

**FY2011 ANNUAL REPORT OF HATCHERY EVALUATION  
ACTIVITIES FOR SPRING CHINOOK SALMON AT  
DWORSHAK AND KOOSKIA NATIONAL FISH HATCHERIES**

**Brood Year 2009 Smolt Releases  
Brood Year 2010 Marking and Tagging  
Brood Year 2011 Adult returns  
Brood Year 2006 SAR  
Prediction for 2012 Adult Returns**

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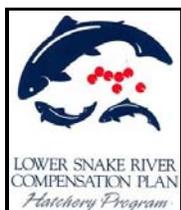
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## DISCLAIMER

Data in this report is as complete and accurate as possible at the time of printing. However, because of the life history complexity of spring Chinook salmon and the mixed stock fisheries in the Clearwater River, data is provisional and subject to future revision and corrections, especially in regards to the adult returns to the rack and harvest. All questions about the validity or precision of information in this report should be directed to the Idaho Fishery Resource Office, Dworshak Fisheries Complex, U.S. Fish and Wildlife Service, (208)-476-7242.

**Note:** Analysis of adult returns is incomplete. The 3-Ocean adult returns in 2011 complete all the adults returning for BY06, released as smolts in 2008. However, until all the coded-wire tags recovered in various fisheries throughout the Columbia, Snake, and Clearwater rivers are reported and recorded in the PSMFC RMIS database, a final accounting cannot be completed. The final accounting will be available after the completion of the BY06 Brood Year Report in FY2013.

**Corrections:** Historical data reported in the **Appendix Tables** have been updated and changed and takes precedence over data in earlier reports.

## CITATION FOR THIS REPORT

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## INTRODUCTION

Dworshak National Fish Hatchery (NFH) is located at the confluence of the North Fork and the main stem 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. In 1982 thirty 8-ft by 80-ft raceways were constructed under the Lower Snake River Compensation Plan (LSRCP) to provide rearing facilities for spring Chinook salmon (*O. tshawytscha*). The production program is designed to return 9,135 adult spring Chinook salmon to Lower Granite Dam by rearing and releasing 1.05 million spring Chinook salmon smolts into the Clearwater River annually.

Kooskia NFH is located about 1.5 miles east of Kooskia, Idaho, 0.5 miles upstream of the confluence of Clear Creek and the Middle Fork Clearwater River. In 1978, Kooskia NFH was included as part of the Dworshak Fishery Complex. The production program at Kooskia NFH is a U.S. Fish and Wildlife Service hatchery constructed to mitigate for water development programs in the Columbia River basin. Currently, the program calls for the release of 600,000 spring Chinook salmon smolts annually to provide sport and Tribal harvest opportunities in the Clearwater River. Because of production constraints, temperature considerations, and other factors, Kooskia NFH brood stock are held and spawned at Dworshak NFH. Dworshak NFH provides initial incubation of eggs for Kooskia NFH until the eye-up stage at which point they are enumerated and transported to Kooskia NFH for final rearing.

This report includes the stock origin and history of the programs, the smolts releases and emigration performances for Brood Year 2009, marking and tagging for Brood Year 2010, and the age composition of the rack returns, estimates of the sport and Tribal harvest, and estimates of the total adult return to the Clearwater River. The smolt to adult survival for Brood Year 2006 at each hatchery is estimated. The predictions made for the 2011 adult return to each hatchery are reviewed and pre-season predictions for the adult returns to each hatchery in 2012 are presented.

## BROOD STOCK ORIGIN AND HISTORY

### Dworshak NFH

The Dworshak NFH spring Chinook salmon program was initially started using spring Chinook salmon stock from the Leavenworth and Little White Salmon NFH programs. Eggs were transferred from these facilities to Dworshak NFH and made up the smolt releases from 1983 to 1986 (**Table 1**). Since these stocks were very strongly influenced by transfers from Carson NFH to Leavenworth and Little White Salmon NFHs, the early Dworshak spring Chinook salmon stock was considered a Lower Columbia River derivative. The spring Chinook salmon program for brood years 1985 and 1986 consisted entirely of eggs that had been transferred from Rapid River State Fish Hatchery (SFH). Rapid River State Fish Hatchery used spring Chinook salmon trapped at Hells Canyon Dam (considered an upper Snake River stock) as an original parent stock. Thus, smolts released from Dworshak NFH in 1987 and 1988 were entirely Rapid River stock, shifting the program away from using the Lower Columbia River Chinook stock. In the 21 years since 1988, Dworshak NFH has maintained its program from returns to its own rack, with the exception of two years when the program was below full production. In 1995, releases from Dworshak NFH were one third Kooskia stock spring Chinook salmon. Then in 2001 about one third of the Dworshak release was Rapid River stock (Lookingglass Fish Hatchery adults collected at Lower Granite Dam). The recent returns to Dworshak NFH (1989 and later) are referred to as Dworshak stock, since they are progeny of returns to Dworshak NFH, rather than direct products of transfers of Rapid River stock.

**Table 1.** Brood stock history of Dworshak NFH spring Chinook salmon smolts directly released from the hatchery, 1983-2011. (RR = Rapid River, KK = Kooskia, DW = Dworshak, LE = Leavenworth, LW = Little White Salmon).

Release Year	Brood Stock Composition
1983	75% LW, 12% RR, 13% LE
1984	100% LE
1985	68% LW, 32% LE
1986	100% LE
1987 – 1988	100% RR
1989 – 1994	100% DW
1995	66% DW, 34% KK
1996 – 2000	100% DW
2001	64% DW, 36% RR
2002-2011	100% DW

## **Kooskia NFH**

The Kooskia NFH spring Chinook salmon program was started using a wide variety of stocks from the Lower Columbia River and Rapid River SFH. However, from 1973 through 1980, smolt releases had a very strong Lower Columbia River stock influence. Egg transfers of Lower Columbia River stock from Dworshak NFH in 1985 and 1986 resulted in smolt releases in 1987 and 1988 that were a mixed stock, referred to as Clearwater stock (**Table 2**). Since the Kooskia NFH program already had stock made up primarily of Lower Columbia River derivatives, the resultant program (1989 and later) retained that lineage, but was referred to as Kooskia stock. Length frequency data, ocean age class at return, and allele frequencies (Elliot and Pascho 1994) all supported a distinction between Dworshak and Kooskia stocks.

In April 2007, 178,678 Dworshak stock smolts (reared at Kooskia) were released from Kooskia NFH to fulfill the smolt release goal at that hatchery and we used the opportunity to evaluate any differences in run timing between Kooskia and Dworshak stocks. All the Dworshak NFH stock were marked with either coded-wire or agency only wire tags in order to identify them when they returned. The 1-Ocean adults returned in the spring of 2008 and the 2-Ocean adults returned in the spring of 2009. Data for 1- and 2-Ocean adult returns suggested that there was essentially no difference in the run timing of the two stocks. A complementary analysis using PIT tag arrival data at Bonneville and Lower Granite dams for return years 2008 and 2009 supported this conclusion. However, the evaluation was terminated with the Co-Manager's agreement in 2009 to implement a change in brood stock management at Kooskia NFH. Rather than use only Kooskia stock for brood stock, the decision was made to not discriminate between different stocks that return to Kooskia NFH when selecting fish for brood stock. Thus, adults returning from releases made in 2007 and 2009 from Kooskia NFH, from Dworshak NFH stock, and the Idaho Department of Fish and Game program at Powell will be included into the brood stock for spawning in the future. Starting with the progeny of brood stock collected and spawned in 2010, the new stock will again be referred to as Clearwater stock (CL) (2012 release). Adults with an adipose fin, either from natural spawning, part of the Idaho Salmon Supplementation (ISS) program (Bowles and Leitzinger 1991), or from the 2008-2017 US v. OR Management Agreement unmarked releases, will be released above the weir to spawn naturally.

**Table 2.** Brood stock history of Kooskia NFH spring Chinook salmon smolts directly released from the hatchery, 1971-2011. (RR = Rapid River, KK = Kooskia, LE = Leavenworth, SS = South Santiam, CL = Clearwater, LW = Little White Salmon, CA = Carson, WR = Wind River, SF=South Fork Clearwater, P=Powell<sup>1</sup>).

Release Year	Brood Stock Composition
1971	86% RR,14% WR
1972	100% RR
1973 – 1974	100% CA
1975	58% RR, 42% CA
1976	100% SS
1977	84% CA, 11% KK, 5% LW
1978	75% RR, 25% CA
1979	69% KK, 31% CA
1980	31% KK, 69% CA
1981	64% CA, 19% KK, 17% RR
1982	100% CA
1983	65% KK, 35% LE
1984	89% KK, 11% RR
1985 – 1986	100% KK
1987 – 1988	100% CL
1989 – 2006	100% KK
2007	69% KK, 31% DW
2008	100%KK
2009	62%KK, 15% DW, 23% P
2010	73%KK , 15 %P, 12% SF
2011	72%KK, 28% P

<sup>1</sup> Powell stock are progeny from the IDFG LSRCP Program located on Walton Creek in the Lochsa River, a tributary of the Clearwater River.

## **BROOD YEAR 2009 SMOLT RELEASES**

Brood Year 2009 was established with the adult returns to Dworshak and Kooskia NFHs in 2009 (Dworshak National Fish Hatchery 2009). Incubation and early rearing was completed in late spring 2010. Juveniles were coded-wire tagged for evaluation of adult contributions and were re-stocked into raceways at final rearing densities in August, 2010. Final rearing was completed during the winter of 2010/2011 and smolt releases were completed in the early spring of 2011.

### **Release Numbers and Timing**

Usually, mean daily flows in the Clearwater and into Lower Granite Reservoir are monitored starting the first of March in order to time spring Chinook salmon smolt releases with increasing flows in the Clearwater and lower Snake River between the last week of March and the first two weeks in April. However, smolt releases were pre-scheduled for March 23 and 24, 2011 in order to allow a complete shutdown of the water supply for spring Chinook salmon so that required maintenance on a valve could be completed. The Idaho FRO began monitoring flows and river conditions in the main stem Clearwater River and into Lower Granite Reservoir starting March 1 to document conditions for the 2011 releases. By March 18, the mean daily inflow into Lower Granite Reservoir and the mean daily flow of the main stem Clearwater River at the Orofino bridge were well above the 10-year averages with indications that conditions would continue to improve by the time of the scheduled release. Releases were made during the evenings of March 23 and 24. Flows in the Clearwater and Snake rivers had increased significantly due to rainstorm events and were at or above the 10-year average.

Dworshak NFH released a total of 1,078,250 BY09 spring Chinook salmon smolts during the evenings of March 23 and 24. Mean total length at the time of release was 137 mm. Due to sufficient water releases from Dworshak Reservoir no arrangements with the U.S. Army Corps of Engineers to increase flow in the North Fork Clearwater River were required.

Kooskia NFH released a total of 657,267 Kooskia stock spring Chinook salmon smolts on April 1, 2011 during a single release into Clear Creek. Mean total length at release was 138 mm.

The Idaho Department of Fish and Game released 308,699 Powell stock spring Chinook salmon that averaged 17.0 to 19.3 fpp into Clear Creek on March 24 and 25, 2011 as part of their LSRCP program. Adults returning to Clear Creek from this release will be incorporated into the Kooskia NFH broodstock program. All these fish were marked by removing the adipose fin. A total of 172,446 were marked with adipose fin clip only; 119,158 were tagged with code-wire and 17,095 were tagged with PIT-tags.

These fish will return to their respective hatcheries in 2012, 2013, and 2014 as 1-, 2-, and 3-Ocean adults.

### **Emigration Performance and Survival**

PIT-tags are used to help evaluate the effectiveness of the production programs at both Dworshak and Kooskia NFH. Information is collected at the various dams throughout the lower Snake and Columbia rivers and is used to provide estimates on emigration time and survival.

PIT-tags also provide real-time data on adult return timing and a means to assess total return as fish are detected at Columbia and Snake River dams.

Dworshak NFH - A total of 51,753 pit-tagged smolts were released at Dworshak NFH as part of the Comparative Survival Study headed by the Fish Passage Center. The Comparative Survival Study evaluates the effectiveness of transporting smolts past the Snake and Columbia River dams as opposed to migration through the hydro system.

The migration time of smolts released from Dworshak NFH to Lower Granite Dam ranged from 3 days to 77 days with a mean travel time of 29 (SE=0.278) days. Ten percent arrived at Lower Granite Dam within 18 days; 50% and 90% arrived within 40 days and 48 days, respectively. Smolts that migrated through the hydro system arrived at Bonneville Dam on average 49 (SE=0.274) days after release. Survival probabilities through the FCRPS were calculated using SURvival under Proportional Hazards 2.1 (SURPH) (Lady *et al.* 2001). The estimated survival for BY09 spring Chinook smolts to Lower Granite Dam was 72.3% (SE=0.0062). The overall estimated survival to Bonneville Dam was 42.9% (SE=0.0239).

Kooskia NFH - A total of 13,932 PIT-tagged smolts were released as part of the Hatchery Evaluation Program at Kooskia NFH. The migration time of smolts released from Kooskia NFH to Lower Granite Dam ranged from 2 days to 70 days with a mean travel time of 26 (SE=0.520) days. Ten percent arrived at Lower Granite Dam within 18 days; 50% and 90% arrived within 37 days and 44 days, respectively. Smolts that migrated through the hydro system arrived at Bonneville Dam on average 45 (SE=0.685) days after release. Survival probabilities through the FCRPS were calculated using SURvival under Proportional Hazards 2.1 (SURPH) (Lady *et al.* 2001). The estimated survival for BY09 spring Chinook smolts to Lower Granite Dam was 73.0% (SE=0.0139). The overall estimated survival to Bonneville Dam was 55.4% (SE=0.0949).

### **Adult Contribution and Survival**

Coded-wire tags are used to estimate the contribution of adults to various commercial, sport and Tribal fisheries in the ocean, in the lower Columbia River, in the lower Snake River, and in the Clearwater River when they return as adults. Coded-wire tag groups are also used to represent treatment and control groups for both on- and off-station research projects and provide information on the effectiveness of alternative production methods.

Two tag codes were used to represent the smolt releases at Dworshak NFH. At Kooskia NFH, two CWT groups were used to represent the smolts released from Kooskia NFH. Idaho Fish and Game releases of Powell stock into Clear Creek are represented by two tag codes (**Table 3**). An agency only CWT group (05) was used to identify unclipped smolts released from Kooskia NFH as part of the 2008-2017 US v. OR Management Agreement. These unclipped smolts were marked in order to differentiate unclipped jacks from natural jacks returning in 2012 that are destined to be placed over that weir so they would not confound the last year of adult evaluation for the Idaho Salmon Supplementation Study. Just prior to release, the coded-wire tag retention rates were estimated in order to provide a more accurate number of coded-wire tagged smolts released. Two hundred and fifty fish from each tag code group were checked for coded-wire tags. The retention rate for Dworshak NFH was 97%. The retention rate for Kooskia NFH was

100% for agency only tags and 95% for tag group 055067. Retention rates for the Idaho Fish and Game smolt releases into Clear Creek were 99%.

**Table 3.** Coded-wire tag (CWT) release information for Brood Year 2009 spring Chinook salmon released from Dworshak and Kooskia NFHs in 2011.

Hatchery	Tag Code	Number CWTs Released	Total Number of Fish Released	Mark Rate <sup>2</sup>	Purpose
DNFH <sup>1</sup>	051183	66,313	537,178	0.12	Contribution, Raceways A7 and A8
	051186	66,673	537,515	0.12	Contribution, Raceways B24 and B25
KNFH <sup>1</sup>	055067	102,970	657,267	0.16	Contribution, BP04
	05	49,853		1.0	USvOR Unclipped releases, BP05
CLWR <sup>1</sup>	100124	53,169	291,604	0.41	IDFG Powell Releases into Clear Creek
	100125	65,989			IDFG Powell Releases into Clear Creek

<sup>1</sup> The entire production group is represented by both tag codes.

<sup>2</sup> The mark rate is calculated by dividing the number of CWTs released by the total number of fish released.

### BROOD YEAR 2010 MARKING AND TAGGING

Brood Year 2010 was established with the adult returns to Dworshak and Kooskia NFHs in 2010 (Dworshak National Fish Hatchery 2010). Incubation, early rearing and coded-wire tagging was completed in 2011. Unlike previous years, coded wire tag retention rates for Dworshak spring Chinook were checked 30 days post-tagging on September 6, 2011. The change in protocol resulted from the need to backfill ponds containing coded wire tagged fish with non-coded-wire tagged fish in order to increase fish density in each raceway. Increased densities were required to accommodate the Nez Perce Tribe Coho Program rearing of coho in six raceways, decreasing the number of raceways available for Chinook rearing. The coded wire tag retention rates for BY10 spring Chinook smolts ranged from 98.4% to 99.9%. The coded-wire tag retention rate for Kooskia NFH was not measured because the fish were in a pond mixed with non-coded wire tagged fish. So, the number of coded-wire tags reported is the number of fish originally coded-wire tagged. **Table 4** lists the tag codes, the number of fish tagged at each hatchery, and the purpose of the tag. Brood Year 2010 will be released in the spring of 2012 and the final release numbers will be reported in the 2012 annual report.

**Table 4.** Coded-wire tag (CWT) release information for Brood Year 2010 spring Chinook salmon scheduled for release from Dworshak and Kooskia NFHs in 2012.

Hatchery	Tag Code	Number CWT	Purpose
DNFH	052985	60,123	Contribution, Raceways A4 and A7
	052986	65,983	Contribution, Raceway B24 and B28
KNFH	054598	100,051	Contribution, BP2

## **Early Rearing Container Evaluation**

In September, 2008, the production staff at Dworshak NFH submitted a proposal to the Dworshak Complex Hatchery Evaluation Team for the evaluation of several different styles of early rearing containers for spring Chinook salmon in lieu of using raceways. The study was designed to continue for two to three years with the intention of making recommendations on the optimum container to use for early rearing. Eventually, plans call for the construction of a separate nursery for the spring Chinook salmon program. The study was initiated in the spring with Brood Year 2008. Fry were stocked directly from the nursery into seven circular tanks, four stainless steel rectangular tanks, and into one raceway used as a control. Growth, mortality, and water quality were monitored from March through April, 2009. The study was continued in 2010 using Brood Year 2009. A report of progress for the study was submitted to Production in FY2011. Production continued using the rearing containers for BY2010, using the burrows ponds to house the containers instead of the raceways in order to avoid high levels of dissolved gases.

## **BROOD YEAR 2011 ADULT RETURNS**

The brood year is formed from the adults that return as brood stock to Dworshak and Kooskia NFHs during the 2011 return year. In this section, we present information on the pre-season adult return monitoring and run assessment, the hatchery returns, the sport and Tribal harvests for each stock, and an estimate of the total adults returning to the Clearwater River by stock.

Special Note Regarding Kooskia NFH Adult Returns – In 2009, the IDFG began a spring Chinook salmon smolt release program in Clear Creek, re-programming the release of smolts originally planned to be released in the upper Lochsa River at Powell. The smolts were marked with coded-wire tags and PIT tags so that the release could be evaluated separately from other releases being made into Clear Creek from Kooskia NFH. Thus, adult returns to Kooskia NFH in 2010 contained 1-Ocean adults from the IDFG smolt release made in 2009. The adult return in 2011 contained 1-Ocean adults from smolt releases made in 2010 and 2-Ocean adults from the smolts released in 2009. The contribution of these releases to the adult return to the Kooskia NFH adult collection facility was estimated by using expansion factors for coded-wire tagged adults collected in the rack. However, all the stocks returning as adults were combined together to form a single broodstock for Kooskia NFH.

### **Adult Return Monitoring and Run Assessment**

Spring Chinook salmon begin returning to the mouth of the Columbia River during January. Federal, state, and Tribal fishery management agencies have begun participating in weekly coordination calls, starting in April, to review the progress and status of the spring Chinook salmon run as the adults migrate upstream through the Lower Columbia and Snake rivers. Information on run strength and timing is used to help managers anticipate meeting broodstock needs and sport and Tribal harvest allocations.

Higher than normal flows in the Columbia River basin during the spring resulted in migration times being later than normal. Early on, co-managers expressed concern that the anticipated numbers predicted to return would not materialize. However, research has shown a positive correlation between discharge and adult run timing of spring Chinook salmon in the Columbia and Snake rivers (Keefer *et al.* 2004; Keefer *et al.* 2008). With the higher than normal discharge in the basin, later returns should be expected as normal. The final in-season estimates for Dworshak and Kooskia NFH adult returns to LGD were 5,828 and 2,767 (adults and jacks combined), respectively (John Cassinelli, IDFG, 2011 Post Season LGD Corrections, (<https://research.idfg.idaho.gov/PublicDocuments/Forms/AllItems.aspx>)). By April, both state and Tribal managers planned to open sport and Tribal harvest seasons in the Clearwater River and developed estimates of harvestable shares of adults excess to broodstock needs.

### Dworshak NFH Rack Return

*Ladder Operations* - The adult ladder at Dworshak NFH was opened on July 5 and was operated continuously through August 29. On a weekly basis starting July 19, adults were moved from the collection pond to the spawning room where they were checked for tags, measured for length, and transferred to the adult holding ponds to mature for spawning. Six inventories were conducted from July 19 through August 29. **Table 5** lists the numbers of adult spring Chinook inventoried on each date. One thousand two hundred and fifty adults entered the rack at Dworshak NFH in 2011. The final disposition of all the adults is listed in Table 7 of the 2011 spring Chinook salmon spawning Report (Dworshak National Fish Hatchery 2011).

**Table 5.** Ladder operation for BY2011 SCS trapped at Dworshak NFH (Dworshak National Fish Hatchery 2011).

Date	Total Number of Fish
19 July	463
26 July	218
2 August	395
9 August	98
16 August	29
29 August	41
Mortalities	6
<b>Total</b>	<b>1,250</b>

*Stock Composition* – Not all the adults that enter the ladder at Dworshak NFH are of Dworshak NFH stock origin. Composition of the rack return is determined by analysis of the coded-wire tags that are recovered from adults that are spawned. We recovered a total of 192 coded-wire tags representing five different stocks or programs for spring Chinook salmon. Mark rates for each tag code were used to expand the number of tags into estimates of total return for each ocean age group for each stock (**Table 6**). Based on coded-wire expansion estimates, Dworshak NFH comprised 86% of the rack, with Kooskia NFH and Clear Creek (IDFG) stock contributing 6% and 7%, respectively. The other three stocks contributed about 1%, collectively.

**Table 6.** Age and stock composition of the adults that returned to Dworshak NFH in 2011, estimated using expanded coded-wire tag recovery information.

Stock/Program	1-Ocean	2-Ocean	3-Ocean	Total	Percent
Dworshak NFH	289	574	212	1,075	86
Kooskia NFH	26	35	13	74	6
Clear Creek	2	84	0	86	7
Selway	2	5	0	7	0.5
Powell	0	2	0	2	0.1
NPTH	6	0	0	6	0.4
<b>Total</b>	<b>325</b>	<b>700</b>	<b>225</b>	<b>1,250</b>	

*Age Composition* – Age composition was calculated using only the Dworshak NFH Stock listed in **Table 6**. Age composition is listed in **Table 7**. The last five return years from 2006 to 2010 exhibit a lot of annual variation in age composition. The 2011 return year is typical of the previous 5-year average, even though the percentage of the 1-Ocean age class was higher and the percentage of the 2-Ocean age class was a little lower. The historical age composition of the rack returns for years 1984 to 2010 are listed in **Appendix Table 3**.

**Note:** We compared the age composition of the total rack return, combining all the stocks, with the age composition of just the Dworshak NFH Stock and found only very minor differences.

Dworshak NFH	1-Ocean = 27%	2-Ocean = 53%	3-Ocean = 20%
Total Rack	1-Ocean = 26%	2-Ocean = 56%	3-Ocean = 18%

**Table 7.** Age composition of spring Chinook salmon adults returning to the Dworshak NFH rack, 2006-2011.

Return Year	1-Ocean	%	2-Ocean	%	3-Ocean	%	Rack Return
2006	62	5	1,136	84	156	11	1,354
2007	702	33	809	39	599	28	2,110
2008	319	17	1,201	65	337	18	1,857
2009	726	33	1,200	55	245	12	2,171
2010	142	12	798	65	285	23	1,225
<b>Mean</b>	<b>390</b>	<b>20</b>	<b>1,029</b>	<b>62</b>	<b>324</b>	<b>18</b>	<b>1,743</b>
2011	289	27	574	53	212	20	1,075

### **Kooskia NFH Rack Return**

*Adult Trap Operations* - The adult trap at Kooskia NFH was opened May 5, 2011 and was operated until July 21, 2011. Adults were removed from the holding pond, measured for length, checked for marks and tags, and then transported to Dworshak NFH for holding until mature for spawning. Adults identified as natural fish were passed above the weir to spawn naturally as part

of the ISS project. Excess 1-Ocean adults (Jacks) were provided to the Nez Perce Tribe for ceremonial and subsistence use or the local Kooskia food bank. Snouts were removed and retained for those with coded-wire tags. Six inventories were conducted from June 16 through July 21. The total rack return was 1,255, including 11 fish passed above the weir to spawn naturally and three trap mortalities. A total of 831 adults were transported to Dworshak NFH for spawning broodstock. **Table 7** lists the numbers of fish inventoried on each date. The final disposition of all the adults is listed in Table 7 of the 2011 spring Chinook salmon spawning Report (Dworshak National Fish Hatchery 2011).

**Table 7.** Ladder operation for BY2011 SCS trapped at Kooskia NFH (Idaho FRO data files).

Date	Total Number
16 June	145
23 June	153
28 June <sup>1</sup>	4 <sup>1</sup>
30 June	210
7 July	285
14 July	183
21 July	272
Mortalities	3
<b>Total</b>	<b>1,255</b>

<sup>1</sup> These fish were given to the Nez Perce Tribal youth program.

**Note:** The ladder was re-opened on August 2<sup>nd</sup> and 6<sup>th</sup> to collect broodstock for the IDFG. Seventy-five and 51 adults were collected on those dates, respectively, and were transported to the Clearwater State Fish Hatchery. These adults were not included in the rack return number for Kooskia NFH.

*Stock Composition* - Not all the adults that enter the Kooskia NFH adult trap are of Kooskia NFH stock origin. Composition of the rack return is determined by analysis of the coded-wire tags that are recovered from adults that are collected. We recovered a total of 212 coded-wire tags representing three different stocks or programs for spring Chinook salmon. Mark rates for each tag code were used to expand the number of tags into estimates of total return for each ocean age group for each stock (**Table 8**). Based on coded-wire tag expansions, the Kooskia NFH stock made up 91% of the rack return while the Powell stock released by IDFG contributed only 6%.

**Table 8.** Age and stock composition of the adults that returned to Kooskia NFH in 2011, estimated using expanded coded-wire tag recovery information.

Stock/Program	1-Ocean	2-Ocean	3-Ocean	Total	Percent
Kooskia NFH	425	565	155	1,145	91
Clear Creek	47	19	0	66	6
Dworshak NFH	0	44	0	44	4
<b>Total</b>	<b>472</b>	<b>628</b>	<b>155</b>	<b>1,255</b>	

*Age Composition* – We calculated the age composition for 2011 using only the Kooskia NFH Stock from **Table 8**. The age composition of the return, listed in **Table 9**, was atypical of the average for the last 5 years in that the percentages of the 1-Ocean age class was much higher than the average while the 2-Ocean age class was much lower than the average. The historical age composition from 1972 to 2011 is listed in **Appendix Table 4**.

**Note:** We compared the age composition of the total rack return, combining all the stocks, with the age composition of just the Kooskia NFH Stock and found only very minor differences.

Kooskia Stock 1-Ocean = 37% 2-Ocean = 49% 3-Ocean = 14%  
 Total Rack 1-Ocean = 38% 2-Ocean = 50% 3-Ocean = 12%

**Table 9.** Age composition of spring Chinook salmon adults returning to the Kooskia NFH rack 2006-2011.

Year	1-Ocean	%	2-Ocean	%	3-Ocean	%	Rack Return
2006	7	1	617	92	46	7	670
2007	257	44	148	25	184	31	589
2008	107	13	647	79	62	8	816
2009	155	26	369	63	65	11	589
2010	27	3	731	91	49	6	807
<b>Mean</b>	<b>111</b>	<b>17</b>	<b>502</b>	<b>70</b>	<b>81</b>	<b>13</b>	<b>694</b>
2011	425	37	565	49	155	14	1,145

### Sport Harvest

Estimates of the numbers of adults and jacks harvested in the sport fishery for Dworshak and Kooskia NFHs are based on expanded numbers of coded-wire tags collected during sport fish harvest surveys by the IDFG. These tags are expanded by tagging and sample rates, across multiple creel survey river sections (Cassinelli, IDFG personal communication). The total estimated harvest of Dworshak NFH stock in the Clearwater River was 2,381. The total estimated harvest of Kooskia NFH stock in the Clearwater River was 1,645. The age compositions of the sport harvests for Dworshak and Kooskia NFHs are reported in **Appendix Tables 7 and 9**, respectively.

### Tribal Harvest

The Nez Perce Tribe provides estimates of Tribal harvest, most of which occurs at the ladder at Dworshak NFH in the North Fork Clearwater River and in Clear Creek below the adult trap at Kooskia NFH, on the Middle Fork of the Clearwater River. The total estimated harvest of Dworshak NFH stock in the North Fork was 943. The total estimated harvest of Kooskia NFH stock in Clear Creek was 308. These are minimum harvest estimates and do not include the contribution that other Tribal harvests in the Clearwater River would make to the totals. The age compositions of the Tribal harvests are reported in **Appendix Tables 8 and 10**. The Nez Perce Tribe did not provide information on the numbers of 2- and 3-Ocean adults in the harvest. Those

numbers were estimated using the percentages of 2- and 3-Ocean adults returning to the respective racks, making the assumption that harvest occurred in proportion to the rack returns.

### **Total Estimated Adult Returns to the Clearwater River**

The numbers of Dworshak and Kooskia NFH origin adult spring Chinook salmon that returned to the Clearwater River in 2011 are challenging to determine because of the mixed stock fisheries and harvests that occur in the Clearwater River basin. The adults that entered the Clearwater River in 2011 originated from smolt releases at Dworshak NFH, Kooskia NFH, Idaho Department of Fish and Game (IDFG) facilities at Powell, Red River, and Crooked River, and Nez Perce Tribal Hatchery releases into Lolo Creek, Newsome Creek, and the Selway River in 2008, 2009, and 2010.

### **Dworshak NFH**

The estimated returns of adults for the Dworshak NFH stock was based on the development of expansion factors derived from the ratio of PIT-tagged to un-PIT tagged adults detected at Lower Granite Dam and the hatchery racks (Peery *et al.* 2012). It is understood that PIT tag expansions in adult returns are likely biased low due to possible tag loss and/or differential mortality during the period from time of release to time of adult return. The Idaho FRO is currently working cooperatively with the IDFG in analyzing the degree of any possible bias in hopes of being able to correct these expansions in the future.

*Dworshak NFH Total Return* – For 2011, the total estimated return to Lower Granite Dam based on expanded numbers of PIT tagged adults detected at Lower Granite Dam was 8,777. The estimate is a summary of the separate estimates made for each age class: 1-Ocean (Jacks) = 4,488; 2-Ocean = 3,306; 3-Ocean = 983.

*Dworshak NFH Escapement* - Escapement (those fish not returning to a rack or harvested in a fishery) is estimated by subtracting the harvests and the rack return from the total estimated return over Lower Granite Dam (**Table 10**). The estimated 2011 run was significantly higher than the previous 2-year average. (There is no estimated escapement for 2006-2008 so those years were not included in the mean.) Even so, the data indicate that the total harvest was much lower than what could have been sustained by the 2011 run.

**Table 10.** Adult returns of Dworshak NFH adult spring Chinook salmon to the Clearwater River from 2006-2011.

Return Year	Rack Return	Sport Harvest	Tribal Harvest	Estimated Escapement	Total Run <sup>1</sup>
2006	1,354	589	392	na	2,335
2007	2,110	256	198	na	2,564
2008	1,857	1,109	159 <sup>2</sup>	na	3,125
2009	2,171	1,373	354	848	4,746
2010	1,225	1,476	1,077 <sup>3</sup>	3,172	6,950
<b>Mean</b>	<b>1,743</b>	<b>960</b>	<b>436</b>	<b>2,012<sup>5</sup></b>	<b>3,994</b>
2011	1,075 <sup>4</sup>	2,381	943	4,378	8,777

<sup>1</sup> Total Run for 2006 to 2008 does not include an estimated escapement.

<sup>2</sup> Total number based on angler interview and is not an expanded estimate.

<sup>3</sup> Includes 17 jacks.

<sup>4</sup> Number of Dworshak NFH stock from **Table 7**.

<sup>5</sup> Escapement mean is for 2009 and 2010 only.

**Appendix Table 1** provides a historical summary of the number of Dworshak NFH stock adults returning to the rack, harvested in the sport and Tribal fisheries, and the estimated number in the escapement for return years 1984 to 2011. **Appendix Table 11** provides the same information with each fishery category broken down by ocean age class.

## Kooskia NFH

At Kooskia NFH, we used the same Peery *et al.* (2012) methodology to estimate the number of 1-Ocean and 2-Ocean adult returns to the Clearwater River, but had to rely on our historical methodology for estimating the number of 3-Ocean adults because there were no 3-Ocean adult PIT-tag returns in the rack to make an estimate using Peery *et al.* (2012). The number of 3-Ocean adults was estimated by summing the number of 3-Ocean adults in the Kooskia NFH rack, the sport harvest, and the Tribal harvest.

*Kooskia NFH Total Return* – For 2011, the total estimated return to Lower Granite Dam was estimated to be 6,813. The estimate is a summary of the separate estimates made for each age class: 1-Ocean (Jacks) = 4,020; 2-Ocean = 2,517; 3-Ocean = 276.

*Kooskia NFH Escapement* - Escapement (those fish not returning to a rack or harvested in a fishery) is estimated by subtracting the harvests and the rack return from the total estimated return over Lower Granite Dam (**Table 11**). Escapement for Kooskia NFH was estimated to be 3,715. The estimated 2011 run was significantly higher than the previous 5-year average. However, the estimated total for four of those years does not have an estimated escapement, so the average would be biased low. Even so, the data indicate that the total harvest was much lower than what could have been sustained by the 2011 run.

**Table 11.** Adult returns of Kooskia NFH adult spring Chinook salmon to the Clearwater River from 2006-2011.

Return Year	Rack Return	Sport Harvest	Tribal Harvest	Estimated Escapement	Total Run <sup>1</sup>
2006	670	73	65	na	808
2007	589	128	166	na	883
2008	816	623	132 <sup>2</sup>	na	1,571
2009	590	188	123	na	901
2010	807	1,327	1,156 <sup>3</sup>	638	3,928
<b>Mean</b>	<b>694</b>	<b>468</b>	<b>328</b>	<b>na</b>	<b>1,618</b>
2011	1,145 <sup>4</sup>	1,645	308	3,715	6,813 <sup>5</sup>

<sup>1</sup> Total Run for 2006 to 2009 does not include an estimated escapement.

<sup>2</sup> Actual harvest estimate not reported. Idaho FRO estimate based on the average harvest reported for 2005, 2006, 2007, and 2009.

<sup>3</sup> Includes 12 Jacks.

<sup>4</sup> Number Kooskia NFH Stock from **Table 8**.

<sup>5</sup> Actual return is between 3,098 and 6,813, depending upon run-reconstruction methodology used

At the same time, we recognize that our total estimate to Lower Granite Dam is probably biased high because of our inability to estimate the efficiency of our hand scanner at the Kooskia NFH trap using a redundant PIT-tag scanning configuration. Available information indicates that hand scanning may have a lower efficiency than other fixed interrogation systems, causing us to not detect every tag and biasing our estimates on the high side. On the other hand, our historical method of summing the rack return and the total estimated harvests from the sport and Tribal fisheries produces a minimum estimate of total return that is known to be biased low, since it does not include any method for estimating escapement.

**NOTE:** Our estimate of 3,098 using our historical method (1,145 + 1,645 + 308 from **Table 11**) is greater than the estimate of 2,841 made by the Idaho Department of Fish and Game using a PIT-tag expansion factor to estimate the number of adults crossing Lower Granite Dam.

The actual return is more realistically between the high estimate of 6,819 using Peery *et al.* (2012) and the low estimate of 3,098 using our historical method. In 2012, we will have a redundant hand scanning system in place at Kooskia NFH to increase our hand scanning efficiency and help us to make an estimate of our efficiency. Our long term plan is to install a permanent in-stream PIT-tag interrogation station in Clear Creek.

**Appendix Table 2** provides a historical summary of the number of Kooskia NFH stock adults returning to the rack, harvested in the sport and Tribal fisheries, and the estimated number in the escapement broken down by ocean age class for return years 1972 to 2011.

### Adult PIT Tag Returns

The conversion rate of Dworshak and Kooskia spring Chinook was calculated using Columbia River Data Access in Real Time software (Columbia Basin Research, available at [www.cbr.edu/dart/dart.html](http://www.cbr.edu/dart/dart.html)). The conversion rate from Lower Granite Dam to the Dworshak adult ladder was calculated using the number of interrogations at Dworshak NFH adult ladder divided by the interrogations at Lower Granite Dam.

During the 2011 migration, a total of 390 PIT tagged adults were detected at Bonneville Dam. Of those, 289 were detected at Lower Granite Dam, giving a conversion rate of 0.72 from Bonneville Dam to Lower Granite Dam (Columbia River Data Access in Real Time). The PIT tagged adults detected at LGD consisted of 17 1-Ocean fish (BY08 released in 2010), 122 2-Ocean fish (BY07 released in 2009) and 150 3-Ocean fish (BY06 released in 2008). Thirty-eight of those were collected in the Dworshak NFH adult ladder giving a conversion rate from LGD to Dworshak NFH of 0.13. The first detection date for Dworshak origin spring Chinook at Lower Granite Dam was May 5, 2011. The last detection was on July 28, 2011.

During 2011, fifty-six Kooskia NFH origin spring Chinook adults were interrogated at Lower Granite Dam (5 from BY06 and 16 from BY07 and 35 from BY08). Six (10.7%) were collected at Kooskia NFH weir. The first detection date for Kooskia origin spring Chinook at Lower Granite Dam was May 9, 2011. The last detection was on July 19, 2011. The conversion rate of Kooskia spring Chinook from Bonneville Dam to Lower Granite Dam was 0.63 (DART website). The conversion rate from Lower Granite Dam to the Kooskia adult holding pond was 0.13.

### **BROOD YEAR 2006 SMOLT TO ADULT RETURN RATE (SAR)**

The smolt-to-adult-return-rate, or SAR, is the ratio of the number of smolts that are released divided by the number of adults that return from that release. The SAR is one of the metrics to measure production performance in the LSRCP program. With the return of the 3-Ocean adults in 2011, estimating the SAR for Brood Year 2006 can be completed. The smolts were released in 2008, the 1-Ocean adults returned in 2009, 2-Ocean adults returned in 2010, and 3-Ocean adults returned in 2011, completing the adult returns for that brood year. Details on the procedures for calculating the smolt to adult return rate is provided in Jones and Burge (2012).

### **Dworshak NFH**

**Table 12** lists the numbers of Dworshak NFH spring Chinook salmon of each age class for the estimated total return to Lower Granite Dam, for the hatchery rack, the sport fishery, the Tribal fishery, and escapement for 2011. The Idaho Department of Fish and Game used expanded estimates of coded-wire tag recovery data to estimate the age composition of the sport harvest. The Nez Perce Tribe reported a total of 449 Jacks (1-Ocean adults) and 494 2- and 3-Ocean adults of Dworshak NFH stock harvested in the Tribal fishery in the North Fork Clearwater River but did not estimate the numbers of 2- and 3-Ocean adults separately. The percentages of 2- and 3-Ocean adults in the Dworshak NFH rack (73% and 27%, respectively), was applied to the total to provide those estimates. By subtracting the hatchery rack, the sport harvest, and the Tribal harvest from the estimated total return, the escapement was estimated to be 2,347 1-Oceans, 1,360 2-Oceans, and 559 3-Oceans for a total of 4,266.

**Table 12.** The estimated number of Dworshak NFH spring Chinook salmon adults of each ocean age class in the various fishery programs in the Clearwater River for the 2011 adult return.

<b>Program</b>	<b>1-Ocean BY08</b>	<b>2-Ocean BY07</b>	<b>3-Ocean BY06</b>	<b>Total</b>
Hatchery Rack	289	574	212	1,075
Sport Harvest	1,316	973	92	2,381
Tribal Harvest	449	361	133	943
Escapement	2,434	1,398	546	4,378
<b>Total</b>	<b>4,488</b>	<b>3,306</b>	<b>983</b>	<b>8,777</b>

**Table 14** lists the numbers of smolts released, and numbers and percent survival of adults returning by age class for Brood Years 2004 through 2009 (release years 2006 to 2011). These include the rack return, the harvest estimates from the sport and Tribal fisheries, and estimates of escapement. The historical numbers, from Brood Years 1981 to 2009 (release years 1983 to 2011) are listed in **Appendix Table 5**. Estimated smolt-to-adult-return, or survival, for Brood Year 2006, released as smolts in 2008, was 0.91 %.

#### **Kooskia NFH**

**Table 13** lists the numbers of Kooskia NFH spring Chinook salmon of each age class in the hatchery rack, the sport fishery, the Tribal fishery, and escapement during 2011. The Idaho Department of Fish and Game reported a total harvest of 1,645 Kooskia NFH Chinook. The Nez Perce Tribe reported a total of 308 fish of Kooskia NFH stock harvested in the Tribal fishery in Clear Creek. The percent of 2- and 3-Ocean adults in the Kooskia NFH rack (1-Ocean adults excluded) was 80.2 and 19.8%, respectively. These percentages were applied to the Tribe's harvest total to estimate the 2- and 3-Ocean age classes in the Tribal harvest.

**Table 13.** The estimated number of Kooskia NFH spring Chinook salmon adults of each ocean age class in the various fishery programs in the Clearwater River for the 2011 adult return.

<b>Program</b>	<b>1-Ocean BY08</b>	<b>2-Ocean BY07</b>	<b>3-Ocean BY06</b>	<b>Total</b>
Hatchery Rack	425	565	155	1,145
Sport Harvest	819	755	71	1,645
Tribal Harvest	58	200	50	308
Escapement	2,718	997	0	3,715
<b>Total</b>	<b>4,020</b>	<b>2,517</b>	<b>276</b>	<b>6,813</b>

**Table 15** lists the numbers of smolts released and the estimated survival of each returning age class for Brood Years 2004 to 2009 (Release Years 2006 to 2011). These include harvest estimates from the sport and Tribal fisheries and escapement estimates for the last two return years. The historical numbers, for Brood Years 1970 to 2009, are listed in **Appendix Table 6**. Estimated smolt-to-adult-return, or survival, for Brood Year 2006, released as smolts in 2008, was 0.61%.

**Table 14.** Brood Year, release year, number of smolts released, and the numbers and percent survival of Dworshak NFH adult returns to the Clearwater River by age class for Brood Years 2004 to 2009. Estimates include the rack return, the sport and Tribal harvest numbers and estimates of escapement, starting with returns in 2009 (BYs 2004, 2005, and 2006). Releases are at the hatchery only and does not include off-site releases or fry/fingerling releases.

Brood Year	Release Year	Smolts Released	1-Ocean Returns			2-Ocean Returns			3-Ocean Returns			Total	
			Return Year	Number	SAR	Return Year	Number	SAR	Return Year	Number	SAR	Return	SAR
2004	2006	1,007,738	2007	767	0.00076	2008	2172	0.00216	2009	383	0.00038	3,322	0.00330
2005	2007	963,211	2008	506	0.00053	2009	2516	0.00261	2010	857	0.00089	3,879	0.00403
2006	2008	939,000	2009	1,847	0.00197	2010	5,666	0.00603	2011	983	0.00105	8,496	0.00905
2007	2009	1,014,748	2010	427	0.00042	2011	3,306	0.00326					
2008	2010	1,109,195	2011	4,488	0.00405								
2009	2011	1,078,250											

**Table 15.** Brood Year, release year, number of smolts released, and the numbers and percent survival of adult returns to the Clearwater River by age class for Brood Years 2004 to 2009, Kooskia NFH stock. Estimates include the rack return, the sport and Tribal harvest numbers and estimates of escapement, starting with returns in 2009 (BYs 2004, 2005, and 2006). Releases at hatchery only and does not include off-site releases or fry/fingerling releases.

Brood Year	Release Year	Smolts Released	1-Ocean Returns			2-Ocean Returns			3-Ocean Returns			Total	
			Return Year	Number	SAR	Return Year	Number	SAR	Return Year	Number	SAR	Return	SAR
2004	2006	637,334	2007	415	0.00065	2008	1,297	0.00204	2009	82	0.00013	1,794	0.00281
2005	2007	569,565	2008	181	0.00032	2009	573	0.00101	2010	231	0.00041	985	0.00173
2006	2008	649,601	2009	246	0.00038	2010	3,435	0.00529	2011	276	0.00043	3,957	0.00609
2007	2009	603,679	2010	262	0.00043	2011	2,517	0.00417					
2008	2010	632,330	2011	4,020	0.00636								
2009	2011	657,267											

## PREDICTION FOR 2012 ADULT RETURNS

### Review of 2011 Predictions

Dworshak NFH - The total number of spring Chinook salmon that we predicted would return to Dworshak NFH and associated fisheries in 2011 was 3,168 (Idaho Fishery Resource Office 2011). Actual number of Dworshak NFH Chinook salmon estimated to have returned to the Clearwater River was 8,665 (**Table 12**). The greatest disparity was in the number of 1- and 3-Ocean fish returning, which was extremely under-estimated by about 5,400 fish. **Table 16** lists the predicted returns and the expanded actual returns of all three age classes of adults in 2011.

**Table 16.** Predicted and calculated returns of Dworshak NFH spring Chinook salmon by ocean age class, 2011. Includes sport and tribal harvest estimates and an estimate of escapement.

Ocean Age Class	Prediction	Calculated Return
1-Ocean	114	4,488
2-Ocean	3,054	3,306
3-Ocean	0	983
Total	3,168	8,777

Kooskia NFH – The prediction made for the 2011 Kooskia NFH return was to the rack, not to the Clearwater River. However, the estimated return was for the Clearwater River, so the prediction will naturally be less than the estimated return. Based on the adult returns and environmental conditions in 2010, the 2011 forecasted return for Kooskia NFH adult spring Chinook to the rack at Kooskia NFH was 279 fish (Table 6a, 2011 Clearwater AOP, U.S. Fish and Wildlife Service *et al.* 2011). The actual number that returned in 2011 is estimated to be between 3,098 and 6,813 (**Table 11**). The Kooskia NFH stock returned at a much higher rate than was predicted. **Table 17** lists the predicted and the estimated actual returns of all three age classes of adults in 2011. In recent years, predictions for Kooskia NFH have tended to be more accurate than those for Dworshak NFH. This was not the case for 2011. Pre-season predictions were used for preliminary management purposes such as potential harvest, brood stock collection adequacy, and planning for adult outplanting so we will continue to work to improve prediction methods.

**Table 17.** Predicted and calculated returns of Kooskia NFH spring Chinook salmon to the Clearwater River for 2011 by ocean age class.

Ocean Age Class	Prediction	Total Return
1-Ocean	95	4,020
2-Ocean	184	2,517
3-Ocean	0	276
Total	279	6,813 <sup>1</sup>

<sup>1</sup> Actual return is between 3,098 and 6,813, depending upon run-reconstruction methodology used

### 2012 Run Predictions

Our forecast for the 2012 spring Chinook salmon return to the Clearwater River for the Dworshak and Kooskia NFH stocks is given in **Table 18**. This is the highest predicted adult return in the history of the program for Dworshak NFH. Brood stock requirements are 1,200 adults at Dworshak NFH (includes an additional 200 because of a production increase) and 800 for Kooskia NFH (includes 200 for the IDFG Clear Creek release). If the prediction is at all close, the Idaho Department of Fish and Game and the Nez Perce Tribe will open sport and tribal fisheries in the Clearwater River in the spring of 2012 that will hopefully be of historic proportions. However, adjustments to harvest levels will likely be made after dam counts of PIT tagged adults provide in-season estimates of returning adults in the late spring of 2012.

**Table 18.** Predicted returns of spring Chinook salmon to the Clearwater River at Lower Granite Dam from the Dworshak Fishery Complex by ocean age class, 2012.

Ocean Age Class	Dworshak NFH	Kooskia NFH
1-Ocean	703	302
2-Ocean	17,252	2,322
3-Ocean	873	33
Total	18,828	2,657

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**APPENDIX TABLES OF HISTORICAL DATA**  
**Dworshak and Kooskia NFH Spring Chinook Salmon**

**Appendix Table 1.** Adult returns of Dworshak NFH adult spring Chinook salmon to the Clearwater River from 1987-2011. See **Appendix Table 11** for the age composition breakdown of each run component.

Return Year	Rack Return	Sport Harvest <sup>1</sup>	Tribal Harvest	Escapement <sup>2</sup>	Total Run
1987	2,017	ns	160	na	2,177
1988	1,972	ns	240	na	2,212
1989	1,700	ns	346	na	2,046
1990	2,042	ns	514	na	2,556
1991	165	ns	0	na	165
1992	370	ns	160	na	530
1993	823	ns	43	na	866
1994	74	ns	0	na	74
1995	125	ns	0	na	125
1996	963	ns	24	na	987
1997	3,150	693	835	na	4,678
1998	915	99	182	na	1,196
1999	800	ns	36	na	836
2000	3,202	4,095	1,173	na	8,470
2001	4,018	8,355	531	na	12,904
2002	2,157	3,542	794	na	6,493
2003	3,422	2,228	1,445	na	7,095
2004	2,356	3,608	419	na	6,383
2005	882	606	102	na	1,590
2006	1,354	589	392	na	2,335
2007	2,110	256	198	na	2,564
2008	1,857	1,109	159 <sup>3</sup>	na	3,125
2009	2,171	1,373	354	848	4,746
2010	1,225	1,476	1,077	3,172	6,950
2011	1,075	2,381	943	4,378	8,777

<sup>1</sup> ns indicates no fishing season was opened.

<sup>2</sup> Estimates of escapement are not available and were not calculated for years 1987 to 2008.

<sup>3</sup> Total number based on angler interview and is not an expanded estimate.

**Appendix Table 2.** Adult returns of Kooskia NFH adult spring Chinook salmon to the Clearwater River from 1972-2011. See **Appendix Table 12** for the age composition breakdown of each run component.

Return Year	Rack Return	Sport Harvest <sup>1</sup>	Tribal Harvest <sup>2</sup>	Escapement <sup>3</sup>	Total Run
1972	5	ns	na	na	5
1973	50	ns	na	na	50
1974	53	ns	na	na	53
1975	326	ns	na	na	326
1976	801	ns	na	na	801
1977	3,026	ns	na	na	3,026
1978	2,035	ns	na	na	2,035
1979	375	ns	na	na	375
1980	67	ns	na	na	67
1981	247	ns	na	na	247
1982	258	ns	na	na	258
1983	373	ns	na	na	373
1984	341	ns	na	na	341
1985	529	ns	na	na	529
1986	283	ns	na	na	283
1987	687	ns	50	na	737
1988	595	ns	72	na	667
1989	973	ns	58	na	1,031
1990	1,141	ns	130	na	1,271
1991	467	ns	na	na	467
1992	312	ns	na	na	312
1993	1,180	ns	na	na	1,180
1994	232	ns	na	na	232
1995	40	ns	na	na	40
1996	202	ns	na	na	202
1997	1,657	45	12	na	1,714
1998	408	0	20	na	428
1999	157	ns	1	na	158
2000	1,581	21	10	na	1,612
2001	2,261	6,397	834	na	9,492
2002	1,037	1,544	683	na	3,264
2003	965	426	164	na	1,555
2004	718	2,195	389	na	3,302
2005	270	53	173	na	496
2006	670	73	65	na	808
2007	589	128	166	na	883

<sup>1</sup> ns indicates no fishing season was opened.

<sup>2</sup> Estimates of escapement are not available and were not calculated for years 1987 to 2009.

<sup>3</sup> na indicates that fishing may or may not have occurred, but no harvest data are available.

<sup>4</sup> Actual harvest estimate not reported. Idaho FRO estimate based on the average harvest reported for 2005, 2006, 2007, and 2009.

**Appendix Table 2.** (Continued)

Return Year	Rack Return	Sport Harvest <sup>1</sup>	Tribal Harvest	Escapement <sup>2</sup>	Total Run
2008	816	623	132 <sup>4</sup>	na	1,571
2009	590	188	123	na	901
2010	807	1,327	1,156	638	3,928
2011	1,145	1,645	308	3,715	6,813

<sup>1</sup> ns indicates no fishing season was opened.

<sup>2</sup> Estimates of escapement are not available and were not calculated for years 1987 to 2009.

<sup>3</sup> na indicates that fishing may or may not have occurred , but no harvest data are available.

<sup>4</sup> Actual harvest estimate not reported. Idaho FRO estimate based on the average harvest reported for 2005, 2006, 2007, and 2009.

**Appendix Table 3.** Number and percent of 1-, 2-, and 3-Ocean spring Chinook salmon adults returning to the Dworshak NFH rack from 1984 to 2011.

Return Year	1-Ocean	%	2-Ocean	%	3-Ocean	%	Rack Return
1984	14	17	52	63	16	20	82
1985	13	4	285	85	36	11	334
1986	78	15	346	67	91	18	515
1987	25	1	1,614	80	378	19	2,017
1988	163	8	569	29	1,240	63	1,972
1989	156	9	1,323	78	221	13	1,700
1990	7	0.3	1,899	93	136	6.7	2,042
1991	16	10	77	47	72	43	165
1992	24	6	303	82	43	12	370
1993	9	1	454	55	360	45	823
1994	3	4	30	41	41	55	74
1995	83	66	36	29	6	5	125
1996	275	28	663	69	25	3	963
1997	12	0.4	2,394	76	744	23.6	3,150
1998	11	1	176	19	728	80	915
1999	670	84	78	10	52	6	800
2000	233	7	2,866	90	103	3	3,202
2001	36	1	3,235	80	747	19	4,018
2002	62	3	1,480	69	615	28	2,157
2003	580	17	478	14	2,364	69	3,422
2004	142	6	2,077	88	137	6	2,356
2005	74	8	686	78	122	14	882
2006	62	5	1,136	84	156	11	1,354
2007	702	33	809	39	599	28	2,110
2008	319	17	1,201	65	337	18	1,857
2009	726	33	1,200	55	245	12	2,171
2010	142	12	798	65	285	23	1,225
2011	289	27	574	53	212	20	1,075

**Appendix Table 4.** Number and percent of 1-, 2-, and 3-Ocean spring Chinook salmon adults returning to the Kooskia NFH rack from 1972 to 2011.

Return Year	1-Ocean	%	2-Ocean	%	3-Ocean	%	Rack Return
1972	5	100	0	0	0	0	5
1973	5	10	45	90	0	0	50
1974	16	30	35	66	2	4	53
1975	15	5	284	87	27	8	326
1976	409	51	286	36	106	13	801
1977	333	11	2,539	84	154	5	3,026
1978	23	1	1,676	82	336	17	2,035
1979	11	3	100	27	264	70	375
1980	9	13	55	82	3	5	67
1981	1	0.4	168	68	78	31.6	247
1982	3	1	116	45	139	54	258
1983	1	0.3	231	61.7	141	38	373
1984	55	16	80	23	206	61	341
1985	26	5	449	85	54	10	529
1986	21	7	159	56	103	37	283
1987	16	2	607	88	64	10	687
1988	39	7	363	61	193	32	595
1989	108	11	722	74	143	15	973
1990	11	1	921	81	209	18	1,141
1991	10	2	100	21	357	77	467
1992	15	5	256	82	41	13	312
1993	11	1	756	64	413	35	1,180
1994	1	0.4	96	41.6	135	58	232
1995	21	52	7	18	12	30	40
1996	86	43	113	56	3	1	202
1997	7	0.4	1,523	92	127	7.6	1,657
1998	1	0.3	200	49	207	51	408
1999	72	46	28	18	57	36	157
2000	966	61	604	38	11	1	1,581
2001	28	1	2,137	95	96	4	2,261
2002	14	1	852	82	171	17	1,037
2003	97	10	71	7	797	83	965
2004	15	2	682	95	21	3	718
2005	29	11	202	75	39	14	270
2006	7	1	617	92	46	7	670
2007	257	44	148	25	184	31	589
2008	107	13	647	79	62	8	816
2009	155	26	370	63	65	11	590
2010	27	3	731	91	49	6	807
2011	425	37	565	49	155	14	1,145

**Appendix Table 5.** Brood Year, release year, number of smolts released, and the numbers and percent survival of Dworshak NFH adult returns to the Clearwater River by age class for Brood Years 1981 to 2009. Estimates include the rack return, the sport and Tribal harvest numbers for years when those fisheries occurred, and estimates of escapement, starting with returns in 2009 (BYs 04, 05, and 06).

Brood Year	Release Year	Smolts Released	1-Ocean Returns			2-Ocean Returns			3-Ocean Returns			Total Return	SAR
			Return Year	Number	SAR	Return Year	Number	SAR	Return Year	Number	SAR		
1981	1983	549,023	1984	14	0.00003	1985	285	0.00052	1986	91	0.00017	390	0.00071
1982	1984	260,519	1985	13	0.00005	1986	346	0.00133	1987	408	0.00157	767	0.00294
1983	1985	1,137,139	1986	78	0.00007	1987	1,742	0.00153	1988	1,391	0.00122	3,211	0.00282
1984	1986	670,606	1987	27	0.00004	1988	639	0.00095	1989	266	0.00040	932	0.00139
1985	1987	1,710,710	1988	182	0.00011	1989	1,593	0.00093	1990	170	0.00010	1,945	0.00114
1986	1988	1,547,219	1989	187	0.00012	1990	2,377	0.00154	1991	72	0.00005	2,636	0.00170
1987	1989	1,651,472	1990	9	0.00001	1991	77	0.00005	1992	62	0.00004	148	0.00009
1988	1990	1,251,247	1991	16	0.00001	1992	434	0.00035	1993	378	0.00030	828	0.00066
1989	1991	1,094,884	1992	34	0.00003	1993	478	0.00044	1994	41	0.00004	553	0.00051
1990	1992	959,369	1993	9	0.00001	1994	30	0.00003	1995	6	0.00001	45	0.00005
1991	1993	7,222	1994	3	0.00042	1995	36	0.00498	1996	26	0.00360	65	0.00900
1992	1994	1,278,273	1995	83	0.00006	1996	679	0.00053	1997	941	0.00074	1,703	0.00133
1993	1995	1,311,445	1996	282	0.00022	1997	3,722	0.00284	1998	909	0.00069	4,913	0.00375
1994	1996	102,903	1997	15	0.00015	1998	274	0.00266	1999	54	0.00052	343	0.00333
1995	1997	53,078	1998	13	0.00024	1999	82	0.00154	2000	245	0.00462	340	0.00641
1996	1998	973,400	1999	700	0.00072	2000	7,688	0.00790	2001	2,463	0.00253	10,851	0.01115
1997	1999	1,044,511	2000	537	0.00051	2001	10,372	0.00993	2002	1,397	0.00134	12,306	0.01178
1998	2000	1,017,873	2001	69	0.00007	2002	4,991	0.00490	2003	5,299	0.00521	10,359	0.01018
1999	2001	333,120	2002	105	0.00032	2003	892	0.00268	2004	269	0.00081	1,266	0.00380
2000	2002	1,000,561	2003	904	0.00090	2004	5,891	0.00589	2005	245	0.00024	7,040	0.00704
2001	2003	1,033,982	2004	223	0.00022	2005	1,260	0.00122	2006	199	0.00019	1,682	0.00163
2002	2004	1,078,923	2005	85	0.00008	2006	2,050	0.00190	2007	762	0.00071	2,897	0.00269
2003	2005	1,072,359	2006	86	0.00008	2007	1,035	0.00097	2008	447	0.00042	1,568	0.00146

**Appendix Table 5.** (Continued)

Brood Year	Release Year	Smolts Released	1-Ocean Returns			2-Ocean Returns			3-Ocean Returns			Total	
			Return Year	Number	SAR	Return Year	Number	SAR	Return Year	Number	SAR	Return	SAR
2004	2006	1,007,738	2007	767	0.00076	2008	2,172	0.00216	2009	383	0.00038	3,322	0.00330
2005	2007	963,211	2008	506	0.00053	2009	2,516	0.00261	2010	857	0.00089	3,879	0.00403
2006	2008	939,000	2009	1,847	0.00197	2010	5,666	0.00603	2011	983	0.00105	8,496	0.00905
2007	2009	1,014,748	2010	427	0.00042	2011	3,306	0.00326					
2008	2010	1,109,195	2011	4,488	0.00397								
2009	2011	1,078,250											

**Appendix Table 6.** Brood Year, release year, number of smolts released, and the numbers and percent survival of adult returns for Kooskia NFH and the Clearwater River by age class for Brood Years 1970 to 2009. Estimates include sport and Tribal harvest numbers for years when those fisheries occurred, and estimates of escapement, starting with returns in 2009 (BYs 04, 05, and 06).

Brood Year	Release Year	Smolts Released	1-Ocean Returns			2-Ocean Returns			3-Ocean Returns			Total	
			Return Year	Number	SAR	Return Year	Number	SAR	Return Year	Number	SAR	Return	SAR
1970	1972	96,032	1973	5	0.00005	1974	35	0.00036	1975	27	0.00028	67	0.00070
1971	1973	356,190	1974	16	0.00004	1975	284	0.00080	1976	106	0.00030	406	0.00114
1972	1974	303,800	1975	15	0.00005	1976	286	0.00094	1977	154	0.00051	455	0.00150
1973	1975	802,100	1976	409	0.00051	1977	2,539	0.00317	1978	336	0.00042	3,284	0.00409
1974	1976	972,200	1977	333	0.00034	1978	1,676	0.00172	1979	264	0.00027	2,273	0.00234
1975	1977	140,000	1978	23	0.00016	1979	100	0.00071	1980	3	0.00002	126	0.00090
1976	1978	297,897	1979	11	0.00004	1980	55	0.00018	1981	78	0.00026	144	0.00048
1977	1979	301,029	1980	9	0.00003	1981	168	0.00056	1982	139	0.00046	316	0.00105
1978	1980	766,946	1981	1	0.00000	1982	116	0.00015	1983	141	0.00018	258	0.00034
1979	1981	382,720	1982	3	0.00001	1983	231	0.00060	1984	206	0.00054	440	0.00115
1980	1982	496,796	1983	1	0.00000	1984	80	0.00016	1985	54	0.00011	135	0.00027
1981	1983	156,915	1984	55	0.00035	1985	449	0.00286	1986	103	0.00066	607	0.00387
1982	1984	237,711	1985	26	0.00011	1986	159	0.00067	1987	69	0.00029	254	0.00107
1983	1985	301,753	1986	21	0.00007	1987	651	0.00216	1988	216	0.00072	888	0.00294
1984	1986	351,405	1987	17	0.00005	1988	407	0.00116	1989	152	0.00043	576	0.00164
1985	1987	763,900	1988	44	0.00006	1989	765	0.00100	1990	233	0.00031	1,042	0.00136
1986	1988	778,407	1989	114	0.00015	1990	1,026	0.00132	1991	357	0.00046	1,497	0.00192
1987	1989	384,235	1990	12	0.00003	1991	100	0.00026	1992	41	0.00011	153	0.00040
1988	1990	403,701	1991	10	0.00002	1992	256	0.00063	1993	413	0.00102	679	0.00168
1989	1991	396,619	1992	15	0.00004	1993	756	0.00191	1994	135	0.00034	906	0.00228
1990	1992	727,251	1993	11	0.00002	1994	96	0.00013	1995	12	0.00002	119	0.00016
1991	1993	343,437	1994	1	0.00000	1995	7	0.00002	1996	3	0.00001	11	0.00003
1992	1994	305,813	1995	21	0.00007	1996	113	0.00037	1997	128	0.00042	262	0.00086

**Appendix Table 6 (Cont.)**

Brood Year	Release Year	Smolts Released	1-Ocean Returns			2-Ocean Returns			3-Ocean Returns			Total Return	SAR
			Return Year	Number	SAR	Return Year	Number	SAR	Return Year	Number	SAR		
1993	1995	722,906	1996	86	0.00012	1997	1,579	0.00218	1998	217	0.00030	1,882	0.00260
1994	1996	333,794	1997	7	0.00002	1998	209	0.00063	1999	57	0.00017	273	0.00082
1995	1997	16,598	1998	2	0.00012	1999	28	0.00169	2000	11	0.00066	41	0.00247
1996	1998	76,846	1999	73	0.00095	2000	45	0.00059	2001	1,366	0.01778	1,484	0.01931
1997	1999	684,165	2000	972	0.00142	2001	8,069	0.01179	2002	531	0.00078	9,572	0.01399
1998	2000	449,094	2001	57	0.00013	2002	2,704	0.00602	2003	1,304	0.00290	4,065	0.00904
1999	2001	80,430	2002	29	0.00036	2003	123	0.00153	2004	97	0.00121	249	0.00310
2000	2002	549,861	2003	128	0.00023	2004	3148	0.00573	2005	73	0.00013	3,349	0.00609
2001	2003	597,063	2004	57	0.00010	2005	375	0.00063	2006	70	0.00012	502	0.00084
2002	2004	643,503	2005	48	0.00007	2006	730	0.00113	2007	235	0.00037	1,013	0.00157
2003	2005	624,967	2006	8	0.00001	2007	233	0.00037	2008	93	0.00015	334	0.00053
2004	2006	637,334	2007	415	0.00065	2008	1,297	0.00204	2009	82	0.00013	1,794	0.00281
2005	2007	569,565	2008	181	0.00032	2009	572	0.00101	2010	231	0.00041	984	0.00173
2006	2008	649,601	2009	246	0.00038	2010	3,435	0.00529	2011	276	0.00050	3,957	0.00609
2007	2009	603,679	2010	262	0.00043	2011	2,517	0.00417					
2008	2010	632,330	2011	4,020	0.00636								
2009	2011	657,267											

**Appendix Table 7.** Number of Dworshak NFH spring Chinook salmon harvested in each ocean age class by return year from 1997 to 2011, by sports fishermen in the Clearwater River, Idaho (Idaho Department of Fish and Game data reports on file with the Idaho FRO).

Return Year	<u>1-Ocean Returns</u>		<u>2-Ocean Returns</u>		<u>3-Ocean Returns</u>		Total Harvest
	Brood Year	Number	Brood Year	Number	Brood Year	Number	
1997	1994	0	1993	693	1992	0	693
1998	1995	0	1994	63	1993	36	99
1999	1996	ns <sup>1</sup>	1995	ns	1994	ns	ns
2000	1997	222	1996	3,766	1995	107	4,095
2001	1998	28	1997	6,712	1996	1,615	8,355
2002	1999	19	1998	2,963	1997	560	3,542
2003	2000	78	1999	212	1998	1,938	2,228
2004	2001	56	2000	3,445	1999	107	3,608
2005	2002	3	2001	494	2000	109	606
2006	2003	4	2002	585	2001	0	589
2007	2004	0	2003	148	2002	108	256
2008	2005	166	2004	846	2003	97	1,109
2009	2006	744	2005	629	2004	0	1,373
2010	2007	37	2006	1,397	2005	42	1,476
2011	2008	1,316	2007	973	2006	92	2,381

<sup>1</sup> No sport harvest season was opened.

**Appendix Table 8.** Number of Dworshak NFH spring Chinook salmon harvested in each ocean age class by return year from 1987 to 2011, by Tribal fishermen in the Clearwater River, Idaho (Nez Perce Tribal Fishery Resource Management Department data reports on file with the Idaho FRO).

Return Year	<u>1-Ocean Returns</u>		<u>2-Ocean Returns</u>		<u>3-Ocean Returns</u>		Total Harvest
	Brood Year	Number	Brood Year	Number	Brood Year	Number	
1987	1984	2	1983	128	1982	30	160
1988	1985	19	1984	70	1983	151	240
1989	1986	31	1985	270	1984	45	346
1990	1987	2	1986	478	1985	34	514
1991	1988	0	1987	0	1986	0	0
1992	1989	10	1988	131	1987	19	160
1993	1990	0	1989	24	1988	19	43
1994	1991	0	1990	0	1989	0	0
1995	1992	0	1991	0	1990	0	0
1996	1993	7	1992	16	1991	1	24
1997	1994	3	1993	635	1992	197	835
1998	1995	2	1994	35	1993	145	182
1999	1996	30	1995	4	1994	2	36
2000	1997	82	1996	1,056	1995	35	1,173
2001	1998	5	1997	425	1996	101	531
2002	1999	24	1998	548	1997	222	794
2003	2000	246	1999	202	1998	997	1,445
2004	2001	25	2000	369	1999	25	419
2005	2002	8	2001	80	2000	14	102
2006	2003	20	2002	329	2001	43	392
2007	2004	65	2003	78	2002	55	198
2008	2005	21	2004	125	2003	13	159
2009	2006	97	2005	221	2004	36	354
2010	2007	17	2006	779	2005	281	1,077
2011	2008	449	2007	361	2006	133	943

**Appendix Table 9.** Number of Kooskia NFH spring Chinook salmon harvested in each ocean age class by return year from 1997 to 2011, by sports fishermen in the Clearwater River, Idaho (Idaho Department of Fish and Game data reports on file with the Idaho FRO).

Return Year	<u>1-Ocean Returns</u>		<u>2-Ocean Returns</u>		<u>3-Ocean Returns</u>		Total Harvest
	Brood Year	Number	Brood Year	Number	Brood Year	Number	
1997	1994	0	1993	45	1992	0	45
1998	1995	0	1994	0	1993	0	0
1999	1996	ns <sup>1</sup>	1995	ns	1994	ns	ns
2000	1997	0	1996	21	1995	0	21
2001	1998	21	1997	5,139	1996	1,237	6,397
2002	1999	8	1998	1,292	1997	244	1,544
2003	2000	15	1999	40	1998	371	426
2004	2001	34	2000	2,096	1999	65	2,195
2005	2002	0	2001	43	2000	10	53
2006	2003	0	2002	53	2001	20	73
2007	2004	85	2003	43	2002	0	128
2008	2005	57	2004	546	2003	20	623
2009	2006	79	2005	109	2004	0	188
2010	2007	28	2006	1,261	2005	38	1,327
2011	2008	819	2007	755	2006	71	1,645

<sup>1</sup> No sport harvest season was opened.

**Appendix Table 10.** Number of Kooskia NFH Spring Chinook salmon harvested in each ocean age class by return year from 1987 to 2011, by Tribal fishermen in the Clearwater River, Idaho (Nez Perce Tribal Fishery Resource Management Department data reports on file with the Idaho FRO).

Return Year	<u>1-Ocean Returns</u>		<u>2-Ocean Returns</u>		<u>3-Ocean Returns</u>		Total Harvest
	Brood Year	Number	Brood Year	Number	Brood Year	Number	
1987	1984	1	1983	44	1982	5	50
1988	1985	5	1984	44	1983	23	72
1989	1986	6	1985	43	1984	9	58
1990	1987	1	1986	105	1985	24	130
1991	1988	0	1987	0	1986	0	0
1992	1989	0	1988	0	1987	0	0
1993	1990	0	1989	0	1988	0	0
1994	1991	0	1990	0	1989	0	0
1995	1992	0	1991	0	1990	0	0
1996	1993	0	1992	0	1991	0	0
1997	1994	0	1993	11	1992	1	12
1998	1995	1	1994	9	1993	10	20
1999	1996	1	1995	0	1994	0	1
2000	1997	6	1996	4	1995	0	10
2001	1998	8	1997	793	1996	33	834
2002	1999	7	1998	560	1997	116	683
2003	2000	16	1999	12	1998	136	164
2004	2001	8	2000	370	1999	11	389
2005	2002	19	2001	130	2000	24	173
2006	2003	1	2002	60	2001	4	65
2007	2004	73	2003	42	2002	51	166
2008	2005	17	2004	104	2003	11	132
2009	2006	12	2005	94	2004	17	123
2010	2007	12	2006	1,072	2005	72	1,156
2011	2008	58	2007	200	2006	50	308

**Appendix Table 11.** Numbers of Dworshak NFH adult spring Chinook salmon returning to the hatchery rack, the sport harvest, the Tribal harvest, and the escapement , by ocean age class, for return years 1984 to 2011.

Return Year	1-Ocean					2-Ocean					3-Ocean					Grand Total
	Rack	Tribal Harvest	Sport Harvest <sup>1</sup>	Escape <sup>2</sup>	Total	Rack	Tribal Harvest	Sport Harvest <sup>1</sup>	Escape <sup>2</sup>	Total	Rack	Tribal Harvest	Sport Harvest <sup>1</sup>	Escape <sup>2</sup>	Total	
1984	14	0	ns	na	14	52	0	ns	na	52	16	0	ns	na	16	82
1985	13	0	ns	na	13	285	0	ns	na	285	36	0	ns	na	36	334
1986	78	0	ns	na	78	346	0	ns	na	346	91	0	ns	na	91	515
1987	25	2	ns	na	27	1,614	128	ns	na	1,742	378	30	ns	na	408	2,177
1988	163	19	ns	na	182	569	70	ns	na	639	1,240	151	ns	na	1,391	2,212
1989	156	31	ns	na	187	1,323	270	ns	na	1,593	221	45	ns	na	266	2,046
1990	7	2	ns	na	9	1,899	478	ns	na	2,377	136	34	ns	na	170	2,556
1991	16	0	ns	na	16	77	0	ns	na	77	72	0	ns	na	72	165
1992	24	10	ns	na	34	303	131	ns	na	434	43	19	ns	na	62	530
1993	9	0	ns	na	9	454	24	ns	na	478	360	19	ns	na	378	866
1994	3	0	ns	na	3	30	0	ns	na	30	41	0	ns	na	41	74
1995	83	0	ns	na	83	36	0	ns	na	36	6	0	ns	na	6	125
1996	275	7	ns	na	282	663	16	ns	na	679	25	1	ns	na	26	987
1997	12	3	0	na	15	2,394	635	693	na	3,722	744	197	ns	na	941	4,678
1998	11	2	0	na	13	176	35	63	na	274	728	145	36	na	909	1,196
1999	670	30	ns	na	700	78	4	ns	na	82	52	2	ns	na	54	836
2000	233	82	222	na	537	2,866	1,056	3,766	na	7,688	103	35	107	na	245	8,470
2001	36	5	28	na	69	3,235	425	6,712	na	10,372	747	101	1,615	na	2,463	12,904
2002	62	24	19	na	105	1,480	548	2,963	na	4,991	615	222	560	na	1,397	6,493
2003	580	246	78	na	904	478	202	212	na	892	2,364	997	1,938	na	5,299	7,095
2004	142	25	56	na	223	2,077	369	3,445	na	5,891	137	25	107	na	269	6,383
2005	74	8	3	na	85	686	80	494	na	1,260	122	14	109	na	245	1,590

<sup>1</sup> ns indicates that there was no season opened that year.

<sup>2</sup> Estimates of escapement are not available and were not calculated for years 1987 to 2008.

**Appendix Table 11. (Cont.)**

Return Year	1-Ocean					2-Ocean					3-Ocean					Grand Total
	Rack	Tribal Harvest	Sport Harvest <sup>1</sup>	Escape <sup>2</sup>	Total	Rack	Tribal Harvest	Sport Harvest <sup>1</sup>	Escape <sup>2</sup>	Total	Rack	Tribal Harvest	Sport Harvest <sup>1</sup>	Escape <sup>2</sup>	Total	
2006	62	20	4	na	86	1,136	329	585	na	2,050	156	43	0	na	199	2,335
2007	702	65	0	na	767	809	78	148	na	1,035	599	55	108	na	762	2,564
2008	319	21	166	na	506	1,201	125	846	na	2,172	337	13	97	na	447	3,125
2009	726	97	744	280	1,847	1,200	221	629	466	2,516	245	36	0	102	383	4,746
2010	142	17	37	231	427	798	779	1,397	2,692	5,666	285	281	42	249	857	6,950
2011	289	449	1,316	2,434	4,488	574	361	973	1,385	3,306	212	133	92	559	983	8,777

<sup>1</sup> ns indicates that there was no season opened that year.

<sup>2</sup> Estimates of escapement are not available and were not calculated for years 1987 to 2008.

**Appendix Table 12.** Numbers of Kooskia NFH adult spring Chinook salmon returning to the hatchery rack, the sport harvest, the Tribal harvest, and the escapement, by ocean age class, for return years 1972 to 2011.

Return Year	<u>1-Ocean</u>					<u>2-Ocean</u>					<u>3-Ocean</u>					Grand Total
	Rack	Tribal	Sport	Escape	Total	Rack	Tribal	Sport	Escape	Total	Rack	Tribal	Sport	Escape	Total	
	Harvest		Harvest			Harvest		Harvest			Harvest		Harvest			
1972	5	na	na	na	5	0	na	na	na	0	0	na	na	na	0	5
1973	5	na	na	na	5	45	na	na	na	45	0	na	na	na	0	50
1974	16	na	na	na	16	35	na	na	na	35	2	na	na	na	2	53
1975	15	na	na	na	15	284	na	na	na	284	27	na	na	na	27	326
1976	409	na	na	na	409	286	na	na	na	286	106	na	na	na	106	801
1977	333	na	na	na	333	2,539	na	na	na	2,539	154	na	na	na	154	3,026
1978	23	na	na	na	23	1,676	na	na	na	1,676	336	na	na	na	336	2,035
1979	11	na	na	na	11	100	na	na	na	100	264	na	na	na	264	375
1980	9	na	na	na	9	55	na	na	na	55	3	na	na	na	3	67
1981	1	na	na	na	1	168	na	na	na	168	78	na	na	na	78	247
1982	3	na	na	na	3	116	na	na	na	116	139	na	na	na	139	258
1983	1	na	na	na	1	231	na	na	na	231	141	na	na	na	141	373
1984	55	na	na	na	55	80	na	na	na	80	206	na	na	na	206	341
1985	26	na	na	na	26	449	na	na	na	449	54	na	na	na	54	529
1986	21	na	na	na	21	159	na	na	na	159	103	na	na	na	103	283
1987	16	1	na	na	17	607	44	na	na	651	64	5	na	na	69	737
1988	39	5	na	na	44	363	44	na	na	407	193	23	na	na	216	667
1989	108	6	na	na	114	722	43	na	na	765	143	9	na	na	152	1,031
1990	11	1	na	na	12	921	105	na	na	1,026	209	24	na	na	233	1,271
1991	10	na	na	na	10	100	na	na	na	100	357	na	na	na	357	467
1992	15	na	na	na	15	256	na	na	na	256	41	na	na	na	41	312
1993	11	na	na	na	11	756	na	na	na	756	413	na	na	na	413	1,180
1994	1	na	na	na	1	96	na	na	na	96	135	na	na	na	135	232

**Appendix Table 12. (Cont.)**

Return Year	<u>1-Ocean</u>					<u>2-Ocean</u>					<u>3-Ocean</u>					Grand Total
	Rack	Tribal	Sport	Escape	Total	Rack	Tribal	Sport	Escape	Total	Rack	Tribal	Sport	Escape	Total	
	Harvest		Harvest			Harvest		Harvest			Harvest		Harvest			
1995	21	na	na	na	21	7	na	na	na	7	12	na	na	na	12	40
1996	86	na	na	na	86	113	na	na	na	113	3	na	na	na	3	202
1997	7	0	0	na	7	1,523	11	45	na	1,579	127	1	0	na	128	1,714
1998	1	1	1	na	2	200	9	0	na	209	207	10	0	na	217	428
1999	72	1	1	na	73	28	0	0	na	28	57	0	0	na	57	158
2000	966	6	6	na	972	604	4	21	na	45	11	0	0	na	11	1,612
2001	28	8	8	na	57	2,137	793	5,139	na	8,069	96	33	1,237	na	1,366	9,492
2002	14	7	7	na	29	852	560	1,292	na	2,704	171	116	244	na	531	3,264
2003	97	16	16	na	128	71	12	40	na	123	797	136	371	na	1,304	1,555
2004	15	8	8	na	57	682	370	2,096	na	3,148	21	11	65	na	97	3,302
2005	29	19	19	na	48	202	130	43	na	375	39	24	10	na	73	496
2006	7	1	1	na	8	617	60	53	na	730	46	4	20	na	70	808
2007	257	73	73	na	415	148	42	43	na	233	184	51	0	na	235	883
2008	107	17	17	na	181	647	104	546	na	1,297	62	11	20	na	93	1,571
2009	155	12	12	na	246	370	94	109	na	573	65	17	0	na	82	901
2010	27	12	12	195	262	731	1,072	1,261	371	3,435	49	72	38	72	231	3,928
2011	425	58	819	2,718	4,020	565	200	755	997	2,517	155	50	71	na	276	6,813

**Appendix Table 13.** Brood Year, release year, number of smolts released, and the numbers of 1-ocean adult returns to the Clearwater River for Dworshak NFH Brood Years 1981 to 2009 broken down by the various run components.

Brood Year	Release Year	Smolts Released	1-Ocean Returns					Total
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	
1981	1983	549,023	1984	14	0	ns	na	14
1982	1984	260,519	1985	13	0	ns	na	13
1983	1985	1,137,139	1986	78	0	ns	na	78
1984	1986	670,606	1987	25	2	ns	na	27
1985	1987	1,710,710	1988	163	19	ns	na	182
1986	1988	1,547,219	1989	156	31	ns	na	187
1987	1989	1,651,472	1990	7	2	ns	na	9
1988	1990	1,251,247	1991	16	0	ns	na	16
1989	1991	1,094,884	1992	24	10	ns	na	34
1990	1992	959,369	1993	9	0	ns	na	9
1991	1993	7,222	1994	3	0	ns	na	3
1992	1994	1,278,273	1995	83	0	ns	na	83
1993	1995	1,311,445	1996	275	7	ns	na	282
1994	1996	102,903	1997	12	3	0	na	15
1995	1997	53,078	1998	11	2	0	na	13
1996	1998	973,400	1999	670	30	ns	na	700
1997	1999	1,044,511	2000	233	82	222	na	537
1998	2000	1,017,873	2001	36	5	28	na	69
1999	2001	333,120	2002	62	24	19	na	105
2000	2002	1,000,561	2003	580	246	78	na	904
2001	2003	1,033,982	2004	142	25	56	na	223
2002	2004	1,078,923	2005	74	8	3	na	85
2003	2005	1,072,359	2006	62	20	4	na	86
2004	2006	1,007,738	2007	702	65	0	na	767
2005	2007	963,211	2008	319	21	166	na	506
2006	2008	939,000	2009	726	97	744	280	1,847
2007	2009	1,014,748	2010	142	17	37	231	427
2008	2010	1,109,195	2011	289	449	1,316	2,434	4,488
2009	2011	1,078,250						

**Appendix Table 14.** Brood Year, release year, number of smolts released, and the numbers of 2-ocean adult returns to the Clearwater River for Dworshak NFH Brood Years 1981 to 2009 broken down by the various run components.

Brood Year	Release Year	Smolts Released	2-Ocean Returns					Total
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	
1981	1983	549,023	1985	285	0	ns	na	285
1982	1984	260,519	1986	346	0	ns	na	346
1983	1985	1,137,139	1987	1,614	128	ns	na	1,742
1984	1986	670,606	1988	569	70	ns	na	639
1985	1987	1,710,710	1989	1,323	270	ns	na	1,593
1986	1988	1,547,219	1990	1,899	478	ns	na	2,377
1987	1989	1,651,472	1991	77	0	ns	na	77
1988	1990	1,251,247	1992	303	131	ns	na	434
1989	1991	1,094,884	1993	454	24	ns	na	478
1990	1992	959,369	1994	30	0	ns	na	30
1991	1993	7,222	1995	36	0	ns	na	36
1992	1994	1,278,273	1996	663	16	ns	na	679
1993	1995	1,311,445	1997	2,394	635	693	na	3,722
1994	1996	102,903	1998	176	35	63	na	274
1995	1997	53,078	1999	78	4	ns	na	82
1996	1998	973,400	2000	2,866	1,056	3,766	na	7,688
1997	1999	1,044,511	2001	3,235	425	6,712	na	10,372
1998	2000	1,017,873	2002	1,480	548	2,963	na	4,991
1999	2001	333,120	2003	478	202	212	na	892
2000	2002	1,000,561	2004	2,077	369	3,445	na	5,891
2001	2003	1,033,982	2005	686	80	494	na	1,260
2002	2004	1,078,923	2006	1,136	329	585	na	2,050
2003	2005	1,072,359	2007	809	78	148	na	1,035
2004	2006	1,007,738	2008	1,201	125	846	na	2,172
2005	2007	963,211	2009	1,200	221	629	466	2,516
2006	2008	939,000	2010	798	779	1,397	2,692	5,666
2007	2009	1,014,748	2011	574	361	973	1,398	3,306
2008	2010	1,109,195						
2009	2011	1,078,250						

**Appendix Table 15.** Brood Year, release year, number of smolts released, and the numbers of 3-ocean adult returns to the Clearwater River for Dworshak NFH Brood Years 1981 to 2009 broken down by the various run components.

Brood Year	Release Year	Smolts Released	3-Ocean Returns					Total
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	
1981	1983	549,023	1986	91	0	ns	na	91
1982	1984	260,519	1987	378	30	ns	na	408
1983	1985	1,137,139	1988	1,240	151	ns	na	1,391
1984	1986	670,606	1989	221	45	ns	na	266
1985	1987	1,710,710	1990	136	34	ns	na	170
1986	1988	1,547,219	1991	72	0	ns	na	72
1987	1989	1,651,472	1992	43	19	ns	na	62
1988	1990	1,251,247	1993	360	19	ns	na	378
1989	1991	1,094,884	1994	41	0	ns	na	41
1990	1992	959,369	1995	6	0	ns	na	6
1991	1993	7,222	1996	25	1	ns	na	26
1992	1994	1,278,273	1997	744	197	0	na	941
1993	1995	1,311,445	1998	728	145	36	na	909
1994	1996	102,903	1999	52	2	ns	na	54
1995	1997	53,078	2000	103	35	107	na	245
1996	1998	973,400	2001	747	101	1,615	na	2,463
1997	1999	1,044,511	2002	615	222	560	na	1,397
1998	2000	1,017,873	2003	2,364	997	1,938	na	5,299
1999	2001	333,120	2004	137	25	107	na	269
2000	2002	1,000,561	2005	122	14	109	na	245
2001	2003	1,033,982	2006	156	43	0	na	199
2002	2004	1,078,923	2007	599	55	108	na	762
2003	2005	1,072,359	2008	337	13	97	na	447
2004	2006	1,007,738	2009	245	36	0	102	383
2005	2007	963,211	2010	285	281	42	249	857
2006	2008	939,000	2011	212	133	92	546	983
2007	2009	1,014,748						
2008	2010	1,109,195						
2009	2011	1,078,250						

**Appendix Table 16.** Brood Year, release year, number of smolts released, and the numbers of 1-ocean adult returns to the Clearwater River for Kooskia NFH Brood Years 1970 to 2009 broken down by the various run components.

Brood Year	Release Year	Smolts Released	1-Ocean Returns					Total
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	
1970	1972	96,032	1973	5	0	ns	na	5
1971	1973	356,190	1974	16	0	ns	na	16
1972	1974	303,800	1975	15	0	ns	na	15
1973	1975	802,100	1976	409	0	ns	na	409
1974	1976	972,200	1977	333	0	ns	na	333
1975	1977	140,000	1978	23	0	ns	na	23
1976	1978	297,897	1979	11	0	ns	na	11
1977	1979	301,029	1980	9	0	ns	na	9
1978	1980	766,946	1981	1	0	ns	na	1
1979	1981	382,720	1982	3	0	ns	na	3
1980	1982	496,796	1983	1	0	ns	na	1
1981	1983	156,915	1984	55	0	ns	na	55
1982	1984	237,711	1985	26	0	ns	na	26
1983	1985	301,753	1986	21	0	ns	na	21
1984	1986	351,405	1987	16	1	ns	na	17
1985	1987	763,900	1988	39	5	ns	na	44
1986	1988	778,407	1989	108	6	ns	na	114
1987	1989	384,235	1990	11	1	ns	na	12
1988	1990	403,701	1991	10	0	ns	na	10
1989	1991	396,619	1992	15	0	ns	na	15
1990	1992	727,251	1993	11	0	ns	na	11
1991	1993	343,437	1994	1	0	ns	na	1
1992	1994	305,813	1995	21	0	ns	na	21
1993	1995	722,906	1996	86	0	ns	na	86
1994	1996	333,794	1997	7	0	0	na	7
1995	1997	16,598	1998	1	1	0	na	2
1996	1998	76,846	1999	72	1	ns	na	73
1997	1999	684,165	2000	966	6	0	na	972
1998	2000	449,094	2001	28	8	21	na	57
1999	2001	80,430	2002	14	7	8	na	29

**Appendix Table 16.** (Continued).

Brood Year	Release Year	Smolts Released	1-Ocean Returns					
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	Total
2000	2002	549,861	2003	97	16	15	na	128
2001	2003	597,063	2004	15	8	34	na	57
2002	2004	643,503	2005	29	19	0	na	48
2003	2005	624,967	2006	7	1	0	na	8
2004	2006	637,334	2007	257	73	85	na	415
2005	2007	569,565	2008	107	17	57	na	181
2006	2008	649,601	2009	155	12	79	na	246
2007	2009	603,679	2010	27	12	28	na	262
2008	2010	632,330	2011	425	58	819	2,718	4,020
2009	2011	657,267						

**Appendix Table 17.** Brood Year, release year, number of smolts released, and the numbers of 2-ocean adult returns to the Clearwater River for Kooskia NFH Brood Years 1970 to 2009 broken down by the various run components.

Brood Year	Release Year	Smolts Released	2-Ocean Returns					Total
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	
1970	1972	96,032	1974	35	0	ns	na	35
1971	1973	356,190	1975	284	0	ns	na	284
1972	1974	303,800	1976	286	0	ns	na	286
1973	1975	802,100	1977	2,539	0	ns	na	2,539
1974	1976	972,200	1978	1,676	0	ns	na	1,676
1975	1977	140,000	1979	100	0	ns	na	100
1976	1978	297,897	1980	55	0	ns	na	55
1977	1979	301,029	1981	168	0	ns	na	168
1978	1980	766,946	1982	116	0	ns	na	116
1979	1981	382,720	1983	231	0	ns	na	231
1980	1982	496,796	1984	80	0	ns	na	80
1981	1983	156,915	1985	449	0	ns	na	449
1982	1984	237,711	1986	159	0	ns	na	159
1983	1985	301,753	1987	607	44	ns	na	651
1984	1986	351,405	1988	363	44	ns	na	407
1985	1987	763,900	1989	722	43	ns	na	765
1986	1988	778,407	1990	921	105	ns	na	1,026
1987	1989	384,235	1991	100	0	ns	na	100
1988	1990	403,701	1992	256	0	ns	na	256
1989	1991	396,619	1993	756	0	ns	na	756
1990	1992	727,251	1994	96	0	ns	na	96
1991	1993	343,437	1995	7	0	ns	na	7
1992	1994	305,813	1996	113	0	ns	na	113
1993	1995	722,906	1997	1,523	11	45	na	1,579
1994	1996	333,794	1998	200	9	0	na	209
1995	1997	16,598	1999	28	0	ns	na	28
1996	1998	76,846	2000	604	4	21	na	45
1997	1999	684,165	2001	2,137	793	5,139	na	8,069
1998	2000	449,094	2002	852	560	1,292	na	2,704
1999	2001	80,430	2003	71	12	40	na	123

**Appendix Table 17.** (Continued).

Brood Year	Release Year	Smolts Released	2-Ocean Returns					
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	Total
2000	2002	549,861	2004	682	370	2,096	na	3,148
2001	2003	597,063	2005	202	130	43	na	375
2002	2004	643,503	2006	617	60	53	na	730
2003	2005	624,967	2007	148	42	43	na	233
2004	2006	637,334	2008	647	104	546	na	1,297
2005	2007	569,565	2009	370	94	109	na	573
2006	2008	649,601	2010	731	1,072	1,261	371	3,435
2007	2009	603,679	2011	565	200	755	997	2,517
2008	2010	632,330						
2009	2011	657,267						

**Appendix Table 18.** Brood Year, release year, number of smolts released, and the numbers 3-ocean adult returns to the Clearwater River for Kooskia NFH Brood Years 1970 to 2009 broken down by the various run components.

Brood Year	Release Year	Smolts Released	3-Ocean Returns					Total
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	
1970	1972	96,032	1975	27	0	ns	na	27
1971	1973	356,190	1976	106	0	ns	na	106
1972	1974	303,800	1977	154	0	ns	na	154
1973	1975	802,100	1978	336	0	ns	na	336
1974	1976	972,200	1979	264	0	ns	na	264
1975	1977	140,000	1980	3	0	ns	na	3
1976	1978	297,897	1981	78	0	ns	na	78
1977	1979	301,029	1982	139	0	ns	na	139
1978	1980	766,946	1983	141	0	ns	na	141
1979	1981	382,720	1984	206	0	ns	na	206
1980	1982	496,796	1985	54	0	ns	na	54
1981	1983	156,915	1986	103	0	ns	na	103
1982	1984	237,711	1987	64	5	ns	na	69
1983	1985	301,753	1988	193	23	ns	na	216
1984	1986	351,405	1989	143	9	ns	na	152
1985	1987	763,900	1990	209	24	ns	na	233
1986	1988	778,407	1991	357	0	ns	na	357
1987	1989	384,235	1992	41	0	ns	na	41
1988	1990	403,701	1993	413	0	ns	na	413
1989	1991	396,619	1994	135	0	ns	na	135
1990	1992	727,251	1995	12	0	ns	na	12
1991	1993	343,437	1996	3	0	ns	na	3
1992	1994	305,813	1997	127	1	0	na	128
1993	1995	722,906	1998	207	10	0	na	217
1994	1996	333,794	1999	57	0	ns	na	57
1995	1997	16,598	2000	11	0	0	na	11
1996	1998	76,846	2001	96	33	1,237	na	1,366
1997	1999	684,165	2002	171	116	244	na	531
1998	2000	449,094	2003	797	136	371	na	1,304
1999	2001	80,430	2004	21	11	65	na	97

**Appendix Table 18.** (Continued)

Brood Year	Release Year	Smolts Released	3-Ocean Returns					
			Return Year	Rack	Tribal Harvest	Sport Harvest	Escape	Total
2000	2002	549,861	2005	39	24	10	na	73
2001	2003	597,063	2006	46	4	20	na	70
2002	2004	643,503	2007	184	51	0	na	235
2003	2005	624,967	2008	62	11	20	na	93
2004	2006	637,334	2009	65	17	0	na	82
2005	2007	569,565	2010	49	72	38	72	231
2006	2008	649,601	2011	155	50	71	na	276
2007	2009	603,679						
2008	2010	632,330						
2009	2011	657,267						