2**. The 560 I-salt returns to the Dworshak NFH rack was above average but not a record. The adult return was comprised of 65.4 percent females and 34.6 percent males, I-salt returns were 79.3 percent male.

Table 2. Adult steelhead broodstock returns by sex, age, and return time at Dworshak NFH rack, 2002-2003.

Ocean Age Class by Run Time	Males	Females	Total
Fall Run (10/2 to 10/29)			
I-Salt	41	3	44
II-Salt	212	238	450
III-Salt	5	2	7
Spring Run (2/21 to 5/06)*			
I-Salt	403	113	516
II-Salt	1,049	3,056	4,105
III-Salt	102	20	122
Combined Total*			
I-Salt	444	116	560
II-Salt	1,261	3,294	4,555
III-Salt	107	22	129
Total Measured Rack Return*	1,812	3,432	5,244

* Intermittent ladder operation due to high number of returns.

Survival

The III-salt returns in 2003 complete the returns from the 1,249,237 smolts released at Dworshak NFH in 1999. Total returns to Dworshak NFH from the 1999 release were 570 I-salts, 6,226 II-salts, and 129 III-salts for a hatchery return survival rate of 0.5543 percent (**Table 3**). The mean hatchery rack return rate for the last 10 years is 0.3685 percent.

Table 3. Rack return vs. release numbers for summer steelhead at Dworshak NFH, release years 1980-2000.

Release Year	Smolts Released	Returns			Total	Rack Return %
		I-Salt	II-Salt	III-Salt		
1980	2,666,085	400	6,613	652	7,665	0.2875
1981	1,930,047	124	1,538	1,219	2,881	0.1493
1982	2,108,319	1,094	12,679	403	14,176	0.6724
1983	1,259,110	120	3,359	239	3,718	0.2953
1984	1,208,319	700	8,318	119	9,137	0.7562
1985	1,035,573	431	3,487	317	4,235	0.4090
1986	1,239,541	168	5,296	215	5,679	0.4582
1987	1,206,580	428	9,896	314	10,638	0.8817
1988	1,432,125	487	7,339	250	8,076	0.5639
1989	1,073,900	218	3,132	162	3,512	0.3270
1990	1,466,664	313	7,349	153	7,815	0.6699
1991	1,192,503	389	3,543	76	4,008	0.3361
1992	1,224,101	61	1,270	71	1,331	0.1087
1993	1,217,990	48	4,005 ¹	83	4,136	0.3396
1994	1,153,417	384	2,537	38	2,959	0.2565
1995	1,213,577	349	3,308	87	3,744	0.3085
1996	1,377,435	253	4,976	69	5,298	0.3846
1997	1,361,034	356	2,225	96	2,677	0.1967
1998	1,228,944	588	5,745	177 ²	6,510	0.5297
1999	1,249,237	570	6,226 ²	129 ²	6,925	0.5543
2000	1,311,447	1,330 ²	4,555 ²			
2001	1,247,550	560 ²				

¹ Does not include twenty unmeasured fish.

² Intermittent ladder operation due to high number of returns.

Adult Outplanting

Occasionally we trap more adult steelhead at the hatcheries than are necessary for broodstock. When this happens they are outplanted into various streams throughout the Clearwater River basin. A total of 942 adults were outplanted from Dworshak NFH and Kooskia NFH for fishery recycle or tribal education program during March and April 2003 (**Table 4**). Kooskia NFH rack returns are summarized in **Table 5**.

Table 4. Number, location, and purpose of summer steelhead outplanted from Dworshak and Kooskia NFHs in 2003.

Location	Purpose	Total
South Fork at Stites	Fishery recycle	313
Gibb's Eddy	Fishery recycle	529
Lapwai	Tribal education program	100
Total		942

Table 5. Rack returns and age class structure for hatchery steelhead and naturals captured at Kooskia NFH, 1995-2003.

Return year	I-Salt	II-Salt	III-Salt	Total Hatchery	Naturals
1995	20	381	20	421	48
1996	72	307	6	385	24
1997	26	420	4	450	61
1998	18	217	0	235	18
1999	36	685	1	722	53
2000	83	232	5	320	17
2001	12	253	1	266	10
2002	75	367	2	444	8
2003	40	350	4	394	16

Coded-Wire Tag Recoveries

A summary of adult steelhead coded-wire tag (CWT) recoveries in the Dworshak and Kooskia NFHs racks are shown in **Table 6**.

Table 6. Summary of coded-wire tag recoveries for adult summer steelhead in the Dworshak and Kooskia NFH racks, 1987-2003.

Year	Total Recoveries	Recoveries of Dworshak Stock	Recoveries of Marks from Strays
1987 ⁴	397	388 ¹	9
1988	50	44	6
1989	284	279 ¹	5
1990	587	571 ¹	16
1991	738	738	0
1992	325	322 ¹	3
1993	511	508	3
1994	238	234	4
1995	108	108 ¹	0
1996	330	326 ²	4
1997	342	341 ²	1
1998	378	368 ³	10
1999	446	445 ³	1
2000	378	375	3
2001	405	403	2
2002 ⁴	637	630	7
2003 ⁴	1012	1011	1

¹Includes NMFS transportation study marks.

²Includes NMFS transportation study marks and Clearwater Hatchery marks from the South Fork Clearwater River releases.

³Includes Clearwater Hatchery marks from South Fork Clearwater and Clear Creek releases.

⁴Intermittent ladder operation due to high number of returns.

Evaluation of Run Projection for 2003 and Forecast for 2004

2003 Prediction. The 2003 run prediction and actual rack return by age class is listed in **Table 7**. Our 2003 prediction was an underestimate. The prediction of II-Salts is based on the number of jacks the previous year. The predictions for I-salts and III-salts are based on average return rates. The hatchery fish return to the Clearwater River (see **Table 1**) was a huge improvement over the previous year and even exceeded the record hatchery “B” run of 1985.

Table 7. Comparison of predicted and actual adult rack returns for summer steelhead at Dworshak NFH, 2002-2003.

Ocean Age Class	Predicted	Expanded return	Actual Rack
I-Salt	429	1,890	560
II-Salt	14,767	15,371	4555
III-Salt	105	435	129
Total	15,301	17,696	5,244

2004 Steelhead Run Prediction. Based on the 1,890 I-salt rack returns (expanded) the predicted steelhead return to Dworshak NFH in 2003-2004 would have been the highest in the hatchery=s history (**Table 8**). In-season hatchery AB@ steelhead estimates at both Bonneville and Lower Granite dams have caused the estimate to be revised drastically downward. Jon Hansen (IDFG-Salmon) estimated 6,017 II-salts for Dworshak NFH. Based on this prediction we are considering intermittent ladder operation to prevent excess fish collection. Intermittent ladder operation also keeps steelhead in the river where they are available for sport and tribal harvest.

Table 8. Predicted steelhead to Dworshak NFH rack, 2003-2004.

Ocean Age Class	2003-04 Prediction
I-Salt	469
II-Salt	19,469
III-Salt	111
Total	20,049